



Sustainability Report

SDG Goal-1- Research on Poverty

1.1 No Poverty

Education is vital for reducing poverty, and each educational institution has a significant impact on this parameter by helping the underprivileged students to rise above their socioeconomic status. A higher degree of education significantly reduces the probability of poverty in the household as it provides the basis for economic prosperity and the end of poverty.

Global sustainable development is what humanity as a whole strives for. The 2030 Sustainable Development Goals, which include "Zero Hunger" and "No Poverty," are being approached by all countries with increasing success. Addressing the issues affecting agricultural and food systems globally requires sustainable growth in agricultural productivity to eradicate poverty.

No Poverty: Research Publications

Given its potential to promote social mobility and personal growth, education and educational institutions play significant part in the quest to eradicate poverty.

To contend with "No poverty" 27 numbers of research papers representing agriculture and sustainable development in several disciplines have been published by the Karunya Institute of Technology and Sciences.

List of Publications related to "No Poverty"

S.No	Title of the Papers	Authors	Subject Domain	Vol	Issue	Year	DOI
1	Recognition of bloom/ yield in crop images using deep learning models for smart agriculture: A review	Darwin, B.Dharmaraj, P.Prince, S. Popescu, D.E.Hemanth, D.J.	Agronomy	11	4	2021	10.3390/agronomy11040646

2	Microbial disease management in agriculture: Current status and future prospects	Sara, D. Mandava, A.K. Kumar, A. Duela, S. Jude, A.	Biocatalysis and Agricultural Biotechnology	23	-	2020	10.1016/j.bcab.2019.101468
3	Hormonal crosstalk in regulating salinity stress tolerance in graminaceous crops	Choudhary, P. Pramitha, L. Rana, S. Verma, S. Aggarwal, P.R. Muthamilarasan, M.	Physiologia Plantarum	173	4	2021	10.1111/pp.1.13558
4	Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and SDG2	Shams Esfandabadi, H. Ghamary As, M. Shams Esfandabadi, Z. Gautam, S. Ranjbari, M.	British Food Journal	124	12	2022	10.1108/BFJ-08-2021-0872
5	Futuristic IoT based Smart Precision Agriculture: Brief Analysis	Swamidason, I.T.J. Pandiyarajan, S. Velswamy, K. Leela Jancy, P.	Journal of Mobile Multimedia	18	3	2022	10.13052/jmm1550-4646.18323
6	Novel Approach for Effective Crop Production using Machine Learning: A Novel Approach for Effective Crop Production using Machine Learning	Chowdary, V.T. Robinson Joel, M. Ebenezer, V. Edwin, B. Thanka, R. Jeyaraj, A.	Proceedings of the International Conference on Electronics and Renewable Systems, ICEARS 2022	-	-	2022	10.1109/ICEARS53579.2022.9751798
7	Scope and recent trends of artificial intelligence in Indian agriculture	Mary, X.A. Popov, V. Raimond, K.Johnson, I. Vijay, S.J.	The Digital Agricultural Revolution: Innovations and Challenges in Agriculture through Technology Disruptions	-	-	2022	10.1002/9781119823469.ch1
8	Clustering and principal component analysis of traditional rice landraces grown under in vitro moisture stress condition	Anupriya, R.Geetha, S. Rajakumar, D. Senthil, S.A. Thankappan, S. Binodh, A.K.	Plant Cell Biotechnology and Molecular Biology	21	42	2020	-

9	Drought prediction using artificial neural network	Metta, P.S. Chintamaneni, A. Kumar, A.Yadav, J. Kumar, V. Bhaskar, B.	2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering, ICACITE 2022	-	-	2022	10.1109/I CACITE5 3722.2022 .9823838
10	Biofertilizers: A Sustainable Approach Towards Enhancing the Agricultural Productivity	Mohanty, S.S 2	Biomolecular Engineering Solutions for Renewable Specialty Chemicals: Microorganisms, Products, and Processes	-	-	2021	10.1002/9 78111977 1951.ch12
11	Comparative Study on Recognition of Food Item from Images for Analyzing the Nutritional Contents	Sreetha, E.S. Naveen Sundar, G. Narmadha, D.	Lecture Notes in Electrical Engineering	905	-	2022	10.1007/9 78-981- 19-2177- 3_27
12	Enabling technologies for future robotic agriculture systems: A case study in Indian scenario	Mary, X.A. Mani, K. Raimond, K. Johnson, I. Dinesh Kumar, P.	The Digital Agricultural Revolution: Innovations and Challenges in Agriculture through Technology Disruptions	-	-	2022	10.1002/9 78111982 3469.ch4
13	Performance of black rice (Oryza sativa) varieties grown in Namsai district of Arunachal Pradesh, India	Sangma, R.R. Manpoong, C. Sharma, A. Devadas, V.S.Singh, D. Pandey, H.	Research on Crops	23	1	2022	10.31830/ 2348- 7542.2022 .002
14	Integrating Genomics and Phenomics Tools to Dissect Climate Resilience Traits in Small Millets	Pramitha, L. Choudhary, P.Das, P. Sharma, S. Karthi, V. Vemuri, H. Muthamilarasan, M.	Omics of Climate Resilient Small Millets	-	-	2022	10.1007/9 78-981- 19-3907- 5_14

15	A preliminary study on design of a modular agricultural mobile robot	Vishal, R.Mahanta, G.B.	AIP Conference Proceedings	2670	-	2022	10.1063/5.0132101
16	An analysis of total factor productivity of cotton in Tamil Nadu	Kavitha, V. Usha Nandhini, S. David Chella Baskar, V.	Ecology, Environment and Conservation	27	1	2021	-
17	A preliminary study on autonomous drone systems for agriculture pesticide spraying	Vishal, R. Mahanta, G.B.	AIP Conference Proceedings	2670	-	2022	10.1063/5.0116467
18	Genomic designing for biotic stress tolerance in Foxtail Millet (Setaria italica L.)	Rana, S. Pramitha, L. Aggarwal, P.R. Muthamilarasan, M.	Genomic Designing for Biotic Stress Resistant Cereal Crops	-	-	2021	10.1007/978-3-030-75879-0_7
19	Impact of Plant Health on Global Food Security: A Holistic View	Srinivasan, T.S. Thankappan, S. Balasubramaniam, M. Bhaskar, V.	Agriculture, Environment and Sustainable Development: Experiences and Case Studies	-	-	2022	10.1007/978-3-031-10406-0_4
20	Impact of IoT based Autonomous Farming Equipment on Crop Culture and Management in the Agricultural Sector	Kumar, N. Singh, A. Das, D. Srivastava, D.Talari, V.S.R. Kurukwar, A.D.	International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings	-	-	2022	10.1109/ICECAA55415.2022.9936243
21	Drip Fertigation with Fertilizer Prescription Through STCR—IPNS—A Way Forward Towards Climate Change Mitigation	Rangasamy, S. Subramaniam, M.Stephen, P.K. Dey, P.	Lecture Notes in Civil Engineering	176	-	2022	10.1007/978-981-16-4629-4_52
22	Arduino based low-cost greenhouse monitoring system for small scale farmers	Anisha, M. Arsad, U.M. Starly, P.J. Dhanalakshmi, K. Anitha, S. Benisha, M. Chezhiyan, P. Elliot, C.J.	Proceedings of the 3rd International Conference on Intelligent Communication Technologies	-	-	2021	10.1109/IICV50876.2021.9388402

			and Virtual Mobile Networks, ICICV 2021				
23	In vitro bio-efficacy of biocontrol agents and oil cakes against <i>Pythium aphanidermatum</i> from tomato	Madhumitha, B. Gnanaprakash, S.Jayapradha, C. Thankappan, S. Rathikannu, S. Priyanga, T.	Journal of Environmental Biology	43	6	2022	10.22438/jeb/43/6/MRN-3032
24	An Investigation on Impact of Malnutrition in Human Health and Technique to Evaluate the Nutrient Intake from the Food Image	Sreetha, E.S.Sundar, G.N Narmadha, D.	2022 IEEE International Power and Renewable Energy Conference, IPRECON 2022	-	-	2022	10.1109/IPRECON55716.2022.10059560
25	Approaches to Plant Nutrient Management Through Fertilization in India: Then, Now and the Future	Praveena Katharine, S. Suguna Devakumari, M.	Reviews in Agricultural Science	10	-	2022	10.7831/ras.10.0_1
26	An analysis on farmers awareness and perception towards Pradhan Mantri Fasal Bima Yojana Scheme in Coimbatore District of Tamil Nadu	Kavitha, V. Nandhini, S.U.	International Journal of Agricultural and Statistical Sciences	18	2	2022	-
27	A study on organic produce marketing in Coimbatore district of Tamil Nadu	Kavitha, V. Chandran, K. Usha Nandhini, S.	Plant Archives	20	-	2020	-

1.2 Proportion of Students Receiving Financial Aid to Attend University because of Poverty.

Low-Income Students Receiving Financial Aid.

KITS provides financial assistance to low-income students to empower them with education and employment. This fellowship encourages bright young minds to achieve academic excellence and grow into contributing members of society.

Total number of students benefited by scholarships and free ships provided by the institution, Government and non-government agencies (NGOs) during the year (other than the students receiving scholarships under the government schemes for reserved categories) are listed below.

(AY 2021-22)									
Year	Name of the scheme	No. of students benefited by government scheme and amount		No. of students benefited by the institution's schemes and amount		No. of students benefited by the non-government agencies (NGOs) and amount			Link to relevant document
		No. of students	Amount	No. of students	Amount (Rs)	No. of students	Amt.	Name of the NGO /agency	
2021-2022	Institutional Merit Scholarship	-	-	1744	83440000 & USD 42100	-	-	-	https://www.karunya.edu/aqar/2021-22/CRITERION_V/5.1.1/a.pdf
2021-2022	Institutional - Student Benevolent Fund Scholarship	-	-	17	1345775	-	-	-	
2021-2022	Institutional GATE Scholarship (Ph.D.)	-	-	1	35000	-	-	-	
2021-2022	Institutional Sports Scholarship	-	-	13	1812126	-	-	-	
2021-2022	TN Govt. Adi-Dravidar Welfare	1	100000	-	-	-	-	-	

	Ph.D. Scholarship							
2021-2022	AICTE – Pragati Scholarship Scheme for Girl Students (Technical Degree)	6	300000	-	-	-	-	-
2021-2022	AICTE – Swanath Scholarship Scheme (Technical Degree)	1	50000	-	-	-	-	-
2021-2022	Central Sector Scheme of Scholarships for College and University Students	13	130000	-	-	-	-	-
2021-2022	Ishan Uday Special Scholarship Scheme for North Eastern Region	2	156000	-	-	-	-	-
2021-2022	Merit-cum-Means Scholarship for Professional and Technical Courses	88	2540000	-	-	-	-	-
2021-2022	PG Scholarship for SC ST Students for pursuing Professional Courses	1	78000	-	-	-	-	-
2021-2022	Post-matric Scholarship Schemes Minorities	33	287100	-	-	-	-	-

2021-2022	Prime Minister's Scholarship Scheme for Central Armed Police Forces and Assam Rifles	6	106000	-	-	-	-	-	
2021-2022	Umbrella Scheme for Education of ST Children - Post-matric Scholarship (PMS) for ST Students - Meghalaya	1	30000	-	-	-	-	-	

1.3 University Anti-Poverty Programmes

Karunya Institute of Technology and Sciences works to lower enrollment barriers and implements policies so that all students, regardless of background or financial status, can receive a top-notch education.

Bottom financial quintile admission target

All students from economically disadvantaged backgrounds who enroll in KITS are assisted in securing bank loans to complete their degree.

Bottom financial quintile student success

95% of the financially aided students enrolled at the university graduate within the specified period of time. In 2022, 4721 students successfully graduated out of 4970 enrolled.

Low-Income Student Support

To alleviate the financial burden of economically disadvantaged students and ensure that they study without interruption, a range of student aid measures are offered to them. These initiatives include student loans, first-girl child scholarships for low-income students, study grants for

first-generation students, reduced tuition or waived fees for students enrolled under sports quota, and a variety of state and private scholarship schemes. Additionally, the institution waives 50% of the fees in the event that the bread-winner of the family passes away accidentally during the course of study period.

Bottom Financial Quintile Student Support

KITS does not prevent admission to students from backgrounds of poverty, However it helps students who are socially and economically challenged to apply for government scholarships such as SC&ST and merit scholarships based on a 2 lakh threshold or lower.

1.4 Community Anti-Poverty Programmes

To fulfil the objectives of community anti-poverty initiatives, KITS offers services to support economically impoverished residents of nearby villages. Additionally, it offers several training programmes, to people who wish to enhance their skill sets and become entrepreneurs to achieve the community anti- poverty program goals.

Programmes for Services Access

Several university-level initiatives aimed at alleviating poverty for the local population include sensitization programmes on two-wheeler engine assembly, tuition centers,3D printing, medical camp; eye-checkup camp, sensitization program on field practices in masonry, bar bending for local community, Manipur relief project, health and hygiene hand wash campaign which are listed below in brief.

Tuition Centers

As there are vulnerable communities living near Karunya University, the Centre for Community Academia and Collaborations (CCAC)renders its helping hand on behalf of the institution. The CCAC division is running 14 free Tuition Centers in the 14 vulnerable areas, 220 students of the downtrodden and tribal communities were benefitted and received school kits, white board sets, mats, and a few playing kits to use their leisure time..

Medical & Eye-Checkup Camps

CCAC has organized free medical camp for local communities residing in Siruvani hills of the Western Ghats. CCAC of KITS in collaboration with Vasan eye care hospitals organized the camp for the needy people on September 25, 2023, at Sadivayal Community Hall, where more than 100 individuals benefited.

Sensitization Program on Field Practices in Masonry and Bar Bending for Local Community

In line with the mission of KITS to contribute to society, the Center for Community Academia Collaborations and the Division of Civil Engineering jointly organized a skill development program on field practices in Masonry and bar bending for rural youth on October 5th, 2023. 10 economically marginalized youths participated in the training.

Manipur Relief Project

CCAC along with Jesus Calls has supported the displaced communities in Manipur state through their relief projects. With the help of the local administration, 4358 people in 58 relief camps in Kangpokpi district, 865 people in 6 relief camps in Imphal district and 5826 in 30 relief camps in Churhandpur district were supported. The Karunya University Coordination committee resolved to support 40 students from Manipur with free education in Engineering.

Health and Hygiene Campaign

The thrust areas of KITS being health care, water, food, and energy, an awareness program on the importance of hand wash was organized for the local communities in Pachinampathy, Perumalkoilpathy, Valayankutai, Govt Primary School and in Seengapathy Govt Residential School. The children were provided with a hygiene kit each consisting of a soap, comb, coconut oil and nail cutter.

Pictures displaying the activities

Tuition Centre



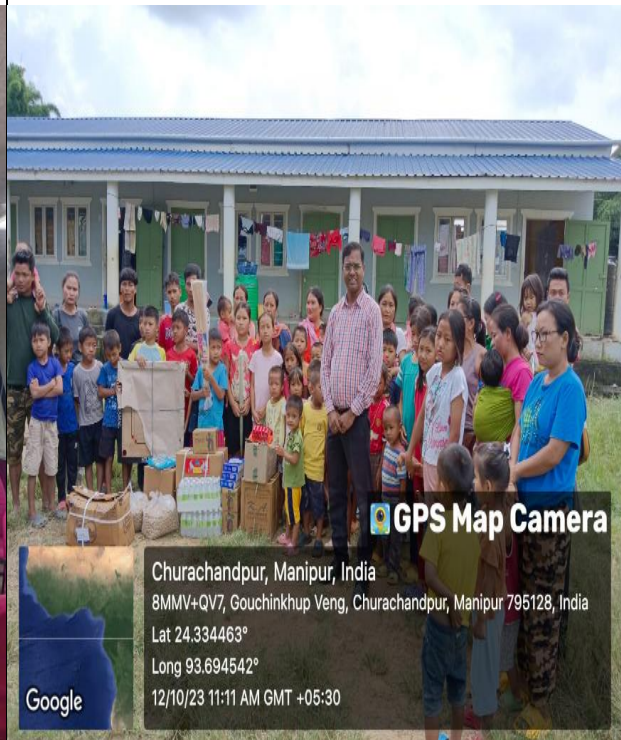
Medical & Eye-Checkup Camps



**Sensitization Program on Field Practices
in Masonry and Bar Bending for Local
Community**



Manipur Relief Project



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Health and Hygiene Campaign



Policy Addressing Poverty:

Since poverty is a crippling force that makes a community and country weak over time, imparting education provides access to a wide range of employment opportunities, skill development and other possibilities for improving the standard of living.

1. Prioritising long-term university plans to help low-income and needy students receive better education.
2. Accelerating research on crop production to help farmers implement technology for effective cultivation in nearby villages.
3. Integrating Agriculture and Engineering research to revolutionize farming practices with IOT and drone technology for enhanced crop yield to alleviate poverty.
4. Equipping low-income students with skills for competitive examinations and placements for the upliftment of their social status



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved

NAAC A++ Accredited

SDG 2- ZERO HUNGER

End hunger, achieve food security, improve nutrition and promote sustainable agriculture.

FAO states that there has been a nearly 50% reduction in the number of people suffering from undernourishment over the past two decades as a result of rapid economic growth and increased agricultural productivity. The Union Minister for Agriculture and Farmers Welfare, Shri Narendra Singh Tomar has said that India, apart from being self-sufficient in food production, has the capacity to meet the food requirements of a large part of the world. Regrettably, extreme hunger and malnutrition continue to pose significant obstacles to development in various regions. The fifth National Family Health Survey (NFHS-5) data, conducted in 2019-21, indicated that among mothers with a child between ages 6-23 months, 18% reported that their child did not eat any food in the 24 hours preceding the survey, referred to as “zero food” (S V Subramanian, Smriti Sharma, Indian Express, May 3, 2023)

The Sustainable Development Goals (SDGs) aspire to eradicate all forms of hunger and malnutrition by 2030, ensuring that everyone, especially children, has access to sufficient and nutritious food throughout the year.

KITS is on a mission to find solutions to human problems in areas relating to Water, Food, Health care and Sustainable Energy through scientific, social and technological research. The university houses 8000 students and 690 faculty and staff on campus representing diverse, cultures, languages and food habits.

Publications related to Zero Hunger: 46 (Annexure-I)

Campus Food Waste:

Campus food waste tracking: Nearly 8000 students reside in the Resident Halls on campus. 20 % of the 2.5 tonnes of food waste per day from both the boys and girls hostels are treated in three biogas plants of 80 m³ capacity. The treated effluent from the biogas plant is diverted to STP in the Bethany Resident Hall for storage and utilized for irrigation/gardening. The gas generated is utilized for cooking. Also, the sludge obtained from STP is disposed on land as bio-fertilizer after composting.

Student Hunger

Student Food Insecurity and Hunger: To address student food insecurity and hunger, awareness of food conservation is generated among the student community. Regular information on preventing food wastage is posted in the WhatsApp group of mess representatives and communicated to all the students.

Students and staff hunger interventions: There are 4 food outlets on the university campus that provide breakfast, lunch and snacks of continental, south Indian and north Indian food cuisine. There are also 4 additional outlets meant for Tea/ Coffee and fresh fruit juices from 09:00 am to 05:00 pm. Students have the choice to select their preferred cuisine from the available Tamil Nadu, South Indian, Andhra, Kerala and NRI mess. Healthy snacks such as green/bengal gram sprouts/boiled peanuts along with Tea/ Milk are served in the evening. Outsourced food outlets for Bakery items, steamed foods,

tender coconut and fresh fruit juices, and beverages also cater to the needs of students and staff. Besides, there are 7 food vending machines on campus for any time access.

Sustainable Food Choices on Campus:

Since students are from different states and abroad, with diverse food cultures, KITS has five types of food mess viz., Tamil Nadu, Kerala, Andhra Pradesh, North India and NRI mess. Sustainable foods are also taking part in the dining of students and staff. As a part of the degree, B.Sc. (Hons.) Agriculture students undergo Experiential Learning Programme (ELP) during the final semester. In the module, mushroom cultivation technology, the harvested mushrooms are value-added and sold to students and staff. Similarly in the food processing technology module, sustainable foods like millet-based value-added products were sold on campus and through a sales counter located at Bethesda.



Mushroom Production by ELP Students



Mushroom Production by ELP Students

Provide healthy and affordable food choices for all on campus.

Every two months, the food menu is revised according to the choice of the students with the recommendation of the mess committee. To ensure hygienic food prepared in the hostels is tested as per the standards. KITS has a sales center for farm produce and farm products at designated locations where all the KITS farm products, including organic fruits and vegetables and healthy food products prepared during ELP modules of B.Sc (Hons.) Agriculture Program is marketed to students and staff at an affordable price.

Proportion of graduates in agriculture and aquaculture including sustainability aspects:

Total number of graduates in Agriculture 2022: 1698

Total number of agriculture graduates in the year 2022: 161

Proportion of graduates in agriculture: 9.48

National Hunger

Access to Food Security Knowledge

Good agricultural practices increase crop productivity thereby food security. Hence farmers' access to sustainable agricultural practices is essential to raise crop yield. To connect the final year B.Sc (Hons.) Agriculture students with farmers in their Rural Agricultural Work Experience Programme (RAWE), KITS has signed MoUs with 13 ICAR-Krishi Vigyan Kendra- (Farm Science Centers) for knowledge sharing with the farmers across Tamil Nadu, Kerala and Telangana. Students were involved in taking agriculture knowledge to the local farmers through various field demonstrations, exhibitions, outreach programmes and village attachments covering more than 700 farmers in districts of Tamil Nadu and Kerala. To improve farm efficiency, advanced agricultural technologies like drones for spraying fertilizers and pesticides are demonstrated by our students to the farmers during RAWE programme.



Knowledge Sharing with Farmers through method demonstrations

Events for Local Farmers and Food Producers

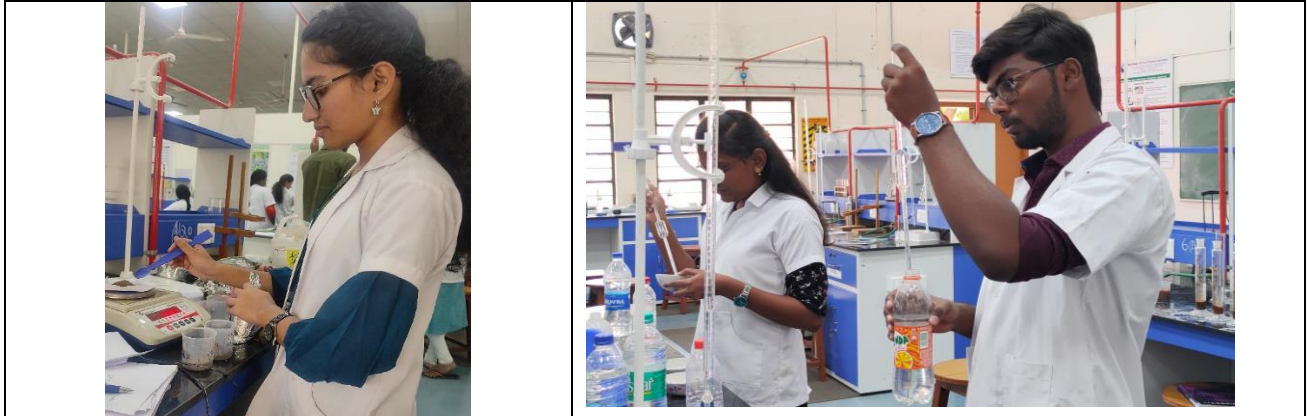
In order to connect to the farming community and transfer knowledge, KITS organizes events for local farmers and food producers through Plant clinics /exhibitions as part of the RAWE programme.



Knowledge Sharing with Farmers through method demonstrations

University Access to Local Farmers and Food Producers

The School of Agricultural Sciences has state-of-the-art laboratory facilities in the areas of Soil Science and Agricultural Chemistry, Plant Pathology, Plant Genetics and Breeding, Entomology and Horticulture which serve as the knowledge hub to disseminate appropriate information to farmers.



Soil and Water Testing Lab in School of Agricultural Sciences

KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES (Deemed To Be University) Coimbatore, India School of Agricultural Sciences Soil Science And Agricultural Chemistry Laboratory		SOIL SAMPLE DETAILS மண் மாதிரி விவரங்கள்		FERTILIZER RECOMMENDATION உபயோகம்			
SOIL HEALTH CARD		IRRIGATED/ RAINFED பரிசீலனை விவரம்		MACRONUTRIENTS (Kg/ acre – g/tree) கரும்பு/செடிக்காக (கிலோ/ஏக்கர் – கிராம்/மரம்)			
NAME OF THE FARMER : Mr. DINESH NAGAR, Coimbatore. ADDRESS: Near Karunya Police station, Karunya Nagar, Coimbatore. SURVEY NUMBER: LATITUDE: LONGITUDE: FARM SIZE : 3 ½ Acres. MOBILE NUMBER: +91 90039 61739 SAMPLE COLLECTED ON: 28.01.2023 REPORT ISSUED ON: 17.02.2023		CROPS GROWN பயிரிடப்பட்ட பயிர்கள்		N	48	UREA	104
NO FOOD WITHOUT SOIL, SOIL IS LIFE, CONSERVE IT.		SOIL TESTING RESULTS மண் ஆய்வு முடிவுகள்		P ₂ O ₅	24	SINGLE SUPER PHOSPHATE	150
S.NO	PARAMETERS	RESULT		K ₂ O	24	MURIATE OF POTASH	40
7	SOIL COLOUR (மண்ணின் நிறம்)	Dark Yellowish Brown		MICRONUTRIENTS (Kg/ acre – g/tree) நுண்ணூட்டி சத்துக்கள் (கிலோ/ஏக்கர் – கிராம்/மரம்)			
8	SOIL TEXTURE (மண் நகம்)	Clay Loam		FERROUS SULPHATE	-	COPPER SULPHATE	-
9	BULK DENSITY (கனநிற அடர்த்தி)	1.1764		MANGANESE SULPHATE	-	BORAX	5
10	CALCIUM CARBONATE (கண்ணாம்பு நிறைவு)	Slightly Calcareous		ZINC SULPHATE	-	SODIUM MOLYBDATE	-
S. NO	PARAMETERS	TEST VALUE	UNIT	RATING	GREEN MANURES/ ORGANIC MANURES/ BIOFERTILIZERS		
1	pH	8.13		Saline	GREEN MANURES (புத்தாண்டு உரம்)	-	1/acre - Kg/tree (1.5 லீட்டர்கள் - கிலோ/மரம்)
2	EC	0.18	dSm ⁻¹	Normal	FARMYARD MANURE (செடிப்பு உரம்)	10	1/acre - Kg/tree (1.5 லீட்டர்கள் - கிலோ/மரம்)
3	ORGANIC CARBON (ஆர்கானிக் கார்பன்)	0.618	%	Medium	BIOFERTILIZERS	-	packets/acre - g/tree (பாகெட்டுகள்/மரம்)
4	AVAILABLE NITROGEN (கிடைக்கக்கூடிய நைட்ரஜன்)	280	Kg/ha	Medium	AZOSPIRILLUM/RHIZOBIUM	-	1 packet / 200g
5	AVAILABLE PHOSPHOROUS (கிடைக்கக்கூடிய பிசுபரஸ்)	23.744	Kg/ha	High	BIOFERTILIZER - 200g/packet	-	1 packet = 200g
6	AVAILABLE POTASSIUM (கிடைக்கக்கூடிய பொட்டாசியம்)	537.6	Kg/ha	High	PHOSPHOBACTERIUM	-	1 packet = 200g
7	IRON (ppm) (இரும்பு)	-					
8	MANGANESE (ppm) (மேன்சென்)	-					

Soil Health Cards and advisories given to farmers

Soil and water samples are tested free of cost at the Soil Science and Agricultural Chemistry lab and issue Soil Health Cards are given to farmers as free advisory services.

The Pathology lab of the School of Agricultural Sciences helps the farmers in the identification of plant diseases and provides recommendations for the control of plant diseases. Biofertilizers and bioagents produced in the lab are sold to farmers at an affordable price.



Biofertilizers and bio-agents production

Students of B.Sc (Hons) Agriculture in their ELP programme module on Commercial Nursery Management cultivate vegetables, fruits and medicinal saplings which are sold to farmers at reasonable prices.



Sustainable Food Purchases

To enable local farming community to generate income KITS purchases fruits and vegetables for the hostel mess from the local wholesale traders at Irrutupallam, 3 km away from the university campus.

Publications related to Zero Hunger

Annexure-I

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
1.	Recognition of bloom/yield in crop images using deep learning models for smart agriculture: A review	Darwin, B. Dharmaraj, P. Prince, S. Popescu, D.E. Hemanth, D.J.	2021	Agronomy	11	4	https://www.scopus.com/record/display.url?eid=2-s2.0-85108616920&origin=resultslist		
2.	Hyperspectral and multispectral image fusion techniques for high resolution applications: A review	Sara, D. Mandava, A.K. Kumar, A. Duela, S. Jude, A.	2021	Earth Science Informatics	14	4	https://www.scopus.com/record/display.url?eid=2-s2.0-85106224339&origin=resultslist	10.1007/s12145-021-00621-6	4.2
3.	Machine Vision and Machine Learning for Intelligent Agrobots: A review	Bini, D. Pamela, D. Prince, S.	2020	ICDCS 2020 - 2020 5th International Conference on Devices, Circuits and Systems	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85084653035&origin=resultslist		
4.	Microbial disease management in agriculture: Current status and future prospects	Lindsey, A.P.J. Murugan, S. Renitta, R.E.	2020	Biocatalysis and Agricultural Biotechnology	23	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85076314237&origin=resultslist	10.1016/j.bcab.2019.101468	8.4
5.	Hormonal crosstalk in regulating salinity stress tolerance in graminaceous crops	Choudhary, P. Pramitha, L. Rana, S. Verma, S. Aggarwal, P.R. Muthamilarasan, M.	2021	Physiologia Plantarum	173	4	https://www.scopus.com/record/display.url?eid=2-s2.0-85115797933&origin=resultslist	10.1111/ppl.13558	9
6.	Azadirachtin-based biopesticide affects the respiration and digestion in <i>Anticarsia gemmatalis</i> caterpillars	Farder-Gomes, C.F. Saravanan, M. Martínez, L.C. Plata-Rueda, A. Zanuncio, J.C. Serrão, J.E.	2022	Toxin Reviews	41	2	https://www.scopus.com/record/display.url?eid=2-s2.0-85127392700&origin=resultslist	10.1080/15569543.2021.1892764	4.8

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
7.	SARS-CoV-2 emerging Omicron subvariants with a special focus on BF.7 and XBB.1.5 recently posing fears of rising cases amid ongoing COVID-19 pandemic	Dhama, K. Chandran, D. Chopra, H. Aminul Islam, M. Emran, T.B. Rehman, M.E.U. Dey, A. Mohapatra, R.K. Praveen, S.V. Mohankumar, P. Sharma, A.K. Bhattacharya, P.	2022	Journal of Experimental Biology and Agricultural Sciences	10	6	https://www.scopus.com/record/display.url?eid=2-s2.0-85146281977&origin=resultslist	10.18006/2022.10(6).1215.1221	0.7
8.	Optimally tuned interleaved luoc converter for pv array fed bldc motor driven centrifugal pumps using whale optimization algorithm—a resilient solution for powering agricultural loads	Jegha, A.D.G. Subathra, M.S.P. Kumar, N.M. Ghosh, A.	2020	Electronics (Switzerland)	9	9	https://www.scopus.com/record/display.url?eid=2-s2.0-85093876398&origin=resultslist	10.3390/electronics9091445	4.7
9.	Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and SDG2	Shams Esfandabadi, H. Ghamary Asl, M. Shams Esfandabadi, Z. Gautam, S. Ranjbari, M.	2022	British Food Journal	124	12	https://www.scopus.com/record/display.url?eid=2-s2.0-85122334287&origin=resultslist	10.1108/BFJ-08-2021-0872	5.4
10.	Production of silicon nanoparticles from selected agricultural wastes	Adebisi, J.A. Agunsoye, J.O. Ahmed, I.I. Bello, S.A. Haris, M. Ramakokovhu, M.M. Hassan, S.B.	2021	Materials Today: Proceedings	38	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85105436607&origin=resultslist	10.1016/j.matpr.2020.03.658	3.2
11.	Leaf Pathology Detection in Potato and Pepper Bell Plant using Convolutional Neural Networks	Aldhyani, T.H.H. Alkahtani, H. Eunice, R.J. Hemanth, D.J.	2022	7th International Conference on Communication and Electronics Systems, ICCES 2022 - Proceedings	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85136323522&origin=resultslist		
12.	Genetic diversity, allelic variation and marker trait associations in gamma irradiated mutants of rice (Oryza sativa L.)	Ramchander, S. Leon, M.T.A.P. Souframanien, J. Arumugam Pillai, M.	2022	International Journal of Radiation Biology	98	1	https://www.scopus.com/record/display.url?eid=2-s2.0-85118280712&origin=resultslist		

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
13.	Futuristic IoT based Smart Precision Agriculture: Brief Analysis	Swamidason, I.T.J. Pandiyarajan, S. Velswamy, K. Leela Jancy, P.	2022	Journal of Mobile Multimedia	18	3	https://www.scopus.com/record/display.url?eid=2-s2.0-85125854714&origin=resultslist	10.13052/jm1550-4646.18323	1
14.	Genomic designing for abiotic stress tolerance in Foxtail Millet (<i>Setaria Italica L.</i>)	Rana, S. Pramitha, L. Muthamilarasan, M.	2021	Genomic Designing for Abiotic Stress Resistant Cereal Crops	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85138341860&origin=resultslist		
15.	A Novel Approach for Effective Crop Production using Machine Learning	Chowdary, V.T. Robinson Joel, M. Ebenezer, V. Edwin, B. Thanka, R. Jeyaraj, A.	2022	Proceedings of the International Conference on Electronics and Renewable Systems, ICEARS 2022	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85128980522&origin=resultslist		
16.	Scope and recent trends of artificial intelligence in Indian agriculture	Mary, X.A. Popov, V. Raimond, K. Johnson, I. Vijay, S.J.	2022	The Digital Agricultural Revolution: Innovations and Challenges in Agriculture through Technology Disruptions	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85147108022&origin=resultslist		
17.	Clustering and principal component analysis of traditional rice landraces grown under in vitro moisture stress condition	Anupriya, R. Geetha, S. Rajakumar, D. Senthil, S.A. Thankappan, S. Binodh, A.K.	2020	Plant Cell Biotechnology and Molecular Biology	21	42	https://www.scopus.com/record/display.url?eid=2-s2.0-85092905220&origin=resultslist	-	
18.	Rhizosphere competent pseudomonas indoloxydans (F3-47) as a plant growth promoter and enhancer of zeamays l. under greenhouse and field trials	Reena Josephine, C.M. Thomas, J.	2021	Current Trends in Biotechnology and Pharmacy	15	5	https://www.scopus.com/record/display.url?eid=2-s2.0-85120333371&origin=resultslist	10.5530/ctbp.2021.3s.34	0.7

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
19.	Drought prediction using artificial neural network	Metta, P.S. Chintamaneni, A. Kumar, A. Yadav, J. Kumar, V. Bhaskar, B.	2022	2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering, ICACITE 2022	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85135467497&origin=resultslist		
20.	Multi-omics intervention in Setaria to dissect climate-resilient traits: Progress and prospects	Aggarwal, P.R. Pramitha, L. Choudhary, P. Singh, R.K. Shukla, P. Prasad, M. Muthamilarasan, M.	2022	Frontiers in Plant Science	13	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85138406364&origin=resultslist	10.3389/fpls.2022.892736	7.1
21.	Nutritional, textural, and sensory quality of oil fried donut enriched with extracted dietary fiber and okara flour	Huq, S. Das, P.C. Islam, M.A. Jubayer, M.F. Ranganathan, T.V. Mazumder, M.A.R.	2021	Journal of Food Processing and Preservation	45	3	https://www.scopus.com/record/display.url?eid=2-s2.0-85100108656&origin=resultslist	10.1111/jfpp.15310	3.4
22.	Biofertilizers: A Sustainable Approach Towards Enhancing the Agricultural Productivity	Mohanty, S.S.	2021	Biomolecular Engineering Solutions for Renewable Specialty Chemicals: Microorganisms, Products, and Processes	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85127531238&origin=resultslist		
23.	Dryland Livestock Rearing Relies Heavily on Tree fodders: A Narrative Review	Manuvanthra, A. Chandran, D. Emran, T.B. Aslam, M.M.K. Savanth, V.V. Kumar, M. Sharma, R. da Silva, L.E. Pran, M. Lishma, N.P. Sureshkumar, R.	2022	Indian Veterinary Journal	99	10	https://www.scopus.com/record/display.url?eid=2-s2.0-85142351470&origin=resultslist	-	0.6
24.	Biogenic larvicidal formulation of metabolites from	Jissin, M. Vani, C.	2020	Tropical Biomedicine	37	3	https://www.scopus.com/record/display	-	1.5

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
	Steinernema saimkayi symbiont Xenorhabdus stockiae KUT6 against dengue vector Aedes aegypti						url?eid=2-s2.0-85090880665&origin=resultslist		
25.	Comparative Study on Recognition of Food Item from Images for Analyzing the Nutritional Contents	Sreetha, E.S. Naveen Sundar, G. Narmadha, D.	2022	Lecture Notes in Electrical Engineering	905	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85135864556&origin=resultslist	10.1007/978-981-19-2177-3_27	0.6
26.	Development of banana peel powder as organic carrier based bioformulation and determination of its plant growth promoting efficacy in rice Cr100g	David Paul Raj, R.S. Agnes Preethy, H. Gilbert Ross Rex, K.	2021	Journal of Pure and Applied Microbiology	15	3	https://www.scopus.com/record/display.url?eid=2-s2.0-85114615194&origin=resultslist	10.22207/JPA M.15.3.18	1.6
27.	Enabling technologies for future robotic agriculture systems: A case study in Indian scenario	Mary, X.A. Mani, K. Raimond, K. Johnson, I. Dinesh Kumar, P.	2022	The Digital Agricultural Revolution: Innovations and Challenges in Agriculture through Technology Disruptions	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85148968635&origin=resultslist		
28.	Performance of black rice (Oryza sativa) varieties grown in Namsai district of Arunachal Pradesh, India	Sangma, R.R. Manpoong, C. Sharma, A. Devadas, V.S. Singh, D. Pandey, H.	2022	Research on Crops	23	1	https://www.scopus.com/record/display.url?eid=2-s2.0-85128415624&origin=resultslist		
29.	Robotic Utilization in Farming Field—A Review	Arulkirubakaran, D. Malkiya Rasalin Prince, R. Neil Anand, K. Manikandan, N. Jenny Manaswitha, D. Lavanya, A. Suresh, M.N. Kishore,	2022	Lecture Notes in Mechanical Engineering	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85131911346&origin=resultslist		

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
		K.C.S. Chauhan, B. Vishal, S.							
30.	Integrating Genomics and Phenomics Tools to Dissect Climate Resilience Traits in Small Millets	Pramitha, L. Choudhary, P. Das, P. Sharma, S. Karthi, V. Vemuri, H. Muthamilarasan, M.	2022	Omics of Climate Resilient Small Millets	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85161854322&origin=resultlist		
31.	A preliminary study on design of a modular agricultural mobile robot	Joseph, D.M. Santhosh, S. Yesudas, K. Sojan, A. Mahanta, G.B.	2022	AIP Conference Proceedings	267 0	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85144303316&origin=resultlist	10.1063/5.0132101	0.7
32.	UAVs for multidisciplinary applications: Introduction	Govarthan, R. Hariharan, S. Paul, J. Mary, T.B. Sagayam, K.M. Elngar, A.A.	2022	Unmanned Aerial Vehicles and Multidisciplinary Applications Using AI Techniques	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85161577607&origin=resultlist		
33.	An analysis of total factor productivity of cotton in Tamil Nadu	Kavitha, V. Usha Nandhini, S. David Chella Baskar, V.	2021	Ecology, Environment and Conservation	27	1	https://www.scopus.com/record/display.url?eid=2-s2.0-85107304874&origin=resultlist	-	
34.	Self-supervised representation learning framework for remote crop monitoring using sparse autoencoder	Anitha, J. Akila Agnes, S. Immanuel Alex Pandian, S.	2021	Advances in Intelligent Systems and Computing	116 7	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85089313783&origin=resultlist		
35.	A preliminary study on autonomous drone systems for agriculture pesticide spraying	Vishal, R. Mahanta, G.B.	2022	AIP Conference Proceedings	267 0	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85144260508&origin=resultlist	10.1063/5.0116467	0.7
36.	Genomic designing for biotic stress tolerance in Foxtail Millet (<i>Setaria italica</i> L.)	Rana, S. Pramitha, L. Aggarwal, P.R. Muthamilarasan, M.	2021	Genomic Designing for Biotic Stress	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-		

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
				Resistant Cereal Crops			85165067336&origin=resultslist		
37.	Impact of Plant Health on Global Food Security: A Holistic View	Srinivasan, T.S. Thankappan, S. Balasubramaniam, M. Bhaskar, V.	2022	Agriculture, Environment and Sustainable Development: Experiences and Case Studies	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85160128226&origin=resultslist		
38.	Impact of IoT based Autonomous Farming Equipment on Crop Culture and Management in the Agricultural Sector	Kumar, N. Singh, A. Das, D. Srivastava, D. Talari, V.S.R. Kurukwar, A.D.	2022	International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85142688580&origin=resultslist		
39.	Drip Fertigation with Fertilizer Prescription Through STCR—IPNS—A Way Forward Towards Climate Change Mitigation	Rangasamy, S. Subramaniam, M. Stephen, P.K. Dey, P.	2022	Lecture Notes in Civil Engineering	176	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85120521290&origin=resultslist		
40.	Arduino based low-cost greenhouse monitoring system for small scale farmers	Anisha, M. Arsad, U.M. Starly, P.J. Dhanalakshmi, K. Anitha, S. Benisha, M. Chezhiyan, P. Elliot, C.J.	2021	Proceedings of the 3rd International Conference on Intelligent Communication Technologies and Virtual Mobile Networks, ICICV 2021	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85104391312&origin=resultslist		
41.	In vitro bio-efficacy of biocontrol agents and oil cakes against <i>Pythium aphanidermatum</i> from tomato	Madhumitha, B. Gnanaprakash, S. Jayapradha, C. Thankappan, S. Rathikannu, S. Priyanga, T.	2022	Journal of Environmental Biology	43	6	https://www.scopus.com/record/display.url?eid=2-s2.0-85142090043&origin=resultslist	10.22438/jeb/43/6/MRN-3032	1.4

S.No.	Title	Authors	Year	Scopus Source title	Vol	Issue	Abstract	DOI	Cite score
42.	An Investigation on Impact of Malnutrition in Human Health and Technique to Evaluate the Nutrient Intake from the Food Image	Sreetha, E.S. Sundar, G.N. Narmadha, D.	2022	2022 IEEE International Power and Renewable Energy Conference, IPRECON 2022	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85150677380&origin=resultslist		
43.	Wearable Environmental Monitoring System for Measurement of Environmental Parameters: A Pilot study	Jegan, R. Evangeline, A.B. Nimi, W.S.	2022	Proceedings - International Conference on Augmented Intelligence and Sustainable Systems, ICAISS 2022	-	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85147551718&origin=resultslist		
44.	Approaches to Plant Nutrient Management Through Fertilization in India: Then, Now and the Future	Praveena Katharine, S. Suguna Devakumari, M.	2022	Reviews in Agricultural Science	10	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85124937759&origin=resultslist	10.7831/ras.10.0_1	3.5
45.	AN ANALYSIS ON FARMERS AWARENESS AND PERCEPTION TOWARDS PRADHAN MANTRI FASAL BIMA YOJANA SCHEME IN COIMBATORE DISTRICT OF TAMIL NADU	Kavitha, V. Nandhini, S.U.	2022	International Journal of Agricultural and Statistical Sciences	18	2	https://www.scopus.com/record/display.url?eid=2-s2.0-85144973880&origin=resultslist	-	1.8
46.	A study on organic produce marketing in Coimbatore district of Tamil Nadu	Kavitha, V. Chandran, K. Usha Nandhini, S.	2020	Plant Archives	20	-	https://www.scopus.com/record/display.url?eid=2-s2.0-85083189862&origin=resultslist	-	



SDG 3: Good Health and Well-being

3.1 Research in Good Health and Well-being

KITS is actively involved in research in the four thrust areas of the University which are Water, Health Care, Food and Sustainable Energy. The faculty members and students are motivated to involve in research and due to this the following are the outcome in the form of publications in Scopus and WoS indexed Journals during the year 2021 and 2022.

Sl. No	Title	Authors	Year	Scopus Source title	Volume	Issue	Citations
1	Deep learning based detection and analysis of COVID-19 on chest X-ray images	Jain, R. Gupta, M. Taneja, S. Hemanth, D.J.	2021	Applied Intelligence	51	3	292
2	More than smell - COVID-19 is associated with severe impairment of smell, taste, and chemesthesis	Parma, V. etal	2020	Chemical Senses	45	7	289
3	COVID-19: air pollution remains low as people stay at home	Gautam, S.	2020	Air Quality, Atmosphere and Health	13	7	198
4	The Influence of COVID-19 on Air Quality in India: A Boon or Inutile	Gautam, S.	2020	Bulletin of Environmental Contamination and Toxicology	104	6	180
5	Pneumonia detection in chest X-ray images using convolutional neural networks and transfer learning	Jain, R. Nagrath, P. Kataria, G. Sirish Kaushik, V. Jude Hemanth, D.	2020	Measurement : Journal of the International Measurement Confederation	165	-	129
6	Air pollution aggravating COVID-19 lethality? Exploration in Asian cities using statistical models	Gupta, A. Bherwani, H. Gautam, S. Anjum, S. Musugu, K. Kumar, N.	2021	Environment, Development and Sustainability	23	4	104

		Anshul, A. Kumar, R.					
7	Valuation of air pollution externalities: comparative assessment of economic damage and emission reduction under COVID-19 lockdown	Bherwani, H. Nair, M. Musugu, K. Gautam, S. Gupta, A. Kapley, A. Kumar, R.	2020	Air Quality, Atmosphere and Health	13	6	97
8	Lipid Data Acquisition for devices Treatment of Coronary Diseases Health stuff on the Internet of Medical Things	Pradeep Raj, M.S. Manimegalai, P. Ajay, P. Amose, J.	2021	Journal of Physics: Conference Series	1937	1	92
9	Recent smell loss is the best predictor of COVID-19 among individuals with recent respiratory symptoms	Gerkin, R.C. et al	2021	Chemical Senses	46	-	89
10	COVID-19: impact by and on the environment, health and economy	Gautam, S. Hens, L.	2020	Environment, Development and Sustainability	22	6	84
11	Classification of Mammogram Images Using Multiscale all Convolutional Neural Network (MA-CNN)	Agnes, S.A. Anitha, J. Pandian, S.I.A. Peter, J.D.	2020	Journal of Medical Systems	44	1	83
12	COVID-19 lockdowns reduce the Black carbon and polycyclic aromatic hydrocarbons of the Asian atmosphere: source apportionment and health hazard evaluation	Ambade, B. Sankar, T.K. Kumar, A. Gautam, A.S. Gautam, S.	2021	Environment, Development and Sustainability	23	8	72
13	Automatic Detection of White Blood Cancer from Bone Marrow Microscopic Images Using Convolutional Neural Networks	Kumar, D. Jain, N. Khurana, A. Mittal, S. Satapathy, S.C. Senkerik, R. Hemanth, J.D.	2020	IEEE Access	8	-	68
14	A new approach for classification skin lesion based on transfer learning,	Rodrigues, D.D.A. Ivo, R.F. Satapathy, S.C. Wang, S.	2020	Pattern Recognition Letters	136	-	67

	deep learning, and IoT system	Hemanth, J. Filho, P.P.R.					
15	SARS-CoV-2 pandemic in India: what might we expect?	Gautam, S. Hens, L.	2020	Environment, Development and Sustainability	22	5	62
16	Apoptotic Effect and Anticancer Activity of Biosynthesized Silver Nanoparticles from Marine Algae Chaetomorpha linum Extract Against Human Colon Cancer Cell HCT-116	Acharya, D. Satapathy, S. Somu, P. Parida, U.K. Mishra, G.	2021	Biological Trace Element Research	199	5	62
17	A shock like no other: coronavirus rattles commodity markets	Rajput, H. Changotra, R. Rajput, P. Gautam, S. Gollakota, A.R.K. Arora, A.S.	2021	Environment, Development and Sustainability	23	5	55
18	SARS-CoV-2 in wastewater: Challenges for developing countries	Pandey, D. Verma, S. Verma, P. Mahanty, B. Dutta, K. Daverey, A. Arunachalam, K.	2021	International Journal of Hygiene and Environmental Health	231	-	54
19	An automated breast cancer diagnosis using feature selection and parameter optimization in ANN	S., P. Al-Turjman, F. Stephan, T.	2021	Computers and Electrical Engineering	90	-	52
20	Bioaerosols: Characterization, pathways, sampling strategies, and challenges to geo-environment and health	Gollakota, A.R.K. Gautam, S. Santosh, M. Sudan, H.A. Gandhi, R. Sam Jebadurai, V. Shu, C.-M.	2021	Gondwana Research	99	-	46
21	Remote Monitoring of Physical Rehabilitation of Stroke Patients Using IoT and Virtual Reality	Postolache, O. Hemanth, D.J. Alexandre, R. Gupta, D. Geman, O. Khanna, A.	2021	IEEE Journal on Selected Areas in Communications	39	2	46
22	Understanding COVID-19 transmission through Bayesian probabilistic modeling and GIS-based Voronoi approach: a policy perspective	Bherwani, H. Anjum, S. Kumar, S. Gautam, S. Gupta, A. Kumbhare, H. Anshul, A. Kumar, R.	2021	Environment, Development and Sustainability	23	4	44

23	Prediction of Cardiac Disease using Supervised Machine Learning Algorithms	Jane Preetha Princy, R. Parthasarathy, S. Subha Hency Jose, P. Lakshminarayanan, A.R. Jeganathan, S.	2020	Proceedings of the International Conference on Intelligent Computing and Control Systems, ICICCS 2020	-	-	44
24	Characterization, seasonal variation, source apportionment and health risk assessment of black carbon over an urban region of East India	Ambade, B. Sankar, T.K. Panicker, A.S. Gautam, A.S. Gautam, S.	2021	Urban Climate	38	-	42
25	IoT-enabled solid waste management in smart cities	Vishnu, S. Jino Ramson, S.R. Senith, S. Anagnostopoulos, T. Abu-Mahfouz, A.M. Fan, X. Srinivasan, S. Kirubaraj, A.A.	2021	Smart Cities	4	3	40
26	Lockdown during COVID-19 pandemic: A case study from Indian cities shows insignificant effects on persistent property of urban air quality	Chelani, A. Gautam, S.	2022	Geoscience Frontiers	13	6	36
27	A hybrid artificial bee colony with whale optimization algorithm for improved breast cancer diagnosis	Stephan, P. Stephan, T. Kannan, R. Abraham, A.	2021	Neural Computing and Applications	33	20	35
28	Effect of Titanium dioxide nanoparticle as an additive on the working characteristics of biodiesel-water emulsion fuel blends	Vellaiyan, S. Subbiah, A. Chockalingam, P.	2021	Energy Sources, Part A: Recovery, Utilization and Environmental Effects	43	9	33
29	Endophyte fungal isolate mediated biogenic synthesis and evaluation of biomedical applications of silver nanoparticles	Bagur, H. Medidi, R.S. Somu, P. Choudhury, P.W.J. karua, C.S. Guttula, P.K. Melappa, G. Poojari, C.C.	2022	Materials Technology	37	3	30

30	A hierarchical three-step superpixels and deep learning framework for skin lesion classification	Afza, F. Sharif, M. Mittal, M. Khan, M.A. Jude Hemanth, D.	2022	Methods	202	-	29
31	Effect of titanium dioxide nanoparticle as an additive on the exhaust characteristics of diesel-water emulsion fuel blends	Vellaiyan, S. Subbiah, A. Chockalingam, P.	2020	Petroleum Science and Technology	38	3	29
32	Leptospiral infection, pathogenesis and its diagnosis—a review	Samrot, A.V. Sean, T.C. Bhavya, K.S. Sahithya, C.S. Chandrasekaran, S. Palanisamy, R. Robinson, E.R. Subbiah, S.K. Mok, P.L.	2021	Pathogens	10	2	28
33	Strong link between coronavirus count and bad air: a case study of India	Gautam, S. Samuel, C. Gautam, A.S. Kumar, S.	2021	Environment, Development and Sustainability	23	11	28
34	Myricetin: versatile plant based flavonoid for cancer treatment by inducing cell cycle arrest and ROS–reliant mitochondria-facilitated apoptosis in A549 lung cancer cells and in silico prediction	Rajendran, P. Maheshwari, U. Muthukrishnan, A. Muthuswamy, R. Anand, K. Ravindran, B. Dhanaraj, P. Balamuralikrishnan, B. Chang, S.W. Chung, W.J.	2021	Molecular and Cellular Biochemistry	476	1	28
35	Qualitative and quantitative analyses of impact of COVID-19 on sustainable development goals (SDGs) in Indian subcontinent with a focus on air quality	Bherwani, H. Gautam, S. Gupta, A.	2021	International Journal of Environmental Science and Technology	18	4	27
36	Analysis of the health, economic and environmental impacts of COVID-19: The Bangladesh perspective	Gautam, S. Setu, S. Khan, M.G.Q. Khan, M.B.	2022	Geosystems and Geoenvironment	1	1	27
37	Polymeric cyclodextrin-dextran spooled nickel ferrite nanoparticles: Expanded anticancer	Ramasamy, S. Enoch, I.V.M.V. Rex Jeya Rajkumar, S.	2020	Materials Letters	261	-	25

	efficacy of loaded camptothecin						
38	Development of a practical evaluation approach of a typical biomass cookstove	Gupta, A. Mulukutla, A.N.V. Gautam, S. TaneKhan, W. Waghmare, S.S. Labhasetwar, N.K.	2020	Environmental Technology and Innovation	17	-	25
39	New Palladium(II) complexes with ONO chelated hydrazone ligand: Synthesis, characterization, DNA/BSA interaction, antioxidant and cytotoxicity	Ayyannan, G. Mohanraj, M. Gopiraman, M. Uthayamalar, R. Raja, G. Bhuvanesh, N. Nandhakumar, R. Jayabalakrishnan, C.	2020	Inorganica Chimica Acta	512	-	25
40	Assessment of groundwater geochemistry using multivariate water quality index and potential health risk in industrial belt of central Odisha, India	Naik, M.R. Mahanty, B. Sahoo, S.K. Jha, V.N. Sahoo, N.K.	2022	Environmental Pollution	303	-	24
41	Binol diurethyl dipyrone fluorescent probe: Dual detection of silver and carbonate ions and its bioimaging applications	Velmurugan, K. Vickram, R. Karthick, R. Jipsa, C.V. Suresh, S. Prabakaran, G. Prabhu, J. Velraj, G. Nandhakumar, R.	2020	Journal of Photochemistry and Photobiology A: Chemistry	401	-	23
42	Exposure and health risk assessment of nitrate contamination in groundwater in Coimbatore and Tirupur districts in Tamil Nadu, South India	Pazhuparambil Jayarajan, S.K. Kuriachan, L.	2021	Environmental Science and Pollution Research	28	8	21
43	Monkeypox: An Update on Current Knowledge and Research Advances	Chandran, D. Dhama, K. Muhammad, A.M.K. Chakraborty, S. Mohapatra, R.K. Yatoo, M.I. Islam, Md.A. Alagawany, M. Sharma, A.K. Mohankumar, P. Panahl, A.D. Chandran, D.	2022	Journal of Experimental Biology and Agricultural Sciences	10	4	21

44	An augmented reality-supported mobile application for diagnosis of heart diseases	Hemanth, J.D. Kose, U. Deperlioglu, O. de Albuquerque, V.H.C.	2020	Journal of Supercomputing	76	2	21
45	Immobilization of enzymes for bioremediation: A future remedial and mitigating strategy	Somu, P. Narayanasamy, S. Gomez, L.A. Rajendran, S. Lee, Y.R. Balakrishnan, D.	2022	Environmental Research	212	-	21
46	Surface conjugation of curcumin with self-assembled lysozyme nanoparticle enhanced its bioavailability and therapeutic efficacy in multiple cancer cells	Somu, P. Paul, S.	2021	Journal of Molecular Liquids	338	-	20
47	An intelligent computer-aided approach for target protein prediction in infectious diseases	Narmadha, D. Pravin, A.	2020	Soft Computing	24	19	20
48	Microbial disease management in agriculture: Current status and future prospects	Lindsey, A.P.J. Murugan, S. Renitta, R.E.	2020	Biocatalysis and Agricultural Biotechnology	23	-	20
49	A statistical approach for high order epistasis interaction detection for prediction of diabetic macular edema	Rajesh, G. Raajini, X.M. Sagayam, K.M. Dang, H.	2020	Informatics in Medicine Unlocked	20	-	20
50	Adsorption of nickel ions from electroplating effluent by graphene oxide and reduced graphene oxide	Rajivgandhi, G. RTV, V. Nandhakumar, R. Murugan, S. Alharbi, N.S. Kadaikunnan, S. Khaled, J.M. Alanzi, K.F. Li, W.-J.	2021	Environmental Research	199	-	19
51	Utilization of Swertia chirayita Plant Extracts for Management of Diabetes and Associated Disorders: Present Status, Future Prospects and Limitations	Dey, P. Singh, J. Suluvoy, J.K. Dilip, K.J. Nayak, J.	2020	Natural Products and Bioprospecting	10	6	19

52	Assessment and valuation of health impacts of fine particulate matter during COVID-19 lockdown: a comprehensive study of tropical and sub tropical countries	Bherwani, H. Kumar, S. Musugu, K. Nair, M. Gautam, S. Gupta, A. Ho, C.-H. Anshul, A. Kumar, R.	2021	Environmental Science and Pollution Research	28	32	18
53	An integrated approach for monitoring social distancing and face mask detection using stacked Resnet-50 and YOLOv5	Walia, I.S. Kumar, D. Sharma, K. Hemanth, J.D. Popescu, D.E.	2021	Electronics (Switzerland)	10	23	18
54	Effect of image transformation on Efficient Net model for COVID-19 CT image classification	Shamila Ebenezer, A. Deepa Kanmani, S. Sivakumar, M. Jeba Priya, S.	2022	Materials Today: Proceedings	51	-	17
55	Designed poly(ethylene glycol) conjugate-erbium-doped magnetic nanoparticle hybrid carrier: enhanced activity of anticancer drug	Kaliyamoorthi, K. Sumohan Pillai, A. Alexander, A. Ramasamy, S. Arivarasu, A. Enoch, I.V.M.V.	2021	Journal of Materials Science	56	5	17
56	Antimicrobial activity, antiproliferative activity, amylase inhibitory activity and phytochemical analysis of ethanol extract of corn (Zea mays L.) silk	Abirami, S. Priyalakshmi, M. Soundariya, A. Samrot, A.V. Saigeetha, S. Emilin, R.R. Dhiva, S. Inbathamizh, L.	2021	Current Research in Green and Sustainable Chemistry	4	-	16
57	Biogenic synthesis of silver nanoparticles using marine algae Cladophora glomerata and evaluation of apoptotic effects in human colon cancer cells	Acharya, D. Satapathy, S. Thathapudi, J.J. Somu, P. Mishra, G.	2022	Materials Technology	37	8	16
58	Onion and garlic polysaccharides: A review on extraction, characterization, bioactivity, and modifications	Kumari, N	2022	International Journal of Biological Macromolecules	219	-	15

59	Largest democracy in the world crippled by COVID-19: current perspective and experience from India	Changotra, R. Rajput, H. Rajput, P. Gautam, S. Arora, A.S.	2021	Environment, Development and Sustainability	23	5	15
60	Performance of 2-Hydroxy-1-Naphthaldehyde-2-Amino Thiazole as a Highly Selective Turn-on Fluorescent Chemosensor for Al(III) Ions Detection and Biological Applications	Kuzhandaivel, H. Basha, S.B. Charles, I.D. Raju, N. Singaravelu, U. Sivalingam Nallathambi, K.	2021	Journal of Fluorescence	31	4	15
61	The influence of meteorological variables and lockdowns on COVID-19 cases in urban agglomerations of Indian cities	Chelani, A.B. Gautam, S.	2022	Stochastic Environmental Research and Risk Assessment	36	9	15
62	Systemic Evaluation of Mechanism of Cytotoxicity in Human Colon Cancer HCT-116 Cells of Silver Nanoparticles Synthesized Using Marine Algae Ulva lactuca Extract	Acharya, D. Satapathy, S. Yadav, K.K. Somu, P. Mishra, G.	2022	Journal of Inorganic and Organometallic Polymers and Materials	32	2	14
63	Kinetic modelling and process engineering of phenolics microbial and enzymatic biodegradation: A current outlook and challenges	Priyadarshini, A. Sahoo, M.M. Raut, P.R. Mahanty, B. Sahoo, N.K.	2021	Journal of Water Process Engineering	44	-	14
64	Vertical profiling of atmospheric air pollutants in rural India: A case study on particulate matter (PM10/PM2.5/PM1), carbon dioxide, and formaldehyde	Gautam, S. Sammuell, C. Bhardwaj, A. Shams Esfandabadi, Z. Santosh, M. Gautam, A.S. Joshi, A. Justin, A. John Wessley, G.J. James, E.J.	2021	Measurement : Journal of the International Measurement Confederation	185	-	14
65	COVID-19: Invasion, pathogenesis and possible cure – A review	P, N. R., N. B., V. S., R. A., S.	2022	Journal of Virological Methods	300	-	14

66	Methyl Palmitate—A suitable adjuvant for Sorafenib therapy to reduce in vivo toxicity and to enhance anti-cancer effects on hepatocellular carcinoma cells	Breeta, R.D.I.E. Grace, V.M.B. Wilson, D.D.	2021	Basic and Clinical Pharmacology and Toxicology	128	3	14
67	Investigation of DNA/BSA binding and cytotoxic properties of new Co(II), Ni(II) and Cu(II) hydrazone complexes	Kanchanadevi, S. Fronczek, F.R. Immanuel David, C. Nandhakumar, R. Mahalingam, V.	2021	Inorganica Chimica Acta	526	-	13
68	Chemometric appraisal of groundwater quality for domestic, irrigation and industrial purposes in Lower Bhavani River basin, Tamil Nadu, India	Sajil Kumar, P.J. Kuriachan, L.	2022	International Journal of Environmental Analytical Chemistry	102	15	13
69	β -Cyclodextrin-folate functionalized poly(lactic-co-glycolide)–superparamagnetic ytterbium ferrite hybrid nanocarrier for targeted delivery of camptothecin	Kaliyamoorthy, K. Pillai, A.S. Alexander, A. Arivarasu, A. Enoch, I.V.M.V. Ramasamy, S.	2021	Materials Science and Engineering C	122	-	13
70	A photoswitchable “turn-on” fluorescent chemosensor: Quinoline-naphthalene duo for nanomolar detection of aluminum and bisulfite ions and its multifarious applications	Immanuel David, C. Jayaraj, H. Prabakaran, G. Velmurugan, K. Parimala Devi, D. Kayalvizhi, R. Abiram, A. Rajesh Kannan, V. Nandhakumar, R.	2022	Food Chemistry	371	-	13
71	Synthesis, structure, biological/chemosens or evaluation and molecular docking studies of aminobenzothiazole Schiff bases	Suyambulingam, J.K. Karvembu, R. Bhuvanesh, N.S.P. Enoch, I.V.M.V. Selvakumar, P.M. Premnath, D. Subramanian, C. Mayakrishnan, P.	2020	Journal of Adhesion Science and Technology	34	23	12

		Kim, S.-H. Chung, I.-M.					
72	Spatial Variation of Airborne Allergenic Fungal Spores in the Ambient PM2.5—A Study in Rajkot City, Western Part of India	Humbal, C. Gautam, S. Joshi, S.K. Rajput, M.S.	2020	Energy, Environment, and Sustainability	-	-	12
73	Magnetic hydroxyapatite nanomaterial-cyclodextrin tethered polymer hybrids as anticancer drug carriers	Ramasamy, S. Dhamecha, D. Kaliyamoorthi, K. Pillai, A.S. Alexander, A. Dhanaraj, P. Menon, J.U. Enoch, I.V.M.V.	2021	Materials Advances	2	10	12
74	Morphological feature extraction and KNG-CNN classification of CT images for early lung cancer detection	Jena, S.R. George, S.T.	2020	International Journal of Imaging Systems and Technology	30	4	12
75	Sinaptic acid safeguards cardiac mitochondria from damage in isoproterenol-induced myocardial infarcted rats	Stanely Mainzen Prince, P. Dey, P. Roy, S.J.	2020	Journal of Biochemical and Molecular Toxicology	34	10	11
76	An open clinical evaluation of selected siddha regimen in expediting the management of COVID-19 –a randomized controlled study	Chitra, S.M. Mallika, P. Anbu, N. Narayanababu, R. Sugunabai, A. David Paul Raj, R.S. Premnath, D.	2022	Journal of Ayurveda and Integrative Medicine	13	1	11
77	Two-stage lung nodule detection framework using enhanced UNet and convolutional LSTM networks in CT images	Akila Agnes, S. Anitha, J. Arun Solomon, A.	2022	Computers in Biology and Medicine	149	-	11
78	A Comprehensive Review: Computational Models for Obstructive Sleep Apnea Detection in Biomedical Applications	Jeyajothi, E.S. Anitha, J. Rani, S. Tiwari, B.	2022	BioMed Research International	2022	-	11

79	Camptothecin-loaded holmium ferrite nanocarrier. Expanded activity on breast cancer cells	Kaliyamoorthi, K. Ramasamy, S. Pillai, A.S. Alexander, A. Arivarasu, A. Enoch, I.V.M.V.	2021	Materials Letters	285	-	11
80	Broad spectrum antimicrobial activity of dispirooxindolopyrrolidine fused acenaphthenone heterocyclic hybrid against healthcare associated microbial pathogens (HAMPs)	Almansour, A.I. Arumugam, N. Kumar, R.S. Raju, R. Ponnuragan, K. AlDhabi, N. Premnath, D.	2020	Journal of Infection and Public Health	13	12	10
81	Improved heart disease diagnostic IoT model using machine learning techniques	Isravel, D.P. Vidya Priya Darcini, S. Silas, S.	2020	International Journal of Scientific and Technology Research	9	2	10
82	Prediction of Various Sizes of Particles in Deep Opencast Copper Mine Using Recurrent Neural Network: A Machine Learning Approach	Gautam, S. Patra, A.K. Brema, J. Raj, P.V. Raimond, K. Abraham, S.S. Chudugudu, K.R.	2022	Journal of The Institution of Engineers (India): Series A	103	1	10
83	Internet of things based intelligent accident avoidance system for adverse weather and road conditions	Onesimu, J.A. Kadam, A. Sagayam, K.M. Elngar, A.A.	2021	Journal of Reliable Intelligent Environments	7	4	10
84	Spatially Resolved Distribution, Sources, Exposure Levels, and Health Risks of Heavy Metals in <math><63\ \mu\text{m}</math> Size-Fractionated Road Dust from Lucknow City, North India	Gupta, V. Bisht, L. Arya, A.K. Singh, A.P. Gautam, S.	2022	International Journal of Environmental Research and Public Health	19	19	10
85	Prediction of COVID-19 active cases using exponential and non-linear growth models	Mahanty, C. Kumar, R. Mishra, B.K. Hemanth, D.J. Gupta, D. Khanna, A.	2022	Expert Systems	39	3	10
86	In silico molecular docking and physicochemical property studies on effective phytochemicals	Muthiah, I. Rajendran, K. Dhanaraj, P.	2021	Molecular and Cellular Biochemistry	476	2	10

	targeting GPR116 for breast cancer treatment						
87	Computational studies on bacterial secondary metabolites against breast cancer	Ravnik, Z. Muthiah, I. Dhanaraj, P.	2021	Journal of Biomolecular Structure and Dynamics	39	18	10
88	SARS-CoV-2 emerging Omicron subvariants with a special focus on BF.7 and XBB.1.5 recently posing fears of rising cases amid ongoing COVID-19 pandemic	Dhama, K. Chandran, D. Chopra, H. Aminul Islam, M. Emran, T.B. Rehman, M.E.U. Dey, A. Mohapatra, R.K. Praveen, S.V. Mohankumar, P. Sharma, A.K. Bhattacharya, P.	2022	Journal of Experimental Biology and Agricultural Sciences	10	6	9
89	Lung cancer detection and classification with DGMM-RBCNN technique	Jena, S.R. George, S.T. Ponraj, D.N.	2021	Neural Computing and Applications	33	22	9
90	Cancer cell detection through histological nuclei images applying the hybrid combination of artificial bee colony and particle swarm optimization algorithms	Alsarori, F.A. Kaya, H. Rahebi, J. Popescu, D.E. Hemanth, D.J.	2020	International Journal of Computational Intelligence Systems	13	1	9
91	Spatial distribution, pollution levels, and risk assessment of potentially toxic metals in road dust from major tourist city, Dehradun, Uttarakhand India	Gupta, V. Bisht, L. Deep, A. Gautam, S.	2022	Stochastic Environmental Research and Risk Assessment	36	10	9
92	Speckle noise suppression in 2D ultrasound kidney images using local pattern based topological derivative	Deepthy Mary Alex Hepzibah Christinal, A. Abraham Chandy, D. Singh, A. Pushkaran, M.	2020	Pattern Recognition Letters	131	-	9
93	Antidiabetic potential of methanolic extracts of Sargassum wightii in streptozotocin induced diabetic mice	Renitta, R.E. Narayanan, R. Cypriyana PJ, J. Samrot, A.V.	2020	Biocatalysis and Agricultural Biotechnology	28	-	9

94	Cancer MiRNA biomarker classification based on Improved Generative Adversarial Network optimized with Mayfly Optimization Algorithm	Tamilmani, G. Devi, V.B. Sujithra, T. Shajin, F.H. Rajesh, P.	2022	Biomedical Signal Processing and Control	75	-	9
95	Liposome nano-formulation with cationic polar lipid DOTAP and cholesterol as a suitable pH-responsive carrier for molecular therapeutic drug (all-trans retinoic acid) delivery to lung cancer cells	Grace, V.M.B. Wilson, D.D. Guruvayoorappan, C. Danisha, J.P. Bonati, L.	2021	IET Nanobiotechn ology	15	4	8
96	Deep Learning and TextBlob Based Sentiment Analysis for Coronavirus (COVID-19) Using Twitter Data	Chandrasekaran, G. Hemanth, J.	2022	International Journal on Artificial Intelligence Tools	31	1	8
97	Deep Learning based Object Detection using Mask RCNN	Triphena Delight, D. Karunakaran, V.	2021	Proceedings of the 6th International Conference on Communicati on and Electronics Systems, ICCES 2021	-	-	8
98	Polyaza functionalized graphene oxide nanomaterial based sensor for Escherichia coli detection in water matrices	Rose, L. Mary, X.A. Johnson, I. Srinivasan, G. Priya, L. Bhagavathsingh, J.	2021	Scientific Reports	11	1	7
99	Optical and antibacterial activity of biogenic core-shell ZnO@TiO2 nanoparticles	Karthikeyan, K. Chandraprabha, M.N. Hari Krishna, R. Samrat, K. Sakunthala, A. Sasikumar, M.	2022	Journal of the Indian Chemical Society	99	3	7
100	Plantar pressure and contact area measurement of foot	Rusu, L. Paun, E. Marin, M.I. Hemanth, J. Rusu, M.R. Calina,	2021	Brain Sciences	11	9	7

	abnormalities in stroke rehabilitation	M.L. Bacanoiu, M.V. Danoiu, M. Danciulescu, D.					
101	Image fusion practice to improve the ischemic-stroke-lesion detection for efficient clinical decision making	Hemanth, D.J. Rajinikanth, V. Rao, V.S. Mishra, S. Hannon, N.M.S. Vijayarajan, R. Arunmozhi, S.	2021	Evolutionary Intelligence	14	2	7
102	Local Ternary Co-occurrence Patterns based Lung Nodules Detection	Bruntha, P.M. Pandian, S.I.A. Anitha, J. Mohan, P. Dhanasekar, S.	2020	2020 6th International Conference on Advanced Computing and Communication Systems, ICACCS 2020	-	-	7
103	CNN architecture for diabetes classification	Nagabushanam, P. Jayan, N.C. Antony Joel, C. Radha, S.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-	7
104	Addressing the relevance of COVID-19 pandemic in nature and human socio-economic fate	Thapliyal, J. Bhattacharyya, M. Prakash, S. Patni, B. Gautam, S. Gautam, A.S.	2022	Stochastic Environmental Research and Risk Assessment	36	10	7
105	An anticancer-active imidazole analogue as a fluorescent sensor: sensitive and selective detection of Cu ²⁺ ions	Savithri, K. Prabhakaran, R. Paulpandi, M. Enoch, I.V.M.V. Mohan, P.S.	2020	Transition Metal Chemistry	45	7	7
106	Detection and grading of diabetic retinopathy in retinal images using deep intelligent systems: A comprehensive review	Priya, H.A.G. Anitha, J. Popescu, D.E. Asokan, A. Jude Hemanth, D. Son, L.H.	2021	Computers, Materials and Continua	66	3	6
107	Automatic 2D Lung Nodule Patch Classification using Deep Neural Networks	Akila Agnes, S. Anitha, J.	2020	Proceedings of the 4th International Conference on Inventive Systems and	-	-	6

				Control, ICISC 2020			
108	Magnetic and luminescent neodymium-doped carbon dot–cyclodextrin polymer nanocomposite as an anticancer drug-carrier	Alexander, A. Sumohan Pillai, A. Manikantan, V. Sri Varalakshmi, G. Allben Akash, B. Enoch, I.V.M.V.	2022	Materials Letters	313	-	6
109	In silico structure prediction, molecular docking and dynamic simulation studies on G Protein-Coupled Receptor 116: a novel insight into breast cancer therapy	Muthiah, I. Rajendran, K. Dhanaraj, P. Vallinayagam, S.	2021	Journal of Biomolecular Structure and Dynamics	39	13	6
110	A Noninvasive Approach Using Multi-tier Deep Learning Classifier for the Detection and Classification of Breast Neoplasm Based on the Staging of Tumor Growth	Renjith, V.S. Hency Jose, P.S.	2020	2020 International Conference on Decision Aid Sciences and Application, DASA 2020	-	-	6
111	A comprehensive review on deep learning techniques for a BCI-based communication system	Bhuvaneshwari, M. Kanaga, E.G.M. Anitha, J. Raimond, K. George, S.T.	2021	Demystifying Big Data, Machine Learning, and Deep Learning for Healthcare Analytics	-	-	6
112	Appraisal of deep-learning techniques on computer-aided lung cancer diagnosis with computed tomography screening	Agnes, S. Anitha, J.	2020	Journal of Medical Physics	45	2	6
113	Artificial Intelligence Techniques in Smart Cities Surveillance Using UAVs: A Survey	Thakur, N. Nagrath, P. Jain, R. Saini, D. Sharma, N. Hemanth, D.J.	2021	Studies in Computational Intelligence	971	-	6
114	Traditional and deep-based techniques for end-to-end automated karyotyping: A review	Remani Sathyan, R. Chandrasekhara Menon, G. Hariharan, S. Thampi, R. Duraisamy, J.H.	2022	Expert Systems	39	3	6

115	Curcumin-celecoxib: A synergistic and rationale combination chemotherapy for breast cancer	Alqahtani, A.M. Chidambaram, K. Pino-Figueroa, A. Chandrasekaran, B. Dhanaraj, P. Venkatesan, K.	2021	European Review for Medical and Pharmacological Sciences	25	4	6
116	Designed dual-functional surface-modified copper-iron sulfide nanocarrier for anticancer drug delivery	Pillai, A.S. Manikantan, V. Alexander, A. Varalakshmi, G.S. Akash, B.A. Enoch, I.V.M.V.	2022	Materials Today Communications	33	-	6
117	G-Quadruplex selectivity and cytotoxicity of a guanidine-encapsulated porphyrin-cyclodextrin conjugate	Alexander, A. Pillai, A.S. Nallamuthu, A. Pal, H. Enoch, I.V.M.V. Sayed, M.	2022	International Journal of Biological Macromolecules	218	-	6
118	Atmospheric Aerosols: Some Highlights and Highlighters, Past to Recent Years	Mushtaq, Z. Sharma, M. Bangotra, P. Gautam, A.S. Gautam, S.	2022	Aerosol Science and Engineering	6	2	6
119	A Novel Breast Cancer Diagnosis Scheme With Intelligent Feature and Parameter Selections	Punitha, S. Stephan, T. Gandomi, A.H.	2022	Computer Methods and Programs in Biomedicine	214	-	6
120	Poly- β -Cyclodextrin-coated neodymium-containing copper sulphide nanoparticles as an effective anticancer drug carrier	Sumohan Pillai, A. Alexander, A. Sri Varalakshmi, G. Manikantan, V. Allben Akash, B. Enoch, I.V.M.V.	2022	Journal of Microencapsulation	-	-	5
121	Convolutional Neural Network for Addiction Detection using Improved Activation Function	Bhuvaneshwari, M. Kanaga, E.G.M.	2021	Proceedings - 5th International Conference on Computing Methodologies and Communication, ICCMC 2021	-	-	5

122	Valencene post-treatment exhibits cardioprotection via inhibiting cardiac hypertrophy, oxidative stress, nuclear factor- κ B inflammatory pathway, and myocardial infarct size in isoproterenol-induced myocardial infarcted rats; A molecular study	Shervin Prince, S. Stanely Mainzen Prince, P. Berlin Grace, V.M.	2022	European Journal of Pharmacology	927	-	5
123	Investigation of Deep Features in Lung Nodule Classification	Bruntha, P.M. Dhanasekar, S. Ahmed, L.J. Khanna, D. Pandian, S.I.A. Abraham, S.S.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-	5
124	Jamun (Syzygium cumini (L.) Skeels) seed bioactives and its biological activities: A review	Kumar, M.	2022	Food Bioscience	50	-	5
125	Composite Deep Belief Network approach for enhanced Antepartum foetal electrocardiogram signal	Jagannath, D.J. Raveena Judie Dolly, D. Dinesh Peter, J.	2020	Cognitive Systems Research	59	-	5
126	Cervical cancer diagnosis based on cytology pap smear image classification using fractional coefficient and machine learning classifiers	Kalbhor, M. Shinde, S.V. Jude, H.	2022	Telkonnika (Telecommunication Computing Electronics and Control)	20	5	5
127	Feature Selection Using Flower Pollination Optimization to Diagnose Lung Cancer from CT Images	Johnson, D.S. Johnson, D.L.L. Elavarasan, P. Karunanithi, A.	2020	Advances in Intelligent Systems and Computing	1130	-	5

128	Seed Waste from Custard Apple (<i>Annona squamosa</i> L.): A Comprehensive Insight on Bioactive Compounds, Health Promoting Activity and Safety Profile	Kumari, N. P	2022	Processes	10	10	5
129	Classification of Road Accidents Using SVM and KNN	Beryl Princess, P.J. Silas, S. Rajsingh, E.B.	2021	Advances in Intelligent Systems and Computing	1133	-	5
130	Automated Detection of Infection in Diabetic Foot Ulcer Images Using Convolutional Neural Network	Yogapriya, J. Chandran, V. Sumithra, M.G. Elakkiya, B. Shamila Ebenezer, A. Suresh Gnana Dhas, C.	2022	Journal of Healthcare Engineering	2022	-	5
131	Advances in photoplethysmogram and electrocardiogram signal analysis for wearable applications	Ashisha, G.R. Anitha Mary, X.	2021	Advances in Intelligent Systems and Computing	1167	-	4
132	Biogenically engineered silver nanoparticles using bael leaf extract and evaluation of its therapeutic potential	Chaitanyakumar, A. Yadav, K.K. Gomez, L.A. Somu, P. Senthoo, S. Choudhury, P.W.J. Jena, S. Karua, C.S. Prasad, R. Prasad, S. Poojari, C.C.	2022	Materials Technology	37	11	4
133	Lung_PAYNet: a pyramidal attention based deep learning network for lung nodule segmentation	Bruntha, P.M. Pandian, S.I.A. Sagayam, K.M. Bandopadhyay, S. Pomplun, M. Dang, H.	2022	Scientific Reports	12	1	4
134	Computational Studies on T2Rs Agonist-Based Anti-COVID-19 Drug Design	Dhanaraj, P. Muthiah, I. Rozbu, M.R. Nuzhat, S. Paulraj, M.S.	2021	Frontiers in Molecular Biosciences	8	-	4
135	Challenges and opportunities in repurposing of drugs: Mini review	Sindhu, S. Murugan, S.	2020	Bangladesh Journal of Medical Science	19	3	4

136	Automated diagnosis of skin disease multiclass image classification using deep convolution neural network	Roshni Thanka, M. Bijolin Edwin, E. Shiny Duela, J. Ebenezer, V.	2020	Journal of Green Engineering	10	10	4
137	Detection of COVID-19 from Chest X-rays Using Resnet-50	Sreejith, V. George, T.	2021	Journal of Physics: Conference Series	1937	1	4
138	Bio efficacy assay of laccase isolated and characterized from trichoderma viride in biodegradation of low density polyethylene (LDPE) and textile industrial effluent dyes	Johnnie, D.A. Issac, R. Prabha, M.L.	2021	Journal of Pure and Applied Microbiology	15	1	4
139	Efficient multiscale fully convolutional UNet model for segmentation of 3D lung nodule from CT image	Agnes, S.A. Anitha, J.	2022	Journal of Medical Imaging	9	5	4
140	Lung Nodule Segmentation Using UNet	Niranjan Kumar, S. Bruntha, P.M. Isaac Daniel, S. Kirubakar, J.A. Elaine Kiruba, R. Sam, S. Immanuel Alex Pandian, S.	2021	2021 7th International Conference on Advanced Computing and Communication Systems, ICACCS 2021	-	-	4
141	A comparative analysis of deep neural networks for brain tumor detection	Deepa, P.L. Ponraj, N. Sreena, G.V.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-	4
142	Regulation of inflammation and COX-2 gene expression in benzo (a) pyrene induced lung carcinogenesis in mice by all trans retinoic acid (ATRA)	Grace, V.M.B. Wilson, D.D. Anushya, R. Siddikuzzaman	2021	Life Sciences	285	-	4

143	An automatic screening approach for obstructive sleep apnea from photoplethysmograph using machine learning techniques	Smily, J.J.E. Anitha, J. Hemanth, J.	2021	Telkonnika (Telecommunication Computing Electronics and Control)	19	4	4
144	An efficient approach for detection and classification of cancer regions in cervical images using optimization based CNN classification approach	Elayaraja, P. Kumarganesh, S. Martin Sagayam, K. Dang, H. Pomplun, M.	2022	Journal of Intelligent and Fuzzy Systems	43	1	4
145	Machine Learning Frameworks in Cancer Detection	Pramanik, S. Sagayam, K.M. Jena, O.P.	2021	E3S Web of Conferences	297	-	4
146	Molecular encapsulation by eosin yellow- β -cyclodextrin conjugate: Differential binding to quadruplex and duplex DNA	Soundarapandian, S. Alexander, A. Pillai, A.S. Manikantan, V. Yousuf, S. Enoch, I.V.	2022	Journal of Molecular Structure	1260	-	4
147	Dew Computing-Inspired Mental Health Monitoring System Framework Powered by a Lightweight CNN	Podder, T. Bhattacharya, D. Majumdar, A.	2022	Lecture Notes in Electrical Engineering	905	-	4
148	Classification of Uterine Fibroids in Ultrasound Images Using Deep Learning Model	Dilna, K.T. Anitha, J. Angelopoulou, A. Kapetanios, E. Chausalet, T. Hemanth, D.J.	2022	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	1335 2	-	4
149	An Intelligent Prediction Model for Target Protein Identification in Hepatic Carcinoma Using Novel Graph Theory and ANN Model	Sundar, G.N. Selvaraj, S. Narmadha, D. Sagayam, K.M. Jone, A.A.A. Aly, A.A. Le, D.-N.	2022	CMES - Computer Modeling in Engineering and Sciences	133	1	4

150	The Effect of Indian Fig Fruit Extract on Human Papilloma Virus containing Cervical Cancer Cells (HeLa) by Decreasing the HPV18 L1 Gene Load	Grace, V.M.B. B, L. Wilson, D.D.	2021	Asian Pacific Journal of Cancer Prevention	22	3	4
151	IoT-Enabled smart mask to detect COVID19 outbreak	Selvadass, S. Paul, J.J. Thusnavis Bella Mary, I. Packiavathy, I.S.V. Gautam, S.	2022	Health and Technology	12	5	4
152	AI driven automatic detection of bacterial contamination in water : AA review	Joy, C. Sundar, G.N. Narmadha, D.	2021	Proceedings - 5th International Conference on Intelligent Computing and Control Systems, ICICCS 2021	-	-	3
153	A transfer learning-based system for grading breast invasive ductal carcinoma	Sujatha, R. Chatterjee, J.M. Angelopoulou, A. Kapetanios, E. Srinivasu, P.N. Hemanth, D.J.	2022	IET Image Processing	-	-	3
154	Performance comparison of machine learning models for classification of traffic injury severity from imbalanced accident dataset	Beryl Princess, P.J. Silas, S. Rajsingh, E.B.	2021	Advances in Intelligent Systems and Computing	1167	-	3
155	Diabetic Retinopathy Diagnosis in OCT images using Convolutional Neural Network	Jancy, P.L. Iwin Thanakumar Joseph, S. Duela, J.S. Devi, D.M.R. Lakshmi, C.P.	2021	Proceedings - 2nd International Conference on Smart Electronics and Communication, ICOSEC 2021	-	-	3
156	Combinatorial double auction based meta-scheduler for medical image analysis application in grid environment	Periyasami, K. Mariammal, A.X.V. Joseph, I.T. Sarveshwaran, V.	2020	Recent Advances in Computer Science and Communications	13	5	3

157	Modeling an effectual multi-section You Only Look Once for enhancing lung cancer prediction	Jena, S.R. George, S.T. Ponraj, D.N.	2021	International Journal of Imaging Systems and Technology	31	4	3
158	Aegle marmelos (L.) Correa: An Underutilized Fruit with High Nutraceutical Values: A Review	Sharma, N. Radha Kumar, M. Zhang, B. Kumari, N. Singh, D. Chandran, D. Sarkar, T. Dhumal, S. Sheri, V. Dey, A. Rajalingam, S. Viswanathan, S. Mohankumar, P. Vishvanathan, M. Sathyaseelan, S.K. Lorenzo, J.M.	2022	International Journal of Molecular Sciences	23	18	3
159	Cyclodextrin and folate functionalized polymer nanocarriers: Chain length dependent properties	Sumohan Pillai, A. Alexander, A. Sri Varalakshmi, G. Manikantan, V. Allben Akash, B. Enoch, I.V.M.V.	2022	European Polymer Journal	179	-	3
160	Experimental Analysis of Filtering-Based Feature Selection Techniques for Fetal Health Classification	Jebadurai, I.J. Paulraj, G.J.L. Jebadurai, J. Silas, S.	2022	Serbian Journal of Electrical Engineering	19	2	3
161	Skin Cancer Prediction Using Machine Learning Algorithms	Lakshminarayanan, A.R. Bhuvaneshwari, R. Bhuvaneshwari, S. Parthasarathy, S. Jeganathan, S. Sagayam, K.M.	2022	Lecture Notes in Electrical Engineering	806	-	3
162	Machine learning analysis on the impacts of COVID-19 on India's renewable energy transitions and air quality	Stephan, T. Al-Turjman, F. Ravishankar, M. Stephan, P.	2022	Environmental Science and Pollution Research	29	52	3
163	A New Silver Nano-Formulation of Cassia auriculata Flower Extract and its Anti-Diabetic Effects	Grace, V.M.B. Wilson, D.D. Divyadharshini, M. Viswana-Than, S. Siddikuzzaman Gopal, R.	2022	Recent Patents on Nanotechnology	16	2	3

164	IoT based virtual reality game for physio-therapeutic patients	Martin Sagayam, K. Shibin, D. Dang, H. Wahab, M.H.A. Ambar, R.	2020	Annals of Emerging Technologies in Computing	4	4	3
165	Classification of Lung Nodule Using Hybridized Deep Feature Technique	Bruntha, M. Pandian, I.A. Abraham, S.S.	2021	Journal of Information Technology Management	12	-	3
166	Microstrip antenna for early stage breast cancer detection—a survey	Deepthy, G.S. Nesasudha, M.	2021	Health and Technology	11	6	3
167	A novel hybridized feature extraction approach for lung nodule classification based on transfer learning technique	Bruntha, P.M. Pandian, S.I.A. Anitha, J. Abraham, S.S. Kumar, S.N.	2022	Journal of Medical Physics	47	1	3
168	Protective role of All Trans Retinoic Acid on B16F10 melanoma cell line metastasis in C57BL/6 mice by enhancing RAR- β protein and homeostasis maintenance	Grace, V.M.B. Saranya, S. Wilson, D.D.	2021	Journal of Histotechnology	44	3	3
169	Common medicinal plants and their role against covid-19 for protection and treatment	Babu, A. Indiraleka, M. Mohan Maruga Raja, M.K. Premnath, D.	2021	Journal of Natural Remedies	21	2	3
170	Prediction of Diabetes Using ML Classifiers	Infancy, K.C. Bruntha, P.M. Pandiaraj, S. Joshiba Reby, J. Joselin, A. Selvadass, S.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-	3
171	HEART DISEASE CLASSIFICATION USING MACHINE LEARNING TECHNIQUES	Radhika, R. Thomas George, S.	2021	Journal of Physics: Conference Series	1937	1	3
172	Analytical approximate solution of fractional order smoking epidemic model	Günerhan, H. Rezazadeh, H. Adel, W. Hatami, M. Sagayam, K.M. Emadifar, H. Asjad, M.I. Hamasalh, F.K. Hamoud, A.A.	2022	Advances in Mechanical Engineering	14	9	3

173	Vehicle automation and car-following models for accident avoidance	Kadam, A. Andrew, J. Martin Sagayam, K. Hien, D.T.	2020	Przeegląd Elektrotechniczny	96	1	3
174	Isolation and Phytochemical Screening of Endophytic Fungi Isolated from Medicinal Plant <i>Mappia foetida</i> and Evaluation of Its In Vitro Cytotoxicity in Cancer	Ravi, P. Somu, P. Acharya, D. Gomez, L.A. Thathapudi, J.J. Ramachandra, Y.L. Rudraiah, S.B. Isaq, M. Karua, C.S. Arifullah, M. Poojari, C.C. Lee, Y.R.	2022	Applied Biochemistry and Biotechnology	194	10	3
175	An Image Processing Approach for Detection of Prenatal Heart Disease	Selvan, S. Thangaraj, S.J.J. Samson Isaac, J. Benil, T. Muthulakshmi, K. Almoallim, H.S. Ali Alharbi, S. Kumar, R.R. Timothy, S.P.	2022	BioMed Research International	2022	-	3
176	Lung Nodule Classification using Shallow CNNs and Deep Transfer Learning CNNs	Bruntha, P.M. Neebha, T.M. Dhanasekar, S. Pandian, S.I.A. Abraham, S.S. Kumar, S.N. Anitha, J.	2021	2021 7th International Conference on Advanced Computing and Communication Systems, ICACCS 2021	-	-	3
177	Impact of gut microbiome lactobacillus spp. In brain function and its medicament towards Alzheimer's disease pathogenesis	John, S.K. Chandrapragasam, V. Dey, P.	2021	Journal of Pure and Applied Microbiology	15	3	3
178	Phyto-pharmacological investigation of marine red algae <i>Kappaphycus alvarezii</i> (doty) doty ex silva for oral diseases	Sharan, L.V. Vennila, J.J.	2021	International Journal on Algae	23	2	2
179	IoT-Based Ensemble Method on PCG Signal Classification to Predict Heart Diseases	Daniel, E. Durga, S. Iwin Thanakumar Joseph, S.	2022	EAI/Springer Innovations in Communication	-	-	2

		Angelin, D. Raj, S.B.E.		on and Computing			
180	Machine Learning for Prediction of Clinical Appointment No-Shows	Joseph, J. Senith, S. Alfred Kirubaraj, A. Jino Ramson, S.R.	2022	International Journal of Mathematical , Engineering and Management Sciences	7	4	2
181	Deep Learning for Sleep Disorders: A Review	Hepsiba, D. Vijay Anand, L.D. Jane Preetha Princy, R.	2021	Proceedings of 2021 IEEE 7th International Conference on Bio Signals, Images and Instrumentation, ICBSII 2021	-	-	2
182	A Hybrid Random Forest Classifier for Chronic Kidney Disease Prediction from 2D Ultrasound Kidney Images	Alex, D.M. Chandy, D.A. Christinal, A.H. Singh, A. Pushkaran, M.	2022	International Journal of Pattern Recognition and Artificial Intelligence	36	7	2
183	Study on public chest X-ray data sets for lung disease classification	Sreena, G.V. Ponraj, N. Deepa, L.P.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-	2
184	Dual feature extraction based convolutional neural network classifier for magnetic resonance imaging tumor detection using U-Net and three-dimensional convolutional neural network	Suresh Kumar, R. Nagaraj, B. Manimegalai, P. Ajay, P.	2022	Computers and Electrical Engineering	101	-	2
185	Comparative Analysis of Melanoma Classification Using Deep Learning Techniques on Dermoscopy Images	Jeyakumar, J.P. Jude, A. Priya Henry, A.G. Hemanth, J.	2022	Electronics (Switzerland)	11	18	2

186	Design, synthesis, spectral analysis and molecular docking studies of some fluorescent biodiagnostic material as potential anti cervical cancer agents	Premnath, D. Indiraleka, M. Mosae Selvakumar, P. Enoch, I.V.M.V.	2020	Materials Today: Proceedings	47	-	2
187	Neural network based vehicle longitudinal controller – design and validation using hardware in loop testing	Sathiyar, P. Cherian, M. Pratap, B.	2020	International Journal of Scientific and Technology Research	9	3	2
188	Impact of electric vehicles in smart grids and micro-grids	Thomas, T. Michael, P.A. Joy, A.	2022	Smart Grids and Microgrids: Technology Evolution	-	-	2
189	Flexible dielectric resonator antenna using polydimethylsiloxane substrate as dielectric resonator for breast cancer diagnostics	Janapala, D.K. Nesasudha, M.	2021	Advances in Intelligent Systems and Computing	1166	-	2
190	Investigation of non-invasive hemoglobin estimation using photoplethysmograph signal and machine learning	Lakshmi, M. Bhavani, S. Manimegalai, P.	2020	Advances in Intelligent Systems and Computing	1108	-	2
191	COVID-19 pandemic, predictions and control in Saudi Arabia using SIR-F and age-structured SEIR model	Durai, C.A.D. Begum, A. Jebaseeli, J. Sabahath, A.	2022	Journal of Supercomputing	78	5	2
192	Review of computational techniques for the analysis of abnormal patterns of ECG signal provoked by cardiac disease	Jothiramalingam, R. Jude, A. Hemanth, D.J.	2021	CMES - Computer Modeling in Engineering and Sciences	127	3	2
193	Phytochemical Screening and Bioactivity Studies of Endophytes Cladosporium sp. Isolated from the Endangered Plant Vateria Indica Using	Isaq, M. Somu, P. Acharya, D. Gomez, L.A. Thathapudi, J.J. Ramachandra, Y.L. Rudraiah, S.B. Ravi, P. Rai, P.S. Rosalin, R.	2022	Applied Biochemistry and Biotechnology	194	10	2

	In Silico and In Vitro Analysis	Poojari, C.C. Lee, Y.R.					
194	Analysis of Diabetes Patients using Classification algorithms	Abinas, J.J. Chandolu, H.V.K. Nagabushanam, P. Radha, S. Krishna, V.M.	2021	Proceedings - 2021 IEEE 10th International Conference on Communication Systems and Network Technologies, CSNT 2021	-	-	2
195	Lobelia trigona Roxb-based nanomedicine with enhanced biological applications: In vitro and in vivo approach	Thanapaul, R.J.R.S. Manikandan, S.K. Govindaraj, T.S. Selvakumar, P.M. Enoch, I.V.M.V. Nadar, M.S.A.M.	2020	IET Nanobiotechnology	14	8	2
196	Clustering-Based Melanoma Detection in Dermoscopy Images Using ABCD Parameters	Jacinth Poornima, J. Anitha, J. Asha Gnana Priya, H.	2020	Advances in Intelligent Systems and Computing	766	-	2
197	Synthesis, computational studies and antibacterial assessment of dispirooxindolopyrrolidine integrated indandione hybrids	Alaqeel, S.I. Arumugam, N. Viswanathan, V. Almansour, A.I. Kumar, R.S. Padmanaban, R. Yeswanthkumar, S. Premnath, D. Ponmurugan, K. Al-Dhabi, N.A. Perumal, K.	2022	Journal of Molecular Structure	1267	-	2
198	Graphene oxide–rhodamine nanocomposite for picomolar detection of chromium(III) by fluorimetry and its biofilm inhibition	Velmurugan, K. Bhuvanesh, N. Prakash, A.F. Maheskumar, V. Vidhya, B. Murugan, S. Kumar, R.S. Almansour, A.I. Perumal, K. Nandhakumar, R.	2021	Microchimica Acta	188	12	2
199	Investigation of machine learning methodologies in microaneurysms discernment	Joseph, S.I.T. Sravanthi, T. Karunakaran, V. Priyadharsini, C.	2020	Advances in Intelligent Systems and Computing	1108	-	2

200	Diagnosis of coronary artery occlusion by fitting polynomial curve with the ECG signal based on optimization techniques	Jothiramalingam, R. Anitha, J. Hemanth, D.J.	2022	Network Modeling Analysis in Health Informatics and Bioinformatics	11	1	2
201	Nutritional, textural, and sensory quality of oil fried donut enriched with extracted dietary fiber and okara flour	Huq, S. Das, P.C. Islam, M.A. Jubayer, M.F. Ranganathan, T.V. Mazumder, M.A.R.	2021	Journal of Food Processing and Preservation	45	3	2
202	Green Synthesis, Experimental and Theoretical Studies to Discover Novel Binders of Exosomal Tetraspanin CD81 Protein	Anand, K. Khan, F.I. Singh, T. Elumalai, P. Balakumar, C. Premnath, D. Lai, D. Chaturgoon, A.A. Saravanan, M.	2020	ACS Omega	5	29	2
203	Deep learning-based semantic segmentation of interphase cells and debris from metaphase images	Sathyan, R.R. Menon, G.C. Prasad, H. Sreedharan, H. Hemanth, D.J.	2022	International Journal of Imaging Systems and Technology	32	6	2
204	Classification model for heart disease prediction with feature selection through modified bee algorithm	Velswamy, K. Velswamy, R. Swamidason, I.T.J. Chinnaiyan, S.	2022	Soft Computing	26	23	2
205	Effect of Culture Condition and Growth Kinetics on Phenol Biodegradation by an Indigenous Rhodococcus pyridinivorans Strain PDB9T NS-1	Barik, M. Das, C.P. Raut, S. Mahanty, B. Sahoo, N.K.	2022	Geomicrobiology Journal	39	3-5	2
206	Neodymium metal nanorods as camptothecin-carriers	Alexander, A. Sumohan Pillai, A. Manikantan, V. Sri Varalakshmi, G. Allben Akash, B. Enoch, I.V.M.V.	2022	Materials Letters	320	-	2

207	Extraction of chitosan from crab shell and fungi and its antibacterial activity against urinary tract infection causing pathogens	Abirami, S. Emilin Renitta, R. Samrot, A.V. Sakthikavitha, M. Revathi, P. Varsini, A.M. Dhiva, S. Saigeetha, S. Shobana, N. Prakash, P.	2021	Journal of Pure and Applied Microbiology	15	2	2
208	Comparative Performance Analysis of Kernel Functions in Support Vector Machines in the Diagnosis of Pneumonia using Lung Sounds	Amose, J. Manimegalai, P. Narmatha, C. Pradeep Raj, M.S.	2022	Proceedings of 2022 2nd International Conference on Computing and Information Technology, ICCIT 2022	-	-	2
209	Exploration of a framework for the identification of chronic kidney disease based on 2d ultrasound images: A survey	Alex, D.M. Chandy, D.A.	2021	Current Medical Imaging	17	4	2
210	CAD System for Detection and Classification of Liver Cancer using Optimization Neural Network Convolution Neural Network Classifiers	Jose, R. Chacko, S.	2020	Proceedings of 2020 IEEE International Conference on Power, Instrumentation, Control and Computing, P ICC 2020	-	-	2
211	Comparative Analysis of Liver Disease Detection using Diverse Machine Learning Techniques	Reddy, C.A. Kiran, L.S. Arul Xavier, V.M.	2022	Proceedings - 2022 6th International Conference on Intelligent Computing and Control Systems, ICICCS 2022	-	-	2
212	Automatic Chest CT Image Findings of Novel Coronavirus Pneumonia (COVID-19) Using U-Net Based Convolutional Neural Network	Agnes, S.A. Anitha, J. Solomon, A.A.	2021	Journal of Information Technology Management	12	-	1

213	Paradigm shift from conventional processes to advanced membrane adsorption-mediated inactivation processes towards holistic management of virus - A critical review	Dey, P. Haldar, D. Rangarajan, V. Suggala, V.S. Saji, G. Dilip, K.J.	2022	Journal of Environmental Chemical Engineering	10	6	1
214	Pneumonia Detection from Chest X-Ray Images Using Deep Learning Methods	Lenny, C. Margharet, A.A. Shiny, B. Tigga, S. George, S.T.	2022	Lecture Notes in Electrical Engineering	905	-	1
215	Advances in Intelligent Based Internet of Medical Things (IoMT) for COVID-19: Olfactory Disorders	Evelyn Brindha, V. Anitha Mary, X.	2021	Studies in Computational Intelligence	923	-	1
216	Major Advances in Monkeypox Vaccine Research and Development – An Update	Chandran, D. Nandanagopal, V.G. Gopan, M. Megha, K. Hari Sankar, C.R. Muhammad Aslam, M.K. Savanth, V.V. Pran, M. Nainu, F. Yattoo, Md.I. Ur Rehman, M.E. Chopra, H. Emran, T.B. Dey, A. Sharma, A.K. Saied, A.A. Dhama, K.	2022	Journal of Pure and Applied Microbiology	16	-	1
217	Distance to distrust: the dilemma for internal stakeholders in post COVID-19 hospitality	Vasudevan, S. Kumar, F.J.P.	2021	International Journal of Spa and Wellness	4	2-3	1
218	Dosimetric Comparison and Plan Evaluation of Different Dose Computing Algorithms for Different Radiotherapy Techniques in Head and Neck Tumors	Pandu, B. Khanna, D. Mohandass, P. Elavarasan, R. Vivek, T.R. Jacob, S. Sunny, G. Ninan, H. Maddipati, T.	2022	Iranian Journal of Medical Physics	19	6	1

219	Edge-based Heart Disease Prediction Device using Internet of Things	Jenifer, A. Jeba, G. Paulraj, L. Nithish Kumar, K. Yuvaraj, T. Alen, G. Peter Rozario, F. Amoli, R.	2022	Proceedings - International Conference on Applied Artificial Intelligence and Computing, ICAAIC 2022	-	-	1
220	Synthesis and Biological Evaluation of 4-Aminoantipyrine Analogues	Ren, H. Dhanaraj, P. Enoch, I.V.M.V. Paulraj, M.S. Indiraleka, M.	2022	Medicinal Chemistry	18	1	1
221	Novel Developmental Therapeutics Targeting Human Oral Squamous Cell Carcinoma Through Reactive Oxygen Species-Mediated Apoptosis	Jesse Joel, T. John, J. Gomez, L.A. Shepherd, R.	2022	Handbook of Oxidative Stress in Cancer: Therapeutic Aspects: Volume 1	1	-	1
222	Synthesis, antibiofilm activity and molecular docking study of new water-soluble copper(II)-pincer complexes	Nagarasu, P. Gayathri, P. Sri, S.N. Saisubramanian, N. Dhanaraj, P. Moon, D. Anthony, S.P. Madhu, V.	2022	Inorganic Chemistry Communications	139	-	1
223	Effects of addition of cement in flyash based geopolymer concrete	Samuvel, R.R. Prince, A.G.	2020	International Journal on Emerging Technologies	11	3	1
224	Molecular encapsulation of berberine and ethidium bromide in anthraquinonecarboxamido- β -cyclodextrin conjugate: supramolecular association with DNA duplex and G-quadruplexes	Soundarapandian, S. Alexander, A. Sumohan Pillai, A. Enoch, I.V.M.V. Yousuf, S.	2021	Nucleosides, Nucleotides and Nucleic Acids	40	5	1
225	A Novel Remote Sensing Based Approach to Estimate the Water Quality Index Using Sentinel-2 Multispectral Data	Rahul, T.S. Brema Karunya, J. John Wessley, G.J.	2022	1st IEEE International Conference on Smart Technologies and Systems for Next Generation	-	-	1

				Computing, ICSTSN 2022			
226	Biogenic larvicidal formulation of metabolites from <i>Steinernema saimkayi</i> symbiont <i>Xenorhabdus stockiae</i> KUT6 against dengue vector <i>Aedes aegypti</i>	Jissin, M. Vani, C.	2020	Tropical Biomedicine	37	3	1
227	IMPACT OF THREE DIFFERENT MATCHING METHODS ON PATIENT SET-UP ERROR IN X-RAY VOLUMETRIC IMAGING FOR HEAD AND NECK CANCER	Mohandass, P. Khanna, D. Nishaanth, B. Saravanan, C. Bhalla, N. Puri, A. Mohandass, B.	2020	Reports of Practical Oncology and Radiotherapy	25	6	1
228	Prediction of Carcinoma Cancer Type Using Deep Reinforcement Learning Technique from Gene Expression Data	Prathik, A. Vinodhini, M. Karthik, N. Ebenezer, V.	2022	Lecture Notes on Data Engineering and Communications Technologies	101	-	1
229	Efficacy of Deep Learning Approach for Automated Melanoma Detection	Renjith, V.S. Subha Heney Jose, P.	2021	2021 International Conference on Decision Aid Sciences and Application, DASA 2021	-	-	1
230	A Survey on Computer-Aided Intelligent Methods to Identify and Classify Skin Cancer	Jeyakumar, J.P. Jude, A. Priya, A.G. Hemanth, J.	2022	Informatics	9	4	1
231	CNN Architecture for Lung Cancer Detection	Tejaswini, C. Nagabushanam, P. Rajasegaran, P. Johnson, P.R. Radha, S.	2022	Proceedings - 2022 IEEE 11th International Conference on Communication Systems and Network Technologies, CSNT 2022	-	-	1

232	Preparation of Paclitaxel-Encapsulated Bio-Functionalized Selenium Nanoparticles and Evaluation of Their Efficacy against Cervical Cancer	Menon, S. Jayakodi, S. Yadav, K.K. Somu, P. Isaq, M. Shanmugam, V.K. Chaitanyakumar, A. Basavegowda, N.	2022	Molecules	27	21	1
233	Regulatory action of all trans cancer acid on metastasis induced lung cell metabolic changes during implantation of B16F10 cancer cells in C57BL6 mice	Grace, V.M.B. Wilson, D.D. Saranya, S. Peardon, R.	2021	Journal of Pure and Applied Microbiology	15	2	1
234	Automatic Drowsiness Detection for Preventing Road Accidents	Bearly, E.M. Chitra, R.	2021	Proceedings - 1st International Conference on Smart Technologies Communication and Robotics, STCR 2021	-	-	1
235	An Improved Deep Neural Learning Classifier for Brain Tumor Detection	Kurian, S.M. Juliet, S.	2022	Proceedings - 6th International Conference on Computing Methodologies and Communication, ICCMC 2022	-	-	1
236	Synthesis and evaluation of intrinsic bioactivity of fluorescein and phenolphthalein derivatives	Santhoshkumar, P. Bharathkumar, K. Obadiah, A. Mohanapriya, R. Durairaj, A. Ramanathan, S. Vasanthkumar, S.	2022	Journal of the Iranian Chemical Society	19	4	1
237	Crystallization of 1, 4-cyclohexanedicarboxylic acid bridged tetranuclear Cu(II) complex containing N-N chelating ligand – crystal structure, antimicrobial,	Shanjitha, S. Suvarna, K. Zothanzama, J. Kumar, N.S. Premnath, D. Kirubavathy, S.J.	2022	Journal of the Iranian Chemical Society	19	12	1

	antioxidant, cytotoxicity and electrochemical studies						
238	Deep Learning-Based Lung Cancer Detection	Mahima, S. Kezia, S. Grace Mary Kanaga, E.	2022	Lecture Notes in Electrical Engineering	905	-	1
239	Global implications of biodiversity loss on pandemic disease: COVID-19	Brema, J. Gautam, S. Singh, D.	2022	COVID-19 and the Sustainable Development Goals	-	-	1
240	Classification of Lung nodules using Convolutional long short-term Neural Network	Akila Agnes, S. Alex Pandian.s, I. Anitha, J. Solomon. A, A.	2021	Proceedings - 5th International Conference on Computing Methodologies and Communication, ICCMC 2021	-	-	1
241	Health Monitoring and Observatory System for Paralyzed Patients using Blynk Application	Varghese, N. Hepsiba, D. Vijay Anand, L.D.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-	1
242	In Vivo Treatment Efficacy of Essential Oil Isolated from Seeds of Momordica charantia in Streptozotocin-Induced Diabetes Mellitus	Mariammal, B.G.V. Devarajan, D.W. Jerrin, R. Viswanathan, S. Siddikuzzaman Gopal, R.	2021	Recent Patents on Biotechnology	15	4	1
243	Detection of Acute Lymphoblastic Leukemia in Microscopic images using Image Processing Techniques	Philip, A.T. Shifaana, S. Sunny, S. Manimegalai, P.	2021	Journal of Physics: Conference Series	1937	1	1
244	Design of Automatic Speed Controlling System	David, J. Jayasingh, R. Daniel, D. Joel Morris Raj, M. Blessytelagathoti, D.	2020	ICDCS 2020 - 2020 5th International Conference on Devices, Circuits and Systems	-	-	1

245	IoT-enabled traffic sign recognition for safe driving	Joseph, S.I.T. Paulin, P.R.K. George, J.A. Joy, J. Smily, J.E.	2021	International Journal of Computer Aided Engineering and Technology	14	3	1
246	A Literature Survey on the Applications of Internet of Things	Mary Havilah Haque, B. Jackuline Moni, D. Gracia, D.	2021	Przegląd Elektrotechniczny	97	12	1
247	An Automated Kidney Tumour Detection Technique from Computer Tomography Images	Thomas, N.R. Anitha, J.	2022	Proceedings of International Conference on Computing, Communication, Security and Intelligent Systems, IC3SIS 2022	-	-	1
248	Coordination diversity in transition metal complexes with 4-aminoantipyrine tethered bis(imino)pyridine ligand: structures, superoxide dismutase and anticancer properties	Pitchaimani, J. Rajkumar, S.T.R.J. Mahalingam, S.M. Philip Anthony, S. Moon, D. Madhu, V.	2020	Journal of Coordination Chemistry	73	23	1
249	ML & DL Methodologies in Heart Disease Prediction: Brief Analysis	Joseph S, I.T. Velliangiri, S. Mythily, M. Jancy, P.L. Kethsy Prabavathy, A.	2022	8th International Conference on Advanced Computing and Communication Systems, ICACCS 2022	-	-	1
250	Mineral composition, phytochemical analysis, anti-oxidant and anti-diabetic activities of a polyherbal formulation- an in vitro approach	Jacob, B. RT, N. Nadar, M.M. Itsaranuwat, P.	2022	Chemical Data Collections	39	-	1

251	Psychosocial Perceptions as Significant Impact Modifiers A Mixed Method Research Among Hospitalized Covid-19 Patients in A Tertiary Care Hospital in Coimbatore District, Tamil Nadu	Purushothaman, P. Susila, T. Santhanakrishnan, I. Rajamanickam, S. Karthikeyan, K. Babu, S.R.	2022	National Journal of Community Medicine	13	12	1
252	Cardiac arrhythmia classification using sequential feature selection and decision tree classifier method	Durga, S. Daniel, E. Deepa Kanmani, S. Philip, J.M.	2021	International Journal of Innovative Computing and Applications	12	4	1
253	Beneficial health effects of cumin (Cuminum cyminum) seeds upon incorporation as a potential feed additive in livestock and poultry: A mini-review	Vinod, N. Sreelakshmi, K.S. Neha, A.R. Soman, M. Manalil, S. Sureshkumar, R. Sabareeshwari, V. Naveen Kumar, P. Kumar, K.K. Sangeetha, K.S. Lishma, N.P. Pran, M. Sharma, A.K. Alagawany, M. Dhama, K. Marthandan, V. Chandran, D.	2022	Journal of Experimental Biology and Agricultural Sciences	10	5	1
254	Automatic Breast Tumor Cancer Diagnosis Based on a Hybrid Densenet	Jayandhi, G. Leena Jasmine, J.S. Seetharaman, R. Mary Joans, S. Priscilla Joy, R.	2022	8th International Conference on Advanced Computing and Communication Systems, ICACCS 2022	-	-	1
255	Machine Learning and Internet of Things Techniques to Assist the Type I Diabetic Patients to Predict the Regular Optimal Insulin Dosage	Jemima Jebaseeli, T. Jasmine David, D. Jegathesan, V.	2021	Internet of Things	-	-	1
256	Cross-vehicle communication based on packet network theory	Kalaiselvi, K. Bazil Wilfred, C. Bijolin Edwin, E.	2021	Journal of Nuclear Energy Science and	10	9	0

		Arya, N. Jain, P. Sentamilselvan, K.		Power Generation Technology			
257	Computer Aided Skin Disease (CASD) Classification Using Machine Learning Techniques for iOS Platform	Alvino Rock, C. Bijolin Edwin, E. Arvinthan, C. Kevin Joseph Paul, B. Jayaraj, R. Jeba Kumar, R.J.S.	2022	Intelligent Systems Reference Library	206	-	0
258	Deep Learning-Based Enhanced Classification Model for Pneumonia Disease	Jeba Priya, S. Joshua Jaistein, S. Naveen Sundar, G. Raja Sundrapandianlee banon, T.	2021	Smart Innovation, Systems and Technologies	224	-	0
259	A Systematic Review on Recent Techniques for the Detection of Multiple Myeloma	Shinu, M.M. Pamela, D. Sree Sankar, J. Devadhas, G.G.	2022	Proceedings of the 2022 3rd International Conference on Intelligent Computing, Instrumentation and Control Technologies: Computational Intelligence for Smart Systems, ICICICT 2022	-	-	0
260	A preliminary study on design of a modular agricultural mobile robot	Joseph, D.M. Santhosh, S. Yesudas, K. Sojan, A. Mahanta, G.B.	2022	AIP Conference Proceedings	2670	-	0
261	Evaluation of Antidiabetic Activity of Sargassum tenerrimum in Streptozotocin-Induced Diabetic Mice	Joy Lindsey, A.P. Issac, R. Prabha, M.L. Renitta, R.E. Catherine, A. Samrot, A.V. Abirami, S. Prakash, P. Dhiva, S.	2021	Journal of Pure and Applied Microbiology	15	4	0
262	Sustainable method of automatic detection of tumor using super pixel segmentation	Jose, R. Chacko, S. Jarin, T.	2021	AIP Conference Proceedings	2396	-	0

263	Health risk detection through web app using machine learning	Goel, R. Aggarwal, T. Reddy, B.B. Dutta, P.J. Chintamaneni, A. Agrawal, S.	2022	2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering, ICACITE 2022	-	-	0
264	A photoplethysmography-based diagnostic support system for obstructive sleep apnea using deep learning approaches	Jothi, E.S.J. Anitha, J. Hemanth, D.J.	2022	Computers and Electrical Engineering	102	-	0
265	Future trends and challenges of UAV: Conclusion	Tharun, V. Parthiban, S. Marry, T.B. Martin Sagayam, K. Elnagar, A.A.	2022	Unmanned Aerial Vehicles and Multidisciplinary Applications Using AI Techniques	-	-	0
266	Smart Fetal Health Monitor	Anu Shilvya, J. Subha Hency Jose, P.	2022	Lecture Notes in Electrical Engineering	905	-	0
267	An emerging paradigms on cervical cancer screening methods and devices for clinical trails	Raimond, K. Rao, G.B. Juliet, S. Tamilarasi, S.R.G. Evangelin, P.S. Mathew, L.	2022	Frontiers in Public Health	10	-	0
268	Influence of artificial intelligence and visible light communication in autonomous vehicles	Vijayalakshmi, B.A. Ayyadurai, M. Nesasudha, M.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-	0
269	Investigation of leukemogenic mechanisms using metabolomic approaches	Anand, D.A. Kavya, K.V.P. Samrot, A.V. Stephen, S.E.A. Fernando, S. Jerald, J.C.P.	2021	Biointerface Research in Applied Chemistry	11	3	0

270	An efficient 2-aminothiazolesalicylaldehyde fluorescent chemosensor for Fe ²⁺ ion detection and a potential inhibitor of NUDT5 signaling hormone for breast cancer cell and molecular keypad lock application	Basha, S.B. Charles, I.D. Raju, N. Manokaran, S. Kuzhandaivel, H.	2022	Chemical Papers	76	11	0
271	Breast Cancer Detection based on 3-D Mammography Images using Deep Learning Strategies	Martin Sagayam, K. Amir Anton Jone, A. Cengiz, K. Rajesh, L. Elngar, A.A.	2022	Journal of Information Technology Management	14	4	0
272	COVID 19 an infectious disease influenced in modern era - Recent survey in India	Subash, T.D. Subha, T.D. Titus, I. Nazim, A. Peter, E.	2020	Materials Today: Proceedings	43	-	0
273	An Efficacy of Covid - 19 Pandemic: Recovery of Workplace Environment and Ecosystem	Sivaprakash, P. Kanchana, S. Venkataramanan, P. Michael, P.A.	2022	International Journal of Occupational Safety and Health	12	3	0
274	Recent Advancements in Nanomaterials for Photodynamic Therapy of Cancers	Shabbirahmed, A.M. Kumaravel, M. Somu, P. Paul, S. Khadria, A.	2022	Handbook of Oxidative Stress in Cancer: Therapeutic Aspects: Volume 1	1	-	0
275	Green telecare: An iot and cloud based identification of common thoracic diseases using deep learning approach	Daniel, E. Durga, S. Vijayalakshmi, J. Janani, R. Susila, N.	2021	Journal of Green Engineering	11	2	0
276	Prediction of Diabetes and Symptoms of Covid-19 Using Machine Learning Classifiers	Baby, S.T. Xavier, S.B. Kathrine, G.J.W.	2022	Proceedings - International Conference on Applied Artificial Intelligence and Computing, ICAAIC 2022	-	-	0
277	Interaction network of insulin resistance proteins with organophosphorus	Joy, A. Balaji, S. Alam, M.A.	2021	International Journal of Computational Biology and Drug Design	14	2	0

	and chlorine pesticides						
278	Dosimetric Importance of Implementing Jaw Tracking Technique in Radiotherapy Treatment Plan Execution	Hridya, V.T. Khanna, D. Raj, A. Padmanabhan, S. Mohandass, P.	2022	Asian Pacific Journal of Cancer Prevention	23	4	0
279	An In Situ Design/Analysis Method of Antimicrobial Effect Using Nano TiO ₂ for Disinfecting COVID-Affected Places	Kumar, T.A. Rajakumar, G. Samuel, T.S.A. Nirmal, D.	2022	Journal of Testing and Evaluation	50	5	0
280	Breast Cancer Segmentation by K-Means and Classification by Machine Learning	Priya, K. Senthilkumar, V. Samson Isaac, J. Kottu, S. Ramakrishna, V.S. Jogendra Kumar, M.	2022	International Conference on Automation, Computing and Renewable Systems, ICACRS 2022 - Proceedings	-	-	0
281	Efficient Breast Cancer Prediction using Hybrid Deep Learning in mammographic images	Jayandhi, G. Leena Jasmine, J.S. Seetharaman, R. Joans, S.M. Priscilla Joy, R.	2022	Proceedings of the International Conference on Electronics and Renewable Systems, ICEARS 2022	-	-	0
282	Investigation on maternal and fetal heart signal extraction using adaptive filtering techniques and integrating with block sparse bayesian learning	Telagathoti, D.B. Sailusha, P. Dolly, R.J. Garlapati, Y.R.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-	0

283	Correction to: Exposure and health risk assessment of nitrate contamination in groundwater in Coimbatore and Tirupur districts in Tamil Nadu, South India (Environmental Science and Pollution Research, (2021), 28, 8, (10248-10261), 10.1007/s11356-020-11552-y)	Jayarajan, S.K.P. Kuriachan, L.	2021	Environmental Science and Pollution Research	28	47	0
284	Automatic detection of malarial parasites from blood cells using soft computing techniques	Karunharan, K.A. Mary, X.A.	2020	International Journal of Pharmaceutical Research	12	4	0
285	Synthesis, molecular docking, cytotoxicity and antioxidant activity evaluation of 4-(3-chloro-1, 4-dioxo-1, 4-dihydronaphthalen-2-ylamino) benzenesulfonamide derivatives	Kumar, P.S. Kumar, K.B. Obadiah, A. Mohanapriya, R. Durairaj, A. Ramanathan, S. Vasanthkumar, S.	2020	International Journal of Pharmaceutical Research	12	1	0
286	Machine Learning-Based Diagnosis of Diseases Associated with Abnormal and Heavy Menstrual Bleeding: A Literature Review	Raji, P. Subha Hency Jose, P.	2022	Lecture Notes in Electrical Engineering	905	-	0
287	Conclusions	Estrela, V.V. Hemanth, J. Saotome, O. Nikolakopoulos, G. Sabatini, R.	2020	Imaging and Sensing for Unmanned Aircraft Systems: Deployment and Applications	-	-	0
288	Green iot-low cost device for the detection of deep vein thrombosis using edge computing	Jebadurai, J. Jebadurai, I.J. Paulraj, G.J.L. Joseph, B.R.C.	2021	Journal of Green Engineering	11	2	0

289	Melanoma Detection and Classification based on Dermoscopic Images using Deep Learning Architectures-A Study	Samuel, N.E. Anitha, J.	2022	4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022 - Proceedings	-	-	0
290	PRE-DETECTION of FOOT ULCER for DIABETIC PATIENT USING THERMAL IMAGER	Priya, V. Pamela, D. Geard Joe Nigel, K. Michael, P.A.	2021	Journal of Physics: Conference Series	1937	1	0
291	Liver cancer detection based on various sustainable segmentation techniques for CT images	Jose, R. Chacko, S.	2022	International Journal of Environmental Technology and Management	25	3	0
292	Phytochemicals from artocarpus heterophyllus and its potential applications: A review	ANU, J.	2021	Plant Cell Biotechnology and Molecular Biology	22	29-30	0
293	Data science: A survey on the statistical analysis of the latest outbreak of the 2019 pandemic novel coronavirus disease (COVID-19) using ANOVA	Babu, R.M.H. Shebana, M. Harish, R.M. Kanimozhi, V. Kumar, K.A.	2021	Data Science for COVID-19: Volume 2: Societal and Medical Perspectives	-	-	0
294	Comparative Analysis of Deep Learning Models for Covid-19 Detection from Chest X-rays	Sreena, V.G. Deepa, P.L. Ponraj, D.N.	2022	Proceedings of 2nd IEEE International Conference on Disruptive Technologies for Multi-Disciplinary Research and Applications, CENTCON 2022	-	-	0
295	Early Detection of Breast Tumor Using Antenna	Karthikeyan, T.A. Nesasudha, M.	2022	Lecture Notes in Electrical Engineering	777	-	0

296	Savitzky-Golay Pre-processed Kulczynski Similarity Feature Extractive Convolutional Deep Belief Network for Brain Tumor Detection	Kurian, S.M. Juliet, S.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-	0
297	Gene co-expression analysis and Network biology studies in Indian population reveals functional similarities between Gastric cancer and other metabolic disorders	Mohandas, B. Vennila, J.J. Ruban, N.	2022	Bangladesh Journal of Medical Science	21	3	0
298	Green technology based biomedical device for low cost screening of arthritis in rural areas	Isaac, S. Raj, A.C. Hepsiba Anand, V. Prabakar, S.	2020	Journal of Green Engineering	10	10	0
299	Dosimetric Importance of the Implementation of Daily Image Guidance in Radiotherapy Practice	Hridya, V.T. Khanna, D. Raj, A. Padmanabhan, S. Mohandass, P.	2022	Asian Pacific Journal of Cancer Prevention	23	1	0
300	Statistical Analysis on the Effects of Lockdown and Its Impact on Childhood Education During Covid-19	Hepsiba, D. Anand, L.D.V. Isaac, J.S.	2021	International Journal of Early Childhood Special Education	13	2	0
301	A preliminary study on autonomous drone systems for agriculture pesticide spraying	Vishal, R. Mahanta, G.B.	2022	AIP Conference Proceedings	2670	-	0
302	Comparative analysis of the efficacy of the eeg-based machine learning method for the screening and diagnosing of alcohol use disorder (aud)	Varghese, S.G. Jacob, O.R. Jose, P.S.H. Jegan, R.	2021	Advances in Intelligent Systems and Computing	1167	-	0
303	Synthesis, characterization, X-ray crystal structures and antibacterial properties of cobaloximes with aniline based ligands	Boopalan, S. Antony, A. Loyid, N.S. Vijaikanth, V. Murugan, S.	2021	Inorganic and Nano-Metal Chemistry	-	-	0

	containing acid functionality						
304	Impact of Plant Health on Global Food Security: A Holistic View	Srinivasan, T.S. Thankappan, S. Balasubramaniam, M. Bhaskar, V.	2022	Agriculture, Environment and Sustainable Development: Experiences and Case Studies	-	-	0
305	Air quality in five major cities of India induced by the COVID-19 pandemic lockdown	Priya, K.L. G. S, S. S, H. S, A. J, B.	2021	Toxicological and Environmental Chemistry	103	1	0
306	Automatic Detection of Leukemia from Blood Cells Using Soft Computing Methods	Karunharan, K.A. Mary, X.A.	2022	Lecture Notes in Networks and Systems	356	-	0
307	A Study on Predicting Software Defects with Machine Learning Algorithms	Anjali, C. Dhas, J.P.M. Singh, J.A.P.	2022	Proceedings of 2022 International Conference on Intelligent Innovations in Engineering and Technology, ICIET 2022	-	-	0
308	An overview of ultra-wide band antennas for detecting early stage of breast cancer	Anooradha, M.K. Amir Anton Jone, A. Jones Mary Pushpa, A. Neethu Susan, V. Beril Lynora, T.	2021	Advances in Intelligent Systems and Computing	1166	-	0
309	Advances and prospects of medicinal herbs and their natural bioactive components for effective control of diabetics	Pinaki, D. Ashok, S. Mahesh, J.A. Amritha, S. Sara, S.G.	2022	Research Journal of Chemistry and Environment	26	6	0
310	Green transportation technology based on ergonomic posture monitoring for enhanced driver safety system	Raj, A.C. Isaac, J.S. Kumar, R. Dhanasony Prabakar, S.	2020	Journal of Green Engineering	10	11	0

311	Transmission Mechanisms of Bioaerosols: An Unseen Threat to Human Health	Gautam, S. Salam, M.A. Sumon, M.H. Iqbal, M.A. Pavoni, B. Khan, M.B.	2021	Bow Ties in Process Safety and Environmental Management: Current Trends and Future Perspectives	-	-	0
312	Investigations on machine learning models to envisage coronavirus in patients	Sabitha, R. Shanthini, J. Bhavadharini, R.M. Karthik, S.	2022	Tele-Healthcare: Applications of Artificial Intelligence and Soft Computing Techniques	-	-	0
313	Phytochemical Profiling, In Vitro Antioxidant Activity of Euphorbia hirta Extracts and In Silico Study Targeting Human Peroxiredoxin 5 Receptor	Poorna Rupha, R. Jacob, A. Sathiyajith, J.N.	2022	Current Trends in Biotechnology and Pharmacy	16	3	0
314	Energy and basic reproduction number of n-Corona graphs prior to order 1	Veninstine, V.J.	2022	Proyecciones	41	4	0
315	Intelligent Speed Breaker Using Internet of Things	Ashwin, S. Paulraj, G.J.L. Jebadurai, I.J. Jebadurai, J.	2022	Proceedings - International Conference on Augmented Intelligence and Sustainable Systems, ICAISS 2022	-	-	0
316	Sustainable analysis of liver tumour detection using various segmentation techniques	Jose, R. Chacko, S.	2021	World Review of Science, Technology and Sustainable Development	17	2-3	0

317	Erratum: More Than Smell-COVID-19 Is Associated with Severe Impairment of Smell, Taste, and Chemesthesis (Chemical Senses (2020) DOI: 10.1093/chemse/bjaa041)	Parma, V et al	2021	Chemical Senses	46	-	0
318	Brain tumor image segmentation using Deep learning	Armstrong, T.R.E. Manimegalai, P. Abinath, A. Pamela, D.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-	0
319	Nanoparticles as antimicrobial agents and drug delivery systems - A review	Suluvoy, J.K. Gomez, P.L.A. Joel, T.J. Toppo, N. Karthikeyan, D.P. Shepherd, R.	2021	Journal of Pure and Applied Microbiology	15	4	0
320	Pomegranate Quality Analysis and Classification Using Feature Extraction and Machine Learning	Kumar, P.S.V.V.S.R. Sudha, S. Das, P. Pradeep, D. Isaac, J.S. Vijaipriya, K.	2022	6th International Conference on Electronics, Communication and Aerospace Technology, ICECA 2022 - Proceedings	-	-	0
321	An Investigation on Impact of Malnutrition in Human Health and Technique to Evaluate the Nutrient Intake from the Food Image	Sreetha, E.S. Sundar, G.N. Narmadha, D.	2022	2022 IEEE International Power and Renewable Energy Conference, IPRECON 2022	-	-	0
322	Review of Non-Invasive Blood Pressure Estimation via Modern Approaches	Jegan, R. Sneha, K.M. Nimi, W.S.	2022	3rd International Conference on Smart Electronics and Communication, ICOSEC 2022 - Proceedings	-	-	0

323	Regulatory Aspects for Flavor and Fragrance Materials	Areekal, N.N. Ramachandran, V. Jayakumar, A. Haponiuk, J.T. Thankachan, R.	2021	Natural Flavors, Fragrances, and Perfumes: Chemistry, Production, and Sensory Approach	-	-	0
324	Prediction of Diabetics Using Machine Learning Classifiers: A Review	Baby, S.T. Karunakaran, V.	2021	Proceedings of the 5th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), I-SMAC 2021	-	-	0
325	An Effective Segmentation of Breast Cancer Using Modified U-NET	Jayandhi, G. Jasmine, J.S.L. Seetharaman, R. Joans, S.M. Joy, R.P.	2022	8th International Conference on Advanced Computing and Communication Systems, ICACCS 2022	-	-	0
326	An efficient data analytics model for predicting the harmful effects of air pollutants	Naveen Sundar, G. Narmadha, D. Immanuel, S.	2020	International Journal of Scientific and Technology Research	9	2	0
327	Analysis of normal lung irradiation in radiosurgery treatments: a comparison of lung optimized treatment (LOT) on cyberknife, 4D target volume on helical tomotherapy, and DIBH on linear accelerator	Holla, R. Khanna, D. Narayanan, V.K.S. Dutta, D.N.	2021	Physical and Engineering Sciences in Medicine	44	4	0
328	Side Effects of Mercury Based Clinical Thermometer and India's Trade Performance to Select Countries - An Analysis	Kalpana Sai, B. Senith, S. Anthony Raj, S.	2021	Journal of Physics: Conference Series	1937	1	0

329	Raspberry Pi based Contactless Attendance Monitoring System for Hospitals	Rejoy Matthew, M. Hency Jose, P.S.	2022	Proceedings - International Conference on Augmented Intelligence and Sustainable Systems, ICAISS 2022	-	-	0
330	Simulation and Modelling of BCI Based Multi Purpose Wheel Chair for Paralysed People	Sindhuja, R. Samson Isaac, J. Vijayakumar, P. Joseph, J. Samuel, A.E.A.	2021	Journal of Physics: Conference Series	1937	1	0
331	Liver Tumor Classification Using Optimal Opposition-Based Grey Wolf Optimization	Jose, R. Chacko, S. Jayakumar, J. Jarin, T.	2022	International Journal of Pattern Recognition and Artificial Intelligence	36	16	0
332	Identification of diabetic retinopathy for retinal images using feed forward neural network	Asha Gnana Priya, H. Anitha, J.	2021	Lecture Notes on Data Engineering and Communications Technologies	54	-	0
333	Changing Patterns in the Spread of Human Monkeypox: A Dangerous New Development in Disease Epidemiology	Chandran, D. Hridya, P. Prasanth, D. Abernaa, D. Kaaviya, A.V. Menon, P.S.S. Vinodhini, D. Aslam, M.K.M. Pran, M. Savanth, V.V. Nainu, F. Yattoo, M.I. Ur Rehman, M.E. Chopra, H. Emran, T.B. Dey, A. Sharma, A.K. Dhama, K.	2022	Journal of Pure and Applied Microbiology	16	1 S	0
334	IoT Medicine in COVID-19 Detection and Emergency Ambulance Alert with Hand Sanitizer	Paul, P.N. Sagayam, K.M.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-	0
335	A review of the possible implication of COVID-19	Peter, D. Xavier, P.	2020	International Journal of Current	12	19	0

	lockdown on eating habits			Research and Review			
336	Medicalization of sexuality and sexual health: A perspective review	Goyal, R. Chandran, D. Garg, K. Mohankumar, P. Gupta, S. Gautam, R.K. Chopra, H. Dhama, K.	2022	Journal of Experimental Biology and Agricultural Sciences	10	6	0
337	Internet of Things (IoT) for Coronavirus (COVID-19) Pandemic: A Survey on Trailblazing Techniques	Selvadass, S. John Paul, J. Thusnavis Bella Mary, I. Diana Andrushia, A.	2022	Lecture Notes in Electrical Engineering	905	-	0
338	Synthesis, Characterization and Antimicrobial Activity Studies of Chlorocobaloximes with Neutral Bases Containing Amine Functionality	Vijaikanth, V. Vasuki, S. David, C.I. Chandran, L. Sowmya, S. Murugan, S.	2021	Asian Journal of Chemistry	33	11	0
339	Development of Low Rank Sparse Matrix Decomposition for Improving Spatial and Temporal Resolutions of MRI Medical Data	Kowsalya, G. Christinal, A.H. Chandy, D.A. Jebasingh, S. Hephzibah, R. Bajaj, C.	2021	2021 International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation, ICAECA 2021	-	-	0
340	Comparative performance analysis of various classifiers on a breast cancer clinical dataset	Jenifer Sweetlin, E. Narain Ponraj, D.	2021	Advances in Intelligent Systems and Computing	1167	-	0
341	Dose delivery accuracy on helical tomotherapy for 4-dimensional tumor motion — a phantom study	Holla, R. Khanna, D. Narayanan, V.K.S.	2021	Reports of Practical Oncology and Radiotherapy	26	3	0
342	Machine learning modeling techniques and statistical projections to predict the outbreak of	Anne, W.R. Jeeva, S.C.	2022	Lessons from COVID-19: Impact on Healthcare	-	-	0

	COVID-19 with implication to India			Systems and Technology			
343	Antimutagenic activity of annona squamosa leaf and seed solvent extracts by salmonella microsome assay	Raj, S.D. Jannet Vennila, J. Manoharan, R.	2021	Medicinal Plants	13	3	0
344	A Detailed Overview of ROS-Modulating Approaches in Cancer Treatment: Nano-based System to Improve Its Future Clinical Perspective	Somu, P. Mohanty, S. Paul, S.	2022	Handbook of Oxidative Stress in Cancer: Therapeutic Aspects: Volume 1	1	-	0

3.2.1 Proportion of Graduates in Health Professions

Total Number of Graduates: 1697

Number of Graduates		Number
1	Bachelors	1295
2	Masters	349
3	Doctoral	53
	Total	1697

3.2.1 - Number of Graduates in Health Professions

Number of Graduates in Health Professions: 281

Bachelors in Health Profession		Number
1	B.Tech Biotechnology	58
2	B.Tech Biomedical Engineering	29
3	B.Tech Food Processing and Engineering	85
	Total	172

Masters in Health Profession		Number
1	M.Sc Biotechnology	11
2	M.Tech Biotechnology	20
3	M.Tech Biomedical Engineering	8
4	M.Sc Food Science and Technology	38
5	M.Tech Food Processing and Engineering	18
6	M.Sc Nano Science & Technology	13
	Total	108

PhD in Health Profession		Number
1	Ph.D Food Processing and Engineering	1

3.3.1 - Collaborations with local, national or global health institutions to improve health & wellbeing outcomes

Karunya Institute of Technology and Sciences, has firmly established itself as a catalyst for positive change and community development through a series of transformative collaborations. These partnerships, driven by the university's unwavering commitment to holistic well-being and societal betterment, span various domains, showcasing its dedication to uplifting and empowering communities in numerous ways.

Venturing into the global arena, KITS has established collaborations with institutions such as Cape Breton University in Canada and Vilnius University in Lithuania, emphasizing international academic exchange and research. Further global partnerships have been formed with renowned institutions in the United States, including Harvard Medical School and Boston Child Hospital, Old Dominion University, and Ashcure Pharma S.R.L. in partnership with Regpak Biopharma Consulting, highlighting the university's global vision in advancing healthcare and technology worldwide.

1.Cape Breton University, Canada



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

A CHRISTIAN MINORITY RESIDENTIAL INSTITUTION

NAAC Accredited, AICTE & MHRD Approved

Dr. E. J. James, M. Tech, PhD., FIE.,
Pro Vice-Chancellor

KITS/PVC/LET/2020
March 17, 2020

Dear Prof. MacKinnon,

Further to our interactions with the CBU academicians during the past ten years and discussions with Prof. Allen Britten, we have recognized the need to sign a MoU with CBU.

I am forwarding herewith two copies of the MoU, prepared on the prescribed format of CBU (sent by Prof. Allen Britten) and signed by the Registrar of this University. You may kindly sign the two copies and one copy may be sent back to us for our record. In the meanwhile, I have sent an electronic version of MoU to Prof. Allen Britten, which I hope he might have forwarded to your office. If the electronic version can be signed and sent, we can keep it as a provisional record in our office.

Looking forward to working with you and CBU faculty in future and with kind regards,

Yours sincerely,

E. J. James

To

Prof. Richard MacKinnon
Vice President,
Academic and Provost,
Cape Breton University
P.O. Box 5300
1250 Grand Lake Road
Sydney, Nova Scotia
B1P6I2
Canada

Copy to: Prof. Allen Britten

 Karunya Nagar, Coimbatore - 641 114,
Tamil Nadu, India.

 +91-422-2614300

 +91-422-2615615

 ku@karunya.edu

 www.karunya.edu



Memorandum of Understanding

Cape Breton University and Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India are linked by common academic interests and seek to develop collaborations and exchanges in fields of shared interest and expertise. The activities undertaken pursuant to this Memorandum of Understanding (MOU) are based on a spirit of cooperation and reciprocity that is intended to be of mutual benefit to both parties.

1. Purpose

This Memorandum of Understanding (MOU) serves as a written understanding of agreed upon principles between Cape Breton University, Sydney, Nova Scotia, Canada, and Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India concerning a set of general academic objectives.

This is a non-binding agreement and is intended to clarify the nature and extent of the complementary activities that might be undertaken for the mutual benefit of the two parties. Each institution will be responsible for managing its own costs.

Commitments of specific institutional resources, personnel, space, facilities, or any other academic or intellectual activities may be contemplated hereunder but are beyond the scope of this MOU.

To the extent that the implementation of any agreed upon activity requires a commitment of resources, personnel, credit-bearing coursework, or intellectual property, a supplementary agreement must be negotiated and approved by the two parties before work on any of the projects can commence.

2. Objectives, Scope, and Major Activities

Both institutions agree to encourage the development of the following types of activities:

- Visits and informal exchanges of faculty, scholars and administrators in specific areas of education, research and outreach.
- Explore ways to cooperate in postgraduate education and training.
- Organize joint conferences, symposia, or other scientific meetings on subjects of mutual interest.
- Exchange of academic information and materials.

A handwritten signature in green ink, appearing to be 'Mujis'.

- Pursue avenues for graduate and professional student exchange during the academic year or summer terms.
- Pursue avenues for undergraduate student exchange during the academic year or summer terms.
- Explore the possibilities for developing joint research programs and collaborations.
- Other exchange and cooperation programs to which both parties agree.

3. Responsibilities of the Parties

The two parties recognize that the implementation of any agreed upon activity will depend upon the interests and expertise of the individuals involved and the availability of financial resources, space and other resources. Accordingly, the implementation of any exchange and cooperative program based on this MOU shall be separately negotiated and determined between the two institutions. It is further expected that both parties will be compliant with all applicable provincial and federal laws and regulations and University policies.

4. Duration and Option to Amend, Extend or Terminate

This MOU will become effective when signed by both parties. The agreement will remain in effect for five years from the signature date, below, and may be renewed or amended by mutual agreement of the parties. The parties agree to periodically review the activities undertaken and the progress made and to consult concerning amendments, renewal or termination of this MOU. Either party may terminate this MOU at any time by providing written thirtyday notice of such termination to the other party.

5. General Terms

This MOU is not intended to, and does not create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity, by either party, its officers, employees, or agents against the other party, its officers, employees, or agents.

Nothing in this MOU obligates either party to commit or transfer any funds, assets, or other resources in support of projects or activities between the two parties.

6. Marketing

Neither party will use the name of the other, either expressly or by implication, in any publicity, solicitation or advertisement without the express written approval of the other party to this MOU. Neither party can represent itself as the other or use their partner's logo, or promote any mutual programmes in any language without prior written approval of the copy, collateral materials and web presence or web linkages by partner officials. Failure to do so may serve as a breach of this agreement.

The two parties recognize that the implementation of any agreed upon activity will depend upon the interests and expertise of the individuals involved and the availability of financial resources,



space and other resources. Both parties will be compliant with all applicable provincial and federal laws and regulations and University policies.

7.English Version

If this Agreement is translated in any language other than the English language, and in the event of a conflict between the English language version and the translated version, the English language version shall prevail in all respects.

8. Authorized Signatures

By the signatures of their respective and duly authorized officials below, both parties acknowledge having read and understood the agreement and agree to be bound by its terms and conditions.

SIGNED:



Dr. Richard MacKinnon,
Vice President,
Academic and Provost,
Cape Breton University



Dr. R Elijah Blessing
Registrar
Karunya Institute of Technology and Sciences



Date: 20 APR 2020

Date: 11 MAR 2020

Questions or Comments on this MOU may be addressed to:

Dr. Richard MacKinnon, Vice President, Academic and Provost, Cape Breton University
P.O. Box 5300, Sydney, Nova Scotia Canada B1P 6L2
Tel: 1-902-563-1980; Email: richard_mackinnon@cbu.ca

Dr. R Elijah Blessing, Registrar, Karunya Institute of Technology and Sciences, Karunya Nagar,
Coimbatore - 641114, Tamil Nadu, India
Tel: +91 422 2614321; Email: registrar@karunya.edu

2. Vilnius University, Lithuania



**VILNIAUS UNIVERSITETAS
VILNIUS UNIVERSITY**

January 7th, 2020

Dear, Dr. E J James
Pro Vice Chancellor
Coimbatore - 641 114, Tamilnadu,
India



Warm greetings from Vilnius University!

I am writing from Vilnius University, International Relations Office.

It is my pleasure to send you the Memorandum of Understanding between Vilnius University and Karunya Institute of Technology and Sciences signed by Vilnius University Pro-Rector for Partnership Prof. Greta Drūteikienė.

Thank you very much for your help and patience throughout the whole signing process.
We look forward to starting our cooperation!

Sincerely Yours,



Julius Pukelis
International Relations Manager
International Relations Office
Vilnius University



Vilnius
University

**MEMORANDUM OF UNDERSTANDING
BETWEEN
VILNIUS UNIVERSITY (LITHUANIA)
AND
KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES
(INDIA)**

Vilnius University and Karunya Institute of Technology and Sciences are exchanging this agreement to develop a spirit of amity with each other.

1. This agreement aims to promote international academic cooperation and the exchange of teaching and research experiences between Vilnius University and Karunya Institute of Technology and Sciences.
2. The two universities will cooperate in developing friendship and mutual interests on a reciprocal basis of respect for the independence and equal status of each university.
3. The two universities agree to:
 - a) exchange academic materials and information;
 - b) mutually receive educational visits by faculty members and researchers;
 - c) exchange students;
 - d) hold joint international conferences;
 - e) conduct joint research projects;
 - f) engage in other activities to better enhance mutual understanding and cooperation.
4. The details of this agreement are to be decided by further consultation between the two universities. Both parties understand that all terms and conditions of the above mentioned activities as well as financial arrangements will have to be negotiated and established in separate written agreements.
5. This agreement shall be in effect for five years from the date of signature and automatically extended for the same period if written intent of termination by either party is not presented six months prior to the date of expiration.
6. Vilnius University designates Pro-Rector for Partnership Prof. Greta Druteikiene, and Karunya Institute of Technology and Sciences designates the Registrar Dr. R. Elijah Blessing, as their respective representatives for the full implementation of this agreement.
7. This agreement is executed in English in two originals and each university will retain one original.

Executed for Vilnius University by

Prof. Greta Druteikiene
Pro-Rector for Partnership, acting according
to authorization dated June 19, 2017, No.
10000-SR-1210
Vilnius University
Date: 2020-01-03

Executed for Karunya Institute of Technology
and Sciences by

Dr. R. Elijah Blessing
Registrar,
Karunya Institute of Technology and
Sciences (Deemed to be University)
Date: 19 NOV 2019

3. Harvard Medical school



Date: 10 December 2018

Dr. R. Elijah Blessing
Registrar
Karunya Institute of Technology and Sciences (Deemed to be University) ("Karunya")
Karunya Nagar, Coimbatore -641114, Tamil Nadu
India

Dear Dr. R. Elijah Blessing,

The Global Health Program of Boston Children's Hospital is pleased to inform you that a grant has been approved in the amount of \$10,000 to provide funding for student led projects of **Karunya Institute of Technology and Sciences, (Deemed to be University)** nurtured at the "Center of Excellence in Surgical Innovation", monitored by a Committee consisting of representatives from Karunya during the period of July 1, 2018 to June 30, 2019. The funding will include expenses directly related to equipment and supplies for Karunya student-led surgical innovation projects.

This letter and its attachments outline the terms and conditions of accepting our grant. Please read all the terms and conditions carefully, sign, and return along with this signed contract letter no later than [date to be returned]. After we receive your signed contract, we will transfer you the funds within two weeks.

The funds must be used specifically for the designated purpose(s) by [one year from date of grant]. You must submit a written request to us in advance if you wish to change the purpose of the grant or if the funds are not expended within the next 12 months.

Upon signing this contract, your agency states that you agree to notify us if there is any change in Karunya's organizational status. In addition, we will request a report on the expenditure of our grant after six months and a final report after one year. When available, please furnish us with a copy of any audited statement of the finances of the project.

This contract also gives the Global Health Program your permission to use photographs, logos, published/printed information, and any other materials you supply, without further notice, in press releases and/or publications.

Congratulations on this recognition of your important efforts. We look forward to working with you during the coming year.

Sincerely,

ACCEPTED AND AGREED:

A handwritten signature in black ink that reads "Michelle Niescierenko".

Dr. Michelle Niescierenko
Director, Global Health Program
Boston Children's Hospital

GENERAL GRANT TERMS, CONDITIONS AND UNDERSTANDINGS

In addition to the specific *terms and conditions in the grant award letter dated 10th December 2018, to which these* General Grant Terms, Conditions and Understandings are attached, The Global Health Program is awarding this grant to you as the Grantee contingent upon the following:

Expenditure of Funds:

This grant (together with any income earned upon investment of grant funds) is made for the purpose outlined in the grant award letter and may not be expended for any other purpose without The Global Health Program's prior written approval.

If the grant is intended to support a specific project or to provide general support for a specific period, any portion of the grant unexpended at the completion of the project or the end of the period shall be returned immediately to The Global Health Program.

You may not expend any grant funds for any political or lobbying activity.

No Assignment or Delegation:

You may not assign, or otherwise transfer, your rights or delegate any of your obligations under this grant without prior written approval from The Global Health Program.

Records and Reports:

You are required to keep a record of all receipts and expenditures relating to this grant and to provide The Global Health Program with a written report summarizing the project promptly following the end of the period during which you are to use all grant funds.

The Global Health Program may also require interim reports. Your reports should describe your progress in achieving the purposes of the grant and include a detailed accounting of the uses or expenditure of all grant funds. You also agree to provide any other information reasonably requested by The Global Health Program. If your organization obtains any audited financial statements covering any part of the period of this grant, please provide a copy to The Global Health Program as well. You are required to keep the financial records with respect to this grant, along with copies of any reports submitted to The Global Health Program, for at least four years following the year in which all grant funds are fully expended.

Required Notification:

You are required to provide The Global Health Program with immediate written notification of: (1) any changes in your organization's tax-exempt status; (2) your inability to expend the grant for the purposes described in the grant award letter; or (3) any expenditure from this grant made for any purpose other than those for which the grant was intended.

Reasonable Access for Evaluation:



You will permit The Global Health Program and its representatives, at its request, to have reasonable access during regular business hours to your files, records, accounts, personnel and clients or other beneficiaries for the purpose of making such financial audits, verifications or program evaluations as The Global Health Program deems necessary or appropriate concerning this grant award.

Publicity:

The Global Health Program needs to review and approve the text of any proposed publicity concerning this grant prior to its release. The Global Health Program may include information regarding this grant, including the amount and purpose of the grant, any photographs you may have provided, your logo or trademark, or other information or materials about your organization and its activities, in The Global Health Program's periodic public reports, newsletters, and news releases.

Right to Modify or Revoke:

The Global Health Program reserves the right to discontinue, modify or withhold any payments to be made under this grant award or to require a total or partial refund of any grant funds if, in The Global Health Program's sole discretion, such action is necessary: (1) because you have not fully complied with the terms and conditions of this grant; (2) to protect the purpose and objectives of the grant or any other charitable activities of The Global Health Program; or (3) to comply with the requirements of any law or regulation applicable to you, of The Global Health Program's grant.

If the Global Health Program does not receive signed copies of its grant award letter and of these general grant terms within 14 days after the date of The Global Health Program's grant award letter, this grant may be revoked.

The undersigned certify that they are duly elected and authorized officers of the Grantee and that, as such, are authorized to accept this grant on behalf of the Grantee, to obligate the Grantee to observe all of the terms and conditions placed on this grant, and in connection with this grant to make, execute and deliver on behalf of the Grantee all grant agreements, representations, receipts, reports and other instruments of every kind.

ACCEPTED AND AGREED TO:

Karunya Institute of Technology and Sciences (Deemed to be University) ("Karunya")

Registrar, Karunya Institute of Technology and Sciences

4. Old Dominion University, USA



MEMORANDUM OF INTENT FOR INTER-INSTITUTIONAL COLLABORATION

This Memorandum of Intent (Mol), executed on this 30th day of March 2021

between

Karunya Institute of Technology and Sciences (Deemed to be University), Karunya Nagar, Coimbatore - 641 114, represented by its Registrar, Prof. Dr. R. Elijah Blessing, herein after referred as **KITS**, (which expression unless repugnant to the context and meaning shall mean and include his assigns, legal representative, nominee, successor in office, administrator, executor, etc) of the **ONE PART**

and

Old Dominion University, having its registered office at 5115 Hampton Boulevard, Norfolk, VA 23529/(757) 683-3000 Virginia, USA , represented by its Associate Vice President for Academic Affairs, Mr. Nina Gonser, herein after referred as **ODU** (which expression unless repugnant to the context and meaning shall mean and include his assigns, legal representative, nominee, successor in office, administrator, executor, etc) of the **OTHER PART**

Whereas, **KITS and ODU** shall collectively to be referred as the '**parties**' and individually as '**party**' wherever the context permits.

Both the parties realize that there is great value in promoting a global outlook and international understanding in the areas of academic and research pursuits; and both the parties recognize the significant role that education and research play in enhancing mutual understanding, friendship, good relations and research interaction;

Now, therefore, both parties are interested in exploring, in good faith, opportunities for future collaborations in their fields through their respective institutions, namely the **KITS** and the **ODU** and set forth their intent for potential collaboration initially in the following fields:

A handwritten signature in green ink, appearing to be "R. Elijah Blessing", is written over the text.



the M.Tech programme in aerospace engineering offered by KITS, and

(ii) Joint research programmes involving the faculty and students of both the institutions.

- 1. Consistency with Institutional and Legal Requirements:** Future collaborations in specific projects and programmes will be on mutual consent based on case to case basis and consistent with the policies and regulations of both the KITS and ODU, and also the laws prevalent in the respective countries.
- 2. Duration:** This Memorandum of Intent shall become effective upon execution by both the parties and shall continue in full force and effect for a period of three years. This MoI may be further extended /renewed for an equal period or more as discussed and finalised between the parties, provided, however, that either party may terminate this Memorandum of Intent at any time with 90 days written notice to the other party.
- 3. Future Obligations:** The parties acknowledge and agree that this Memorandum of Intent does not create any binding legal obligations or financial commitments. The parties recognize that any such future obligations or commitments must be agreed upon in writing, which must be signed by an authorized representative of each of their institutions. The parties also recognize that any future obligations or commitments will depend on the availability of funds for each party.

IN WITNESS WHEREOF, the parties have executed this Memorandum of Intent as of the date shown below.

On behalf of

Karunya Institute of Technology And Sciences, Karunya Nagar Coimbatore, India  Prof. Dr. R. Elijah Blessing, M. E., Ph.D. Registrar	Old Dominion University Virginia, USA  Mg. Nina Gonser Associate Vice President for Academic Affairs
Date:	Date: 4/21/21

Dr. R. Elijah Blessing
Registrar,
Karunya Institute of Technology and Sciences
(Deemed to be University)
Karunya Nagar,
Coimbatore-641114

5. Ashcure Pharma S.R.L. and Regpak Biopharma Consulting

KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES
(Declared as Deemed to be University under Sec. 3 of the UGC Act 1956)
Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India
(hereafter referred to as "Karunya")

AND

ASHCURE PHARMA S.R.L.
Bulevardul Unirii 11, Bloc 2B, Level 4, Room 7, Apartment 11
Sector 4, Bucharest, Romania
(hereafter referred to as "AshCure")

AND

REGPAK BIOPHARMA CONSULTING
Aristotelesstraat 18, 1064 LD
Amsterdam, The Netherlands
(hereafter referred to as "RegPak")

Whereby AshCure is responsible for procuring the medicinal products, medical devices (incl. diagnostic devices) and distribution and RegPak is vertically integrated with AshCure to provide all regulatory, pharmacovigilance and other associated activities for product registration and maintenance.

AND

Karunya, AshCure and RegPak are hereafter also referred to individually as a "Party" and collectively as the "Parties".

AND

In the spirit of academia-industry understanding and cooperation and in recognition of the challenges of our present times and the pressing concerns of future in the areas of education, research & development (R&D), healthcare, development of medicinal products, medical devices (incl. diagnostic devices), pharmacology and related fields including regulatory, pharmacovigilance, all of which call for a closer cooperation between academia and industry,

AND

In recognition of the realisation that cooperation between academia and industry and free exchange of ideas are at the heart of R & D excellence

AND

In recognition of the fact that academic institutions and industry have responsibilities and a commitment towards learning, research and innovation in the context of industry academia cooperation and societal interventions.

The areas of cooperation shall include any project, programme or product development at any site, which is considered to be desirable and reasonable for the development of cooperation between the Parties. However, any specific program shall be subject to mutual consent, availability of resources the common goals of Parties. Such programs may include:

1. Exchange of materials and information of academic, research or economic interest
2. Joint projects for R&D, product / prototype development and market survey
3. Mutual industry/academia/laboratory visits by those concerned
4. Joint activities such as exchange programmes, technology transfer / licensing
5. Any other activities for enhancing mutual understanding and cooperation.

The terms of such cooperation shall be mutually discussed and agreed upon and confirmed in writing by both Parties. Exchange of ideas, information and materials may be carried out subject to signing of a non-disclosure agreement (NDA). Specific activities that involve financial commitments on either side shall also be undertaken following specific agreements entered into for the said purpose. All the agreements signed shall be in full accordance with the prevailing laws in the countries concerned.

This Letter of Intent (LoI) shall enter into force upon approval by both Parties and remain effective for three years from the date of entry. It may be extended for a further period by mutual agreement expressed in writing. Either Party may terminate this LoI by written notices to the other. Such termination will come into effect after three months from the date of the written notice.

IN WITNESS WHEREOF the Parties to this Letter of Intent hereby confirm their agreement to its terms by affixing their respective signature on this 03rd day of December 2021.

<p>For and on behalf of : Karunya Institute of Technology and Sciences</p>  <p>Dr.R. Elijah Blessing Registrar</p>	<p>For and on behalf of : AshCure Pharma S.R.L.</p>   <p>Parminder Kaur Managing Director</p>
<p>Key Contact Person: Capt (Dr.) KRS Krishnan ME, PhD Professor & Director (IIE) krs.krishnan@karunya.edu director_ie@karunya.edu Mobile: +91 994 777 2580</p> 	<p>Key Contact Person: Parminder Kaur parminder@ashcurepharma.com parminder@reppakbiopharma.com Mobile: +31(0)6290 75858</p> <p>Back-up: Jaswinder Kaur jazz@reppakbiopharma.com Mobile: +91 (0)9888 152299</p>

National Collaborations:

On a national scale, Karunya Institute of Technology and Sciences has signed MOUs with SEESHA, Shibin Nutraceuticals Private Limited, Parry Agro Industries Ltd., Cyrix Healthcare, Jubilee Mission Medical College and Research Institute, Siemens Healthcare Private Limited, Salzer Electronics Limited and DXC, showcasing their commitment to healthcare research and innovation.

1. SEESHA & Karunya: Karunya University and SEESHA worked together for Research training and community services.

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ARINA NAGAR, COIMBATORE

தமிழ்நாடு தமில்நாடு TAMIL NADU
--4577
24.3.2010

MEMORANDUM OF UNDERSTANDING

This Deed of Memorandum of Understanding entered into
Between

1. **Karunya University**, Karunya Nagar, Coimbatore - 641 114, represented by the Registrar Dr. Anne Mary Fernandez aged 55 years w/o Mr. G. L. Fernandez, residing at No.2, Alpha Quarters Karunya Nagar, Coimbatore-641114, hereinafter called the Party of the **FIRST PART**.

and

2. **Samiti for Education Environment Social & Health Action (SEESHA)**, # 72, Rajaji Salai, Chennai - 600 001, represented by the Executive Director Dr. Jeyakumar Daniel, aged 60 years, S/o Late Dr.G. R. D. Daniel, residing at Flat No.4A, KG Bellaire, 100 feet Bye pass Road, Velachery, Chennai-600 042 hereinafter called the Party of the **SECOND PART**

Dr. ANNE MARY FERNANDEZ
REGISTRAR
KARUNYA UNIVERSITY
(Karunya Institute of Technology and Sciences)

CHENNAI
SEESHA

The vision of Karunya:

True to its name which means "Compassion", Karunya University will be fully involved in finding solution to alleviate the sufferings of humanity as well as to guide society to prosperity. Karunya University shall be known as a University with a social concern to address the problems and needs of humanity through research, academic and value based instructions training, social endeavors and by raising leaders who would be focused on addressing the needs of society from the higher levels, in terms of service, authority, ability or knowledge. Train and develop youth as total persons who would also be endowed with divine power and compassion to serve humanity, to alleviate their sufferings through prayer, counseling and good works;

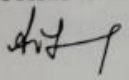
The vision of Seesha:

To help and promote the cause of humanity from poor circumstances in deprived areas and enable them to attain better standard in life. To identify deserving people from highly impoverished families, free them from day-to-day hunger and prepare them for basic rudimentary education for a good life. To provide in the long-term, shelter, food and raiment for such people assuring them of the economic stability, the hope and the enjoyment of life. To bring out talents and skills of those people which skills otherwise may not be discovered due to their poor financial background. To associate the Trust with educational institutions such as schools, colleges and adult education centers with the objectives of educating the people chosen by the Trust. To provide medical and other facilities for purpose of their healthcare. To construct, establish and maintain houses for the poor or hostels for students and to establish and maintain libraries and reading rooms. To promote education for poor and deserving students by grant of scholarship to students. To help widows, children and destitute through financial or other forms of assistance. To conduct training programmes in health, medical care, and other hospital related programmes. To conduct special training (Vocational) programmes to inculcate self discipline among the people so that they would have the potential to serve and lead the communities where they live besides sustaining themselves. To establish and manage hospitals, clinics, old age care homes, rehabilitation centres and hospice.

Whereas, SEESHA in their Trust Meeting after a elaborate discussion, decided to extend the activities of Seesha around the surroundings of the locality at Karunya Nagar, in order to provide health and medical care to the poor and needy, decided to establish and manage hospital, clinics and other related activities, establishing orphanages and Old Age Care Homes, Relief , Rehabilitation Centers, Vocational Training Centers, etc., approached the authorities of the Karunya University for providing necessary land/and or building on a long time lease in Karunya Nagar and work as a joint collaboration programme on Research, Training and Community services.

Whereas; the executive Committee of Karunya University in their meeting examined the request of Seesha in detail and accepted to grant them the required vacant land/and or building and have decided to enter into a Lease Deed to fulfill the Vision of Karunya and SEESHA.

This agreement is being done on a collaborate basis between Karunya University and Seesha for mutual benefits in fulfilling their mutual objectives.


Dr. ANNE MARY FERNANDEZ
REGISTRAR
KARUNYA UNIVERSITY
(Karunya Institute of Technology and Sciences)
Karunya Nagar Colmbatore 641 114.



Now, the Deed of Memorandum of Understanding Witnessed as follows:

1. The management and administration of the Karunya Rural Community Hospital hitherto under the control of the Party of the First Part shall be now handed over to the Party of the Second Part. The Party of the Second Part can construct new or renovate buildings for the hospital and other projects in the land leased to them at their own costs, also to install and erect necessary equipments / machineries in the hospital and in other projects at their own costs. The movables installed by Seesha are the assets of Seesha. In the event of the termination of the Lease, Seesha has every right to take back all their movables, viz., machineries, equipments, lightings, furniture's & fixtures, etc.
2. The party of the Second Part, viz., Seesha is only a tenant in the land/and or building leased to them by the party of the First Part and any new building or renovate (super structure) constructed by the Party of the Second Part and movables, viz., machineries, equipments, lightings, furniture's & fixtures, etc will be the property of party of the Second Part, if they desire, can transfer the ownership of the building to the party of the First Part against the lease charges due if any or collect the necessary cost of the building (mutually agreed) from the party of the First Part. However, at all times the land will continue to be the property of the First Part.
3. The Party of the First Part also agrees to construct buildings by their own resources in the land leased to the Party of the Second Part on their request.
4. The Party of the First Part and the Second Part would conduct the training programmes separately or jointly in consultation, in the leased premises for the benefit of the locality at Karunya Nagar and the society to fulfill the Vision of Karunya and SEESHA
5. The party of the First Part and the party of the Second Part will do collaborative research together.

BOTH THE PARTIES OF THE FIRST PART AND SECOND PART HAVE SET THEIR HANDS AND SIGNED THIS MEMORANDUM OF UNDERSTANDING IN THE PRESENCE OF THE UNDERSIGNED WITNESSES ON THIS _____ DAY _____ OF 2010 AND THIS MOU COMES INTO EFFECT FROM 1st APRIL 2010.

Witnesses:

1. *A. Durain*
J. JEBASINGAM,
S/o. Mr. V. Jebaganam
Pro/Karunya University, 601114
2. *[Signature]*
S. Jebaseelan Jeevingh
S/o Rev. M. Samuel Rajiah
Program Manager
Seesha

[Signature]
Party of the FIRST PART

[Signature]
Party of the SECOND PART



2. Shibin Nutraceuticals Private Limited, Chennai



தமிழ்நாடு தமில்நாடு TAMIL NADU
12.11.2018.

58AB 685415




M. DORAISWAMY
"STAMP VENDOR"
10-A, STATE BANK ROAD,
COIMBATORE - 641 018.
L.No: 7353/B1/97/28-3

MEMORANDUM OF AGREEMENT


This non-binding Memorandum of Agreement (MOA) is entered into by and between, Karunya Institute of Technology and Sciences, with registered address at Karunya Nagar, Coimbatore, Tamil Nadu 641114, represented by its Registrar Dr. R. Elijah blessing, hereafter called as "KIT" (which expression shall include its successors, executors, administrators, Legal representatives and assignees).

AND

M/s. Shibin Nutraceuticals Pvt Ltd, with a registered address at No.88/F, door no.5E, 2nd block, 5th floor, Vijayshanthi Towers, Vadapalani, Chennai - 600026 represented by its Chief Executive Officer, Mr. Shibin.R. D hereafter called as SHIBIN (which expression shall include its successors, executors, administrators, Legal representatives and assignees) and Mr. S. VENKATESH BABU (a.k.a. Emmanuel Ebner), Co-Founder and Chief Strategy Officer, Shibin Nutraceuticals Pvt Ltd. Karunya Institute of Technology and Sciences and Shibin Nutraceuticals Pvt Ltd are referred to collectively, as "Parties" or individually as "Party."







1. Purpose

The Parties recognize the benefits to be derived from increased collaboration, cooperation and interaction for the further research and development activities on Biotechnological applications of Microalgae, Marine and Terrestrial Microorganisms and Bioremediation of environmental pollution (hereafter, collectively referred to as the "Field"). The purpose of this MOA is for Research & Consultancy for Microalgae between **KITS** and **SHIBIN** in the Field with a view to benefiting from each other's initiatives and working procedures and to support collaboration among the researchers associated with both Parties.

2. Scope

This MOA sets forth the intentions of the Parties for increased collaboration, cooperation and interaction and does not create any legally binding commitments. If the Parties later agree to undertake specific joint projects with legally binding obligations, they will develop separate written agreements for such projects, setting out each Party's contributions, deliverables, and budgets.

The parties collaborate, cooperate and interact to achieve the following scopes of this MOA.

1. The Parties intend to pursue collaboration on fundamental, academic research, related to Biotechnological applications of Microalgae, Marine and Terrestrial Microorganisms and Bioremediation of environmental pollution.
2. Both parties exchange the technical expertise such as experimental procedures, instrumental knowledge and development of new protocols in Fields. Industrial visit, training and internship for the students in micro algae cultivation and product formulation area, etc.
3. Both parties agree to exchange the expertise of their working staff under mutual convenience when requested by either Party. For example, **SHIBIN** can request to utilize the expertise of **KITS** staff for their technical events. However, exchange of faculties or staff or scientist is to be done under mutual convenience of the Parties when such exchanges doesn't affect the normal functioning of the Parties. During Conferences, Seminars, Symposia and Workshops organized by either Party, above mentioned exchange of working staff may avail with mutual concerns.
4. Both Parties agree to utilize their Laboratory Instrument Facilities with duly agreed payments. Such utilizations don't affect the normal functioning of the Parties.


3. Costs

Where possible and appropriate, the Parties may also seek funding for collaborations from other government and private agencies.

4. General Provisions

4.1 As stated above, any specific joint projects will be set forth in separate written agreements.

4.2 Treatment of intellectual property rights developed through collaborations under this MOA will be determined between the Parties through mutual consultation and separate written agreements on a case-by-case basis.



R.D. Shiba

4.3. Publication credits of any kind arising as a result of this MOA shall be shared by both the Parties. The lead authors would be the Party where major part of the experiments conducted. The corresponding authors of the publications would be the Party which has prepared the manuscript. The above issues will be discussed by the parties and decide the authorship details. The publications as a result of this MOA will be made under mutual concerns of the Parties while either Parties are intimated verbally.

5. Confidentiality

5.1. If either Party wishes to disclose information it considers to be confidential or proprietary to the other Party, the Parties will enter into a written non-disclosure agreement.


6. Duration

6.1 This MOA shall be effective for a period of three (3) years from the date of final signature. It may be modified or extended by mutual written agreement by the Parties. This MOA may be terminated by either party upon three (3) months advance written notice.

The Parties to this Memorandum of Agreement hereby confirm their agreement to its terms by affixing their respective signature on this 25th Day of January 2019.


Karunya Institute of Technology and Sciences

ShibinNutraceuticalsPvt Ltd


Dr. E. J. BLESSING
REGISTRAR
Karunya Institute of Technology and Sciences
Karunya Nagar
Coimbatore-64114


Mr. SHIBIN
M.D. & Chief Executive Officer
ShibinNutraceuticalsPvt Ltd
88/F.D. No. .5E, 2nd block, 5th floor,
Vijayshanthi Towers, Vadapalani,
Chennai- 600 026


Mr. S. VENKATESH BABU
(Alias) Emmanuel Ebner
Co Founder and CSO
Shibin NutraceuticalsPvt Ltd
88/F.D. No. .5E, 2nd block, 5th floor,
Vijayshanthi Towers, Vadapalani,
Chennai- 600 026


Witness:
Dr. JIBU THOMAS
Associate Professor
Department of Biotechnology
Karunya Institute of Technology and
Sciences
Coimbatore 641114

3. Parry Agro Industries Ltd., Chennai



தமிழ்நாடு தமில்நாடு TAMIL NADU

11-7-2020



78AB 694765
க. ரெஸ்ஸி
சா.ப.ச. முக்தகரக்காள்
விர்ப்பனையாளர்
கொண்டாமுகத்தூர், கோமல, கரீடு நகர்
உரிமம் எண்: 16482/ஆ/1/95

Memorandum of Understanding

This Memorandum of Understanding (MoU) entered at Coimbatore into on this 19th day of November 2020,

between,

M/s. Karunya Institute of Technology and Sciences (Deemed to be University), Karunya Nagar, Coimbatore - 641 114, represented by its Registrar, Dr. R. Elijah Blessing, (hereinafter referred to as **KITS**), (which expression unless repugnant to the context and meaning shall mean and include its assigns, legal representative nominee, successor in office, administrator, executor, etc.) of the **ONE PART**,

and

M/s. Parry Agro Industries Ltd, having its registered office Parry House, 5th Floor, 43 Moore Street, Chennai – 600 001, having their Estates Administration Office at Iyerpadi (PO), Valparai, and represented by its Vice President/Chairman, Mr.K.J.Mahesh Nair (hereinafter referred to as **Parry Agro**), (which expression unless repugnant to the context and meaning shall mean and include its successors-in-interest and permitted assigns) of the **OTHER PART**.

சுருதி

*
Nair

WHEREAS the parties above named have held mutual discussions and agreed to establish a joint collaborations towards various R&D activities in Engineering and Technology without any direct financial commitment of the parties.

AND WHEREAS the Parties now wish to set out their understanding of the broad outlines/principles agreed so far between them concerning the Project and the steps needed to achieve the same.

NOW THIS MEMORANDUM OF UNDERSTANDING WITNESSETH ASS FOLLOWS:

1. Purpose

This MoU aims to promote industry academic cooperation, the exchange of research experiences, industry linkages, Joint research proposals/activities like Conferences, Research and Consultancy in the fields of Biotechnology, Agricultural Technology and Food Technology between KITS and Parry Agro to benefit from each other's initiatives and working procedures and to support collaboration among the researchers associated with both Parties. In connection with the above the parties agree to:

- a) Exchange academic materials and information;
- b) Conduct joint research projects
- c) Mutually receive industry/laboratory visits by faculty members, students and researchers;
- d) Exchange students, faculty members and researchers;
- e) Hold joint activities like conferences, seminars, industry academia meets;
- f) Engage in other activities to better enhance mutual understanding and cooperation.

The parties recognize the benefits to be derived from increased collaboration, cooperation and interaction for the further research and development activities on Biotechnology, Agricultural Technology and Food Technology.

2. Scope

This MoU sets forth the intentions of the Parties for increased collaboration, cooperation and interaction and does not create any legally binding commitments. If the Parties later agree to undertake specific joint projects with legally binding obligations, they will execute a separate written agreement for such projects, on such terms and conditions as mutually agreed upon between them, inter alia setting out each Party's contributions, deliverables, and budgets.

The parties collaborate, cooperate and interact to achieve the following scopes of this MoU.

1. The Parties intend to pursue collaboration on fundamental, academic research, related to Biotechnological, Agricultural Technology and Food Technology applications.
2. Both parties exchange the technical expertise such as experimental procedures, instrumental knowledge and development of new protocols in Fields, Industrial visit, training and internship for the students/Faculty in process and product formulation area, etc.
3. Both parties agree to exchange the expertise of their working staff under mutual convenience when requested by either party. However, exchange of faculties or staff or Scientist is to be done under mutual convenience of the parties when such exchanges doesn't affect the normal functioning of the parties. During Conferences, Seminars.



Symposia, Meets and Workshops organized by either party, above mentioned exchange of working staff may avail with mutual concerns.

4. Both parties agree to utilize their Facilities under duly agreed conditions.

3. Costs

Where possible and appropriate, the parties may also seek funding for collaborations from other government and private agencies.

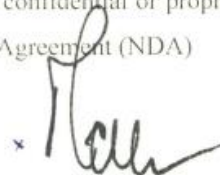
4. General Provisions

- 4.1 As stated above, any specific joint projects will be set forth in separate written agreements.
- 4.2 Treatment of intellectual property rights developed through collaborations under this MoU will be determined between the parties through mutual consultation and separate written agreements on a case- to -case basis.
- 4.3 Publication credits of any kind arising as a result of this MoU shall be shared by both the parties, before making such publications for their prior written consent. The lead authors would be the party where major part of the experiments conducted. The corresponding authors of the publications would be the party which has prepared the manuscript. The above issues will be discussed by the parties and decide the authorship details. The publications as a result of this MoU will be made under mutual concerns of the parties while either party are intimated verbally.
- 4.4 Any press releases or other publications to be issued or made by one party that refer to this MoU or the subject matter and/or the relationship established between the parties of this MoU, shall have prior approval of the other party.
- 4.5 This instrument in no way restricts either party from participating in similar activities with other companies, institutes, organizations, and individuals.
- 4.6 Nothing in this MoU establishes or will deemed to establish a principal-agent relationship, employee-employer relationship, a representative or joint partnership between the parties hereto and neither party will enter into any contract or commitment on behalf of the other.
- 4.7 Nothing in this MOU will be construed to constitute an obligation or commitment of funds or otherwise from either party.
- 4.8 This MoU is not legally binding

5. Confidentiality

If either party wishes to disclose information it considers to be confidential or proprietary to the other party, the parties will enter into a written Non-Disclosure Agreement (NDA)





Permission:

Necessary permission will be obtained by both parties from each other before the start of any Field/Laboratory trials. KITS will have to obtain necessary clearance to conduct field trials in Parry Agro's Estates and inturn Parry Agro will have to obtain necessary clearance to conduct Laboratory/field trials at KITS

Each party shall comply with all statutory provisions as may be necessary in connection with and incidental to the Project.


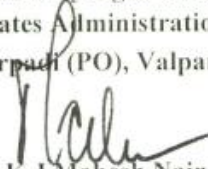
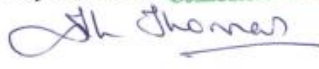

6. Investigators from each party:

Investigators from each party will be identified to coordinate the identification of research problems, submission of proposals for funding and monitor its progress and execution. The Investigators and Nodal Members may be changed by either party as they may deem appropriate from time to time, with a prior written intimation of 10 days to the other

7. Duration

This MoU is non-exclusive and shall be effective for a period of three (3) years from the date of execution of this MoU. It may be modified or extended by mutual written agreement by the parties. Notwithstanding the above period of duration, this MoU may be terminated by either party upon three (3) months advance written notice to the other. This MoU is being executed in two sets separately by each party and both shall be deemed to be original and shall constitute one and the same instrument.

IN WITNESS WHEREOF the Parties to this Memorandum of Understanding hereby confirm their agreement to its terms by affixing their respective signature on this 19th Day of November 2020.

<p>For and on behalf of : Karunya Institute of Technology and Sciences, Karunya Nagar, Coimbatore-64114.</p>  <p>Dr.R. ELIJAH BLESSING, REGISTRAR Dr. R. Elijah Blessing Registrar Karunya Institute of Technology and Sciences (Deemed to be University) Karunya Nagar Coimbatore - 641114</p>	<p>For and on behalf of : M/s. Parry Agro Industries Ltd Estates Administration Office Iyerpudi (PO), Valparai 642108</p>  <p>* Mr.K.J.Mahesh Nair Vice President</p>
<p>Key Contact Person</p>  <p>Dr. JIBU THOMAS, Associate Professor, Department of Biotechnology (KITS) Karunya Nagar, Coimbatore-64114.</p>	<p>Key Contact Person</p>  <p>Dr.S.Marimuthu Head-R&D Parry Agro Industries Ltd. Murugalli Estate Valparai-642125</p>
<p>Witness</p>	<p>Witness</p>

4. Cyrix Healthcare, Ernakulum, Kerala



தமிழ்நாடு தமில்நாடு TAMIL NADU

11.7.2020



Handwritten signature and text in Tamil, including the number 78AB 694773 and a date stamp '2020/12/17 95'.

LETTER OF COOPERATION

This **LETTER OF COOPERATION** is intended to be made this 17th day of December 2020, between Karunya Institute of Technology and Sciences (Deemed-to-be-University), having its office at Karunya Nagar, Coimbatore – 641114, South India and represented by its Registrar Dr. R. Elijah Blessing, (hereinafter referred to as **KITS**), (which expression unless repugnant to the context and meaning shall mean and include his assigns, legal representative, nominee, successor in office, administrator, executor, etc.) of the **ONE PART**,

and

M/s. **CYRIX HEALTH CARE PVT. LTD.**, having its office at 30/641B, Petta Junction, Poonithura, Maradu, Ernakulam, Kerala 682038. Represented by its Director, Mr. Joymon K John, (hereinafter referred to as **"CYRIX"**), (which expression unless repugnant to the context and meaning shall mean and include his assigns, legal representative, nominee, successor in office, administrator, executor, etc.) of the **OTHER PART**.

Handwritten signature in green ink.

Solely with a view to provide a platform to build a strong and on- going relationship between both parties.

OBJECTIVES

To augment this common goal and objective both parties agree to establish a JOINT WORKING GROUP for coordination. Both parties shall ensure that the JOINT WORKING GROUP comprises of appropriate personnel representing either party to discuss and implement the measures envisaged in this letter of cooperation.

The primary goals are mentioned below

- To develop and foster strategic linkages with Department of Biomedical Engineering, KITS and the technical team of CYRIX.
- To assist the students of KITS and enhance their knowledge about the latest technologies in which Research is involved.
- To understand the needs and expectations of both the KITS and the CYRIX and to identify the measures required to meet above objectives.
- To give valuable inputs to suitably customize the training methodology so that the students fit into the industrial scenario meaningfully.

On behalf of KITS the respective HoD and the designated Faculty coordinator and on behalf of CYRIX the designated Director of the company would deliberate the coordinated and systematic activities, in a mutual beneficial manner, in the interest of the students and faculty of KITS in particular, and in the mutual interest of both KITS and CYRIX at large.

It is agreed and understood between the parties that both parties shall take all reasonable steps to cooperate and ensure successful implementation of all the activities envisaged in this letter of cooperation.

MECHANISMS FOR COOPERATION

The “**Joint Working Group**” will implement, administer and execute the following activities to achieve the objectives like.

Technical Presentations and Talks

CYRIX will provide its speakers to participate and deliver technical presentations and talks on topics that are jointly decided by Department and CYRIX.

Participation in Technical Events and Symposiums

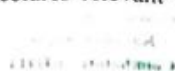
CYRIX and the KITS will jointly participate in technical events and symposiums at KITS. The final decision will be taken on a case to case basis after review and discussion between the CYRIX and the KITS.

Guest Lectures for Students

CYRIX proposes to participate in providing guest lectures relevant to the syllabus subjects where industry inputs are desirable.







Placement of Competent Students

Joint working group of CYRIX, will endeavour to assist in the placement of toppers and competent students of final year which will be need based and demand driven.

Providing Internships to Students

CYRIX will support technical competence in students by providing internships to students during vacations as recommended by the joint working group of CYRIX and the KITS

Proposals and Products

CYRIX and KITS will initiate joint project proposals to funding agencies and commercialization of products developed.

Industry Institute Interaction

CYRIX would propose an advisory service and participation for a robust industry interaction. These may include facilitation of R & D in Biomedical Engineering. CYRIX would provide advisory service to Biomedical Engineering department to facilitate the faculty to pursue research in areas relevant to industry and in bringing in collaborative / sponsored research projects to the department.

Confidentiality



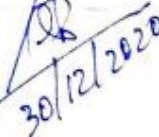
Either party guarantees and acknowledges that all information whether in writing or oral or otherwise obtained from other party under this Letter of Cooperation would be kept strictly confidential during the tenure of the Letter of Cooperation or after its cessation for a period of 2 years and either party shall not divulge, disclose or impart such confidential informations to any third person/organization.

Miscellaneous

However it is understood and agreed between the parties that this letter of cooperation is a non-binding one and more particularly does not impose any legal or financial commitments between the parties.

It is agreed and understood between the parties that this joint deliberation, pursuant to this letter of cooperation, is at will and shall be valid for a period of one year and may be called off by either party on any day, by giving a month's notice to the other party, prior to the appointed date of withdrawal. However this letter of cooperation may be renewed for further term, with mutual consent.

Neither party here under shall be liable for any consequential loss or damages arising out of the performance of obligations under the terms of this letter of cooperation.

FOR AND ON BEHALF OF: KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES. (For and on behalf of Dept. of Bio- Medical Engineering.)	FOR AND ON BEHALF OF: CYRIX HEALTH CARE
Sign:  Dr. R. Elijah Blessing Registrar Karunya Institute of Technology and Sciences (Deemed to be University) Karunya Nagar Coimbatore - 641114	Sign:  Mr. Joymon K John Director
Date: /12/2020	Date: /12/2020 

5. Jubilee Mission Medical College and Research Institute, Thrissur

MEMORANDUM OF AGREEMENT

BETWEEN



KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

KARUNYA NAGAR, COIMBATORE – 641 114.

AND



JUBILEE MISSION MEDICAL COLLEGE & RESEARCH INSTITUTE

THRISSUR, KERALA – 680006

AGREEMENT

In the spirit of national understanding and cooperation;

and

In recognition of the challenges of our present time and the pressing concerns of the future that call for an ever close cooperation between institutions;

and

In recognition of the fact that Universities and Academic institutions are centers of culture and scholarly activity with particular responsibilities and commitment to research, teaching and learning in an international and national context;

and

In recognition that academic cooperation and free exchange of ideas are at the heart of academic freedom and excellence; and

Therefore,

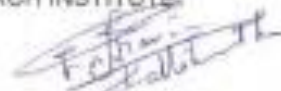
Karunya Institute of Technology and Sciences and Jubilee Mission Medical College & Research Institute enter into a Memorandum of Agreement (MoA) to cooperate in areas of research and academic programmes of mutual interest offered by either party which are desirable and reasonable for the development of cooperation between the two institutions. However, any specific program shall be subject to mutual consent, availability of funds and approval of each party. Such programmes may include:

1. Collaborative work among faculty members
2. Collaborative work of students
3. Joint research projects
4. Joint conferences / workshops
5. Exchange of research materials

The terms of such specific cooperation shall be discussed and agreed upon by both parties prior to the initiation of any particular programme or activity.

This agreement shall be effective upon approval by both the parties and remain effective for three years. Either party may terminate this agreement by written notices to the other. Such termination will come into effect six months from the date of expression by either or both the parties.

JUBILEE MISSION MEDICAL COLLEGE &
RESEARCH INSTITUTE



Fr. Francis Palikunnath
Director



Dr. Benny Joseph
CEO

Date: 06/01/2020

KARUNYA INSTITUTE OF TECHNOLOGY
AND SCIENCES



Dr. P. Mannar Jawahar
Vice Chancellor, KITS



Dr. R. Eshah Blessing
Registrar, KITS

Date:

6. Siemens Healthcare Private Limited, Mumbai



தமிழ்நாடு தமிழ்நாடு TAMIL NADU க. ஜெ. 85AB 768141
 க. ஜெ. 85AB 768141
 சா.ப.அ. பதிவு செய்துள்ள
 விநியோக யாளர்
 சிதம்பரம் மாவட்டம், சிதம்பரம், தமிழ்நாடு
 உரிமை எண்: 16482/சு.1/95

Memorandum of Understanding

This Memorandum of Understanding (MoU), is entered into on this 10th day February Two Thousand and Twenty One,

between:

M/S. Siemens Healthcare Private Limited, having its registered office at Siemens Healthcare Private Limited: Unit No. 9A, 9th Floor, North Tower, Godrej One, Pirojshanagar, Eastern Express Highway, Vikhroli (East), Mumbai – 400079 and having its local office in Coimbatore at Unit No 318, Regus Srivari, No. 1045, Level 3, Srivari Srimath, Avinashi Road, Coimbatore-641018; represented by *Ramesh, Anandru & R. Raghunathan* (hereinafter referred to as 'SIEMENS') (which expression unless repugnant to the context and meaning shall mean and include his assigns, legal representative, nominee, successor in office, administrator, executor, etc.) of the ONE PART.

and

Karunya Institute of Technology and Sciences (Deemed to be University), Karunya Nagar, Coimbatore - 641 114, represented by its Registrar, Dr. R. Elijah Blessing, (hereinafter referred to as **KITS**), (which expression unless repugnant to the context and meaning shall mean and include his assigns, legal representative, nominee, successor in office, administrator, executor, etc.) of the **OTHER PART**.

R. Raghunathan



Dr. R. Elijah Blessing



with a mutual desire to cooperate on bringing Industry interface by providing programs which are in line with the strengths and aspirations of both the organizations.

The expressions Siemens Healthcare and "KITS" shall, wherever the context admits, mean and include their respective successors in interest and permitted assigns.

WHEREAS

- Siemens Healthcare with a objective of bringing industry interface to students pursuing Biomedical in Department of Instrumentation Engineering
- Siemens Healthcare is an innovation and market leader in Medical equipments and in providing Healthcare Infrastructure with complete offerings in Diagnostic solution, Advanced Therapies, Ultrasound, Laboratory Diagnostics Point of care solution, and Services has expertise and experience in enabling healthcare providers with better outcomes.
- Siemens is willing to participate in an arrangement with KITS for providing Industry Interface to the BMIE students of the KITS as preferred partner
- This MoU provides for Siemens Healthcare and KITS to come together for mutually beneficial cooperation on Industry Interface of Medical equipments as mentioned below;

NOW THEREFORE THIS MoU WITNESSETH AS FOLLOWS:

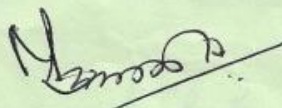
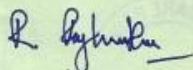
1. **Objectives:**

The objective of this MoU is to combine and synergies the expertise of SIEMENS and KITS. Both the parties shall commit the necessary resources in pursuance of the objectives and formulate necessary action plan to fulfill the objectives. Both the parties undertake to work with each other in a seamless and transparent manner in the spirit of mutuality and partnership.

2. **Areas of Cooperation:**

This MoU addresses mutual cooperation in the following areas:

1. To provide lecture sessions by experts to the partnering departments (DOIE) 50 hours per academic year for the students pursuing BME course.
(Structure of the Industry Interface program is detailed in Annexure I of the quotation)
2. To facilitate site visit for observation for the participant students only. The travel, accommodation & miscellaneous expenses for the visit shall be the scope of the KITS.
3. To impart short term Industrial In-plant training in Siemens Offices for a period of 5 days. (Structure of the Industrial In-plant training is detailed in Annexure II of the quotation) Note: The selection & finalization of the Siemens office where the student undergoes implant training will be decided by Siemens.
4. To provide skill upgradation for non-teaching staffs of KITS on Imaging Modalities for a period of 5 days, which includes observation & questioning sessions with Field Service Engineer. On-site and the travel & other miscellaneous expenses shall be in the scope of the KITS



5. Siemens shall provide guest lectures (Four per Academic year) only on selected topics by mutual general consent in the field of BME and also this session happens for short duration (say 2 hours) and this is completely different from Education program
6. To provide inputs to enhance the curriculum and be an advisory from the capacity of an industry expert in Medical engineering field (Radiology).

3 **Non Exclusivity:**

The cooperation/understanding contemplated herein is not exclusive and SIEMENS/ KITS shall be free to enter into similar arrangements with any other party also.

4. **Exercising Authority:**

Both SIEMENS and KITS will nominate and inform to each other names of two specific representatives to act as the exercising authorities, for operating the various provisions of this MoU on behalf of their respective organizations. All formal communications will be exchanged only through these nominated representatives.

5. **Validity of this MoU**

This MoU shall be valid for a period of 3 years, initially from the date of signing, after which it can be renewed by mutual agreement between the parties. Either party during its currency can also terminate this MoU by giving a notice of one month on the other. On termination, each party shall return to the other party all such documents and reference material as may have been borrowed for the purpose of fulfilling the work under this MoU. This MoU shall also stand terminated if a court of competent jurisdiction declares either of the parties as insolvent. Any termination as per this clause shall not affect the antecedent liabilities of the parties prior to the termination including completion of all assignments that have been agreed prior to such termination.

6. **Confidentiality:**

In the course of fulfilling the mutual responsibilities under this MoU, there will be a sharing of information of confidential nature. Both parties hereby agree to maintain such information relating to methods, trade secrets, products, services, processes, techniques and other proprietary information in strict confidence and not divulge these to any third party without the express consent of the other party except as may be necessary in the course of fulfilling mutual responsibilities in this MoU. This clause of confidentiality shall extend to the parties employees and associate / Subsidiary Companies / Concerns.

The parties each agree to refrain from distributing, disclosing or disseminating the Confidential Information of the other party and its affiliated entities which is disclosed to it and its affiliated entities in any manner to any person or entity except to the Recipient's employees, consultants and agents who have a need to know and who are obligated in a manner consistent with this MoU to maintain the confidentiality of such information.

Each party's obligation to maintain the confidentiality of the Confidential Information of the other party shall expire two (2) years after the date of disclosure or 12 months after expiry or termination of this MoU whichever is earlier.

All drawings and other documents, any copies thereof, or things or samples which embody the Confidential Information of a party shall remain the property of that party and will be promptly destroyed, upon that party's request. The parties each agree that the Recipient of Confidential Information shall not remove any copyright, confidential, proprietary rights or intellectual property notices attached to or included in any Confidential Information furnished by the other. The Recipient shall reproduce all such notices on any copies.

R. Srinivasan

[Handwritten signature]



[Handwritten initials]

The restrictions and confidentiality obligations set forth in this MoU shall not apply to the Discloser's Confidential Information which:

- a. is disclosed upon the advance written authorization of the Discloser;
- b. is lawfully disclosed to the Recipient by a third party without any confidentiality obligation; or
- c. is clearly demonstrable that same was lawfully known or independently developed by the Recipient prior to such disclosure.

Neither party shall use the Confidential Information of the other for any purpose other than to carry out the purpose of this MoU.

The Receiving Party shall construe nothing contained in this MoU as granting to a party a license, either express or implied, under any patent or copyright owned or obtained, or which is or may be licensable.

Neither party shall make any press release or other public references or utterances of any kind regarding this MoU, the information received as part of this MoU or the contents of this agreement without prior written consent of the other party.

Each party upon written request from the other party shall return or destroy all drawings and other documents, including any copies or summaries thereof, or other tangible forms which embody any confidential information of the requesting party.

7. Notices:

All notices and communications concerning this MoU shall be sent to the respective addresses of the parties as below

In the case of SIEMENS HEALTHCARE

Siemens Healthcare Private Limited
Unit No. 9A, 9th Floor, North Tower, Godrej One, Pirojshanagar, Eastern Express
Highway, Vikhroli (East), Mumbai – 400079

In the case of Karunya Institute of Technology and Sciences (KITS)

Karunya Institute of Technology and Sciences (Deemed to be University)
Karunya Nagar
Coimbatore-641 114.

8. Amendments:

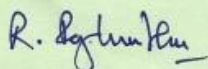
Any amendments to this MoU shall be in writing and signed by both the parties.

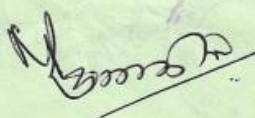
9. Ownerships:

Intellectual property rights, titles or ownership of any products, proprietary information or technology will not be transferred from one company to another on account of use of the same as part of any work under this MoU and shall always remain with the original owner of the same.

10. Costs:

KITS shall bear their respective costs arising out of the imparted Industry Interface programs under this MoU.









11. **Detailed agreement:**

The parties will enter into a detailed agreement for each module materialized under this MoU. The detailed agreement shall outline roles and responsibilities, liabilities to customers and define primary and secondary responsibilities for each business assignment to be executed. The detailed agreement shall not override the MoU, but define a commercial and contractual framework for work execution.

12. **Resolution of Disputes:**

All matters, queries, disputes or differences, whatsoever, arising between the parties touching the construction, meaning, operation or effect of this Memorandum of Agreement or out of or relating to this Memorandum of Understanding or breach thereof shall be mutually discussed between the parties and settled or else settled through arbitration in accordance with the relevant Arbitration Act in force at such time. English shall be the Language in the Arbitration. The Arbitration award shall be binding on both parties. Place of arbitration would be in Coimbatore In all matters concerning of this MoU, requiring judicial intervention Coimbatore court alone will have jurisdiction.

13. **Commitments:**

KITS/ SIEMENS shall make commitments or bind **KITS/SIEMENS** in any manner with any customer only with prior written consent from **KITS/ SIEMENS**. This MoU does not create a joint venture, agency, partnership or other business arrangement, and any agreement between the parties as to business activities will be set forth in subsequent written agreements. Therefore this MoU cannot be used as a right to represent either party on behalf of the other, in any business promotion or sales activities, unless so authorized in writing.

14. **Force Majeure:**

Neither **SIEMENS** nor **KITS** shall be liable for non-performance of any or all their obligations under this MoU due to reasons of "Force Majeure" and / or reasons beyond their reasonable control. If the performance as specified in this proposal is prevented, restricted, delayed or interfered by reason of :

- Fire, explosion, cyclone, floods;
- War, revolution acts or public enemies, locate or embargo;
- Any law, order, proclamation, ordinance, demand or requirements of any Government or authority or representative of any such Government including restrictive trade practices or regulations;
- Strikes, shutdowns or labor disputes which are not instigated for the purpose of avoiding obligations herein or any other circumstances beyond control.

The same shall not constitute a breach of the agreement and the time for performance for such provision, if any, shall be deemed to be extended for a period equal to the duration of condition preventing performance.

In Case the Force – Majeure conditions prevails and / or is likely to prevail for a period beyond one month both the parties will decide the project progress & future actions mutually.

15. **Governing Law:**

This MoU shall be governed by the laws of Republic of India.

R. Rajan



[Handwritten signature]

[Handwritten mark]

16. **Integration:**

This MoU contains the entire understanding between the parties and supersedes any prior written or oral agreements between them.

17. **Waiver**

No failure or delay on the part of either party in the exercise of any right or privilege hereunder shall operate as a waiver thereof or of the exercise of any other right or privilege hereunder, nor shall any single or partial exercise of any such right or privilege preclude other or further exercise thereof of any other right of privilege.

18. **Severability**

If any provision of the MoU is held to be ineffective, unenforceable or illegal for any reason, such decision shall not affect the validity or enforceability of any or all the remaining portions thereof.

19. **Non-solicitation**

During the terms of this MoU and for one year after its expiry or termination, neither party shall, without the prior written consent of the other party, canvass or solicit for direct or indirect employment of any employee (involved with work of this MoU) of each other or proceed with any application by or on behalf of that employee for direct or indirect employment. Neither party shall procure any third party to do any of the aforesaid acts.

IN WITNESS WHEREOF THE PARTIES HEREIN HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEAL, THE DAY, MONTH AND YEAR FIRST HEREINABOVE MENTIONED.

Signed for and on behalf of
Siemens Healthcare Private Limited

Signed for and on behalf of
Karunya Institute of Technology and
Sciences

[Handwritten signature]
Dr. Ramesh Mandu R. RAJIBUNATHAN
Sr. Gen. Manager - Sales
[Handwritten signature]
Sr. Gen. Manager - Finance

[Handwritten signature]
Dr. R. Elijah Blessing,
Registrar

Dr. R. Elijah Blessing
Registrar
Karunya Institute of Technology and Sciences
(Deemed to be University)
Karunya Nagar
Coimbatore - 641114

Witnesses:

1. *[Handwritten signature]* (K. GEETHA) 1.
2. *[Handwritten signature]* (J.V. GURUMURTHY) 2.



7. Salzer Electronics Limited,Coimbatore



salzer®

Karunya-Salzer Innovation Cell

Memorandum of Agreement (MOA)

School of Electrical Sciences



Karunya Institute of Technology and Sciences

(Declared as Deemed-to-be University under section 3 of the UGC act 1956)

Karunya Nagar, Coimbatore 641 114, Tamilnadu, India.

Phone : +91-422-2614300, Fax : +91-422-2615615

Website: www.karunya.edu, Email: ku@karunya.edu



TAMILNADU தமிழ்நாடு तमिलनाडु TAMIL NADU
No. 69823 Karunya University
Date: 08/09/2014 Coimbatore

12AB 615053

M. DORAISWAMY
"STAMP VENDOR"
10-A, STATE BANK ROAD,
COIMBATORE - 641 018
L.No: 7333/B1/97/100



MEMORANDUM OF AGREEMENT

This Memorandum of Agreement (MOA) is made on 6/10/2014 at Karunya University, Coimbatore, between M/s Salzer Electronics Limited having its registered office at Samichettipalayam, Coimbatore - 641047, India (hereinafter referred as SEL) and Karunya University, an autonomous institute established under sec. 3 of the UGC Act, 1956 vide Notification No. 9-3-2003-U3 dt. 23.06.2004 based in Coimbatore.

WHEREAS SEL is a company incorporated under the companies Act 1956 and engaged in manufacturing of Switchgear Products, Cam Operated Rotary Switches, Starters & Auto Electrical Products, represented by its Managing Director, Mr.R.Doraiswamy.

WHEREAS Karunya University (hereinafter referred as UNIVERSITY) is engaged in conducting research and development in various technological and engineering areas, having excellence in highly trained personnel, research and development facilities.

WHEREAS SEL and KU are entering into an MOA, to explore the development of technologies, improve capabilities of common interest and engage in research projects in the areas of Electrical and Electronics Engineering

Dr. S. Sundar Manoharan
Vice - Chancellor
KARUNYA UNIVERSITY
Karunya Nagar
Coimbatore - 641 114.

Term

This MOA is valid for a term of 5 years unless terminated earlier or extended by mutual agreement of parties at least 30 days prior to expiry.

Now it is hereby agreed to have MOA between the parties hereto as follows:

Article 1. JOINT PROGRAMME

- 1.1 SEL shall provide Industrial visit, in-plant practical training, mini and major projects to the students of UNIVERSITY at their factory on mutually agreed schedule.
- 1.2 As and when feasible, SEL shall give preference for placement opportunities to students of UNIVERSITY for its future manpower requirements, depending on their suitability.
- 1.3 SEL experts shall give seminars and lectures to the UNIVERSITY students on the updated applications of technologies and thereby exposing the students to the industrial practices.
- 1.4 UNIVERSITY shall permit SEL representatives to use the UNIVERSITY Library on mutually agreed terms and conditions.
- 1.5 SEL will offer skill up gradation for non teaching staff.
- 1.6 UNIVERSITY will offer the updated technology to SEL supervisors.
- 1.7 UNIVERSITY and SEL shall appoint a coordinator from each end to take care of the joint program.

Article 2. R & D ACTIVITIES FOR NEW INNOVATIVE PRODUCT DEVELOPMENT

- 2.1 UNIVERSITY and SEL shall establish a innovation cell which will be governed by a product development team in UNIVERSITY for each project with primary responsibility to address the state of the art of technology relevant to the product proposed, analyze different configurations and design the product, predict the product performance, identify test and evaluation procedures and facility requirements, etc.
- 2.2 UNIVERSITY and SEL shall establish a joint project team to develop new products of interest to SEL. The project team shall have a Project Leader from SEL and Project Leader from UNIVERSITY.
- 2.3 The Joint Project Team is responsible to formulate specific project proposals, each defining the requirements, specifications, action plan, role & responsibilities of parties, mile stones, schedule and budget.
- 2.4 Once the projects are identified, the project team will get appropriate approval from respective management of UNIVERSITY or SEL & shall enter into a separate agreement in writing for implementing such projects including the matters such as funding, manufacturing right, patenting etc. as mutually agreed to for each such projects.
- 2.5 After due approval from SEL and UNIVERSITY managements, the joint project team is responsible to manage and guide the project implementation as per approved schedule.



Dr. S. Sundar Manoharan
Vice - Chancellor
KARUNYA UNIVERSITY
Karunya Nagar
Coimbatore - 641 114.

Article 3: DEVELOPMENT OF PROJECTS

3.1 With mutually agreed terms & conditions and specific approval by Principal for every project, UNIVERSITY shall make available its facilities in the campus for hardware realization and evaluation, for the projects taken up by UNIVERSITY for SEL. This shall include machinery in the workshop, CAD/CAM Laboratory, computer center, library, laboratory facilities for inspection, testing, assembly, calibration, quality control, etc.

3.2 Identified experts and faculty of UNIVERSITY shall be fully associated in the hardware development program in UNIVERSITY campus and provide all technical support.

3.3 Professors and Experts from UNIVERSITY shall deliver special lectures at SEL to update the officials of SEL with latest knowledge and information on the state of the art in areas of interest to SEL on mutually agreed schedule.

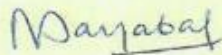
3.4 For joint development projects/products identified by the UNIVERSITY /SEL Joint Project Team, the schedule, materials and personnel involved in the project will be decided quickly and finalized to execute the projects as per schedule.

Article 4: ADDITIONS

Other activities to promote institute–industry co-operation and joint projects shall be mutually formulated, agreed and suitably implemented, reviewed and revised in due course as and when required.

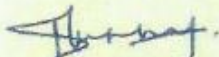
Article 5: AUTHORISED PERSONNEL

On behalf of SEL



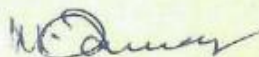
1. Mr. N. Jayabal

Director



2. Mr. D. Rajanayagam

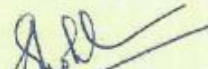
Senior Manager-Quality



3. Mr. K. Raman

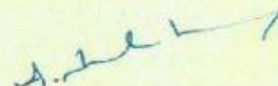
Head -HR

On behalf of KARUNYA UNIVERSITY



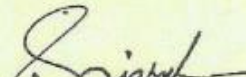
1. Dr. A. Shobha Rekh

Director i/c, School of Electrical Sciences



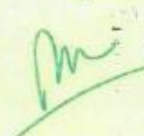
2. Dr. A. Immanuel Selvakumar

HOD, Department of EEE



3. Prof. K. Rajasekaran

HOD, Department of EIE



Dr. S. Sundar Manoharan
Vice - Chancellor
KARUNYA UNIVERSITY
Karunya Nagar
Coimbatore - 641 114.

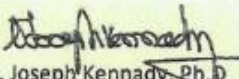
Article 6: DISPUTE RESOLUTION

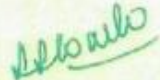
Both UNIVERSITY and SEL shall make best efforts to resolve all differences and disputes arising in connection with this MOA amicably.

Article 7: VALIDITY

The MOA is effective from the date of signing. Both the parties shall try their best to nurture the MOA with a view to get mutual benefits. However both the parties are free to terminate the MOA without assigning any reason, by giving one month notice

For and on behalf of Karunya University


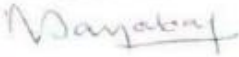

Dr. C. Joseph Kennedy, Ph.D
Registrar
Karunya University, Coimbatore


Dr. S. Sundar Manoharan, Ph.D
Vice-Chancellor
Karunya University, Coimbatore

For and on behalf of M/s Salzer Electronics Limited

Mr. R. Doraisamy
Managing Director, M/s Salzer Electronics Limited

Witnesses:

- 
S. BASKARA SIVARAJ, SALZER ELECTRONICS LTD
Director, Coimbatore
SAMICHETTI PULAYAM, COIMBATORE - 641 047
- 
N. JAYABAL, Salzer Electronics Ltd. Coimbatore - 641 047
Director


Dr. S. Sundar Manoharan
Vice - Chancellor
KARUNYA UNIVERSITY
Karunya Nagar
Coimbatore - 641 114.

8. **DXC Technology:** Karunya University and DXC Technology joined forces to provide technical expertise and support in various healthcare initiatives. This collaboration leveraged technology and innovation to enhance the delivery of healthcare services and promote digital solutions in healthcare. Namely, Vaccine drives, empowerment training programs for women in 9 places in India. KITS gave technical expertise for constructing Primary Health centre at Poovattasherry, brahmakulam, kothad in Kerala.

SEESHA DXC Skill development project aims to provide skill development trainings to school dropouts, college dropouts, unemployed youth and women (9 places in India) through short term courses at Karunya Nagar and Alandurai covering both rural and tribal communities.



Skill Training and distribution of certificates



Women Empowerment Programs

LOCAL COLLABORATIONS:

Karunya Institute of Technology and Sciences, in collaboration with SEESHA, has formed local partnerships with entities like the Primary Health Centre in Pooluvapatti, and the Forest Department in Coimbatore, focusing on senior care and local tribal people's healthcare.

Additionally, Collaborations with academic institutions like Bishop Appasamy College, Sri Krishna College of Arts, Kumaraguru College of Arts & Science College, and Nehru Arts & Science College have joined hands with our institution to provide internships for their social work students. These partnerships are geared towards enriching educational opportunities, providing valuable support to students, and fostering academic excellence across various institutions. KITS with SEESHA plays a pivotal role in training social work students from these colleges, both within the hospital and in the community, ensuring a well-rounded and comprehensive learning experience.

1. **Primary Health Centre, Pooluvapatti:** Karunya University, through SEESHA, has collaborated with the PHC since September 17, 2020 to with the goal of enhancing healthcare services. This partnership aimed to improve medical facilities and accessibility, ensuring that local communities received essential medical care and support, including Mobile Health Screening, Vaccination Drives, Immunization of Children, camps, and Covid testing kiosks



Seesha Karunya COMMUNITY HOSPITAL

Siruvani Main Road, Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India
Ph : + 91-422 - 2614681 / 82 E-mail : aaskch@seesha.org

From:
Dr. Paul Dhinakaran

17.09.2020

To
The Block Medical Officer
Primary Health centre
Pooluvapatti- 641101

Dear Madam,

Sub :- Mobile health services to surrounding villages --reg

Greetings from SEESHA

We are happy to inform you that SEESHA Karunya Community hospital has started mobile health services to surrounding villages. We have planned to create awareness on the spread of corona virus, fever screening, Oxygen saturation if required and distribution of Vitamin "C" & Zinc, Kobasurakudineer. This ambulance will visit to the village as per the schedule given below. We would be very much happy if the Block PHC would join hands to render the above service for the people in the block by your support and permitting the Village health nurse (VHN) during the ambulance visits to the villages. We are also willing to support in the vaccination drive to the villages.

Monday : Nallurpathy, Mundanthurai, Suppanimadai, Mullankadu.

Tuesday: Kalkotipathy, Sadiyaval,

Wednesday: Sadiyavalpathy, Singapathy, Pottapathy.

Thursday: Sarkarporethy, Jakirporethy, Vellapathy.

Friday: Valayankuttai, Moongilmadnikuttai, Pooluvapatti reugee camp.

Thanking you for your support to **SEESHA**.

With regards

Chief Operating officer
SEESHA


Dr. Samuel Thomas

Seesha HealthCare Services
Specialty: Seesha Healthcare Services, Special & Health Address: (Registered Public Charitable Trust)

*Received a copy of
Permission granted -
N. M. M.
12/9/20*

வட்டிற் மருத்துவ அலுவலர்
அதே அறங்காணிய நம்பியம்
பூலுவட்டி - 641 101
ப.ப.அ. அலுவலர் அலுவல் - MF313

2. Forest Department in Coimbatore

**SEESHA**
Let's Give Life

Samiti for Education Environment Social & Health Action
(A Registered Charitable Organization)

SEESHA HOUSE, 37, Gandhi Road, Tambaram West, Chennai - 600 045
☎ +91 44 6666 0000 Email : info@seesha.org www.seesha.org

Founder :
Dr. Paul Dhinakaran

B.W.
13-8-19

From
Dr. Samuel Thomas
Chief Operating Officer- SEESHA
Karunya Nagar
Coimbatore-641114

ACF (T).
Bolampatty

To
The District forest Officer
Coimbatore

Dear Sir,

Greetings from SEESHA!

SEESHA is a registered NGO which works on various social and economic empowerment programmes for the weaker sections in the society.

Currently we are focussing our attention on the welfare and empowerment of Tribal Community in Thondamuthur Block as the initial effort we would like to implement the following programmes for the tribal families in Sadivayal and surrounding areas.

1. Making and marketing of furniture made of Lantana
2. Tailoring Training
3. Community Health Clinic
4. Any other skill training programmes

These projects would create more employment opportunities and provide welfare and Health care services to almost 150 tribal families in their area. We also would like to provide the necessary support to the department of forests in this venture.

Hence I request you sir that our organisation may kindly be permitted to utilize the community hall located at Chinnar check post in Siruvani road.

Thanking You

Organise the Training Programme joining with Come Here

The organisation SEESHA is permitted to use the Community Hall near Chinnar Check Post.

Also, the Community Health Clinic may be set up in Sadivayal.

[Signature]

Dr. Samuel Thomas
Chief Operating Officer- SEESHA

Dr. Samuel Thomas
Chief Operating Officer
Samiti for Education Environment Social and Health Action (SEESHA)
SEESHA HOUSE
37, Gandhi Road, West Tambaram,
Chennai-600045.

Assistant Conservator of Forests (Training)
Bolampatty Range, Iruttupallam,
Coimbatore - 641 114

6. Tapovan Senior Citizens Foundation: The collaboration with Tapovan reflects Karunya University's dedication to geriatric care. Karunya Institute of Technology and Sciences (KITS) is offering support to the Old Age Care Home in Kuppanur, Madhampatty, by establishing a 24/7 dispensary with a nurse on site and regular doctor visits



10812
26.7.2017

தமிழ்நாடு தமில்நாடு TAMIL NADU
ஐ 297
கோவை.641114

க. ஜெ. 42AB 759279
க. வி. சி. சி. சி.
க. ம. க. குந்தியங்குடி
கிழவன்குடி
காரதிமடாலை, கோவை, தமிழ்நாடு
பதிவு எண் 18428 / 46 T. N.



MEMORANDUM OF AGREEMENT BETWEEN SEESHA KARUNYA COMMUNITY HOSPITAL (SKCH) AND TAPOVAN SENIOR CITIZENS FOUNDATION (TSCF), KARADIMADAI ROAD, KUPPANUR COIMBATORE TO PROVIDE HEALTH CARE SUPPORT:

Based on the invitation extended by Tapovan Senior citizens Foundation (also referred as TSCF) in Karadimadai Road, Kuppanur, Coimbatore, Seesha Karunya Community Hospital, (SKCH) Coimbatore desires to establish a Health Care Support at TAPOVAN Complex and nearby villages, Coimbatore, thereby enabling access to Quality Health care for the residents and nearby residents to access a continual care for common ailments and Emergencies.

Q. J. J. J. J.

CONSIDERING that such joint collaboration will mutually benefit both organization and ultimately, resulting in Residents of Tapovan Complex obtaining Quality Healthy Life with compassionate care, both parties hereby agree as follows:

A) Objective and Modalities of Cooperation:

The objective of the above said agreement dated 09th November 2017 is to establish a collaborative frame work between both the organizations. In order to fulfill the above agreed upon objectives, both the organizations will fulfil following responsibilities:

a) RESPONSIBILITIES OF SEESHA KARUNYA COMMUNITY HOSPITAL (SKCH):

1. Provide a Nurse at Tapovan Complex residing and stationed in the quarters provided by TSCF to monitor health of the elderly residents, maintain the Health records and share/report to the Medical Officer at Seesha Karunya Community hospital or other referred hospitals.
2. Medical Officer – Doctor, Physiotherapist, and Counselor will visit Tapovan, once a week at appointed time.
3. Laboratory and Diagnostic care – Master health check up and Diabetic health checkup will be carried out for a fee at SKCH, Karunya Nagar.
4. Fee based Referral and Ambulance Services will be made available when in need – on a 24 hour call basis.
5. Fee based Laboratory tests, treatment by Physiotherapist, counseling sessions, wound dressings, first aid treatment, Medicines and/or Ambulance.

b) RESPONSIBILITIES OF TSCF, KARADIMADAI ROAD, KUPPANUR, COIMBATORE:

1. Provide free of charge Medical Room for in house medical facilities
2. Provide free of charge Food and Accommodation for the Residential Nurse
3. A minimum Donation of Rs20000/-per month will be provided for Health care Support to Seesha Karunya Community Hospital

The Terms and conditions will be reviewed once every twelve months.

d) Follow-up Committee:

For implementation, supervision, and follow-up of activities herein agreed upon, a Follow-Up Committee consisting of **Dr. Gnanaraj, Director of Medical services**, Seesha Karunya Community Hospital (or his appointed representative), Karunya Nagar and **Mr. K. Varatharajan, Secretary, TSCF** (Or his representative) of Tapovan Senior Citizens Foundation:

Among other things, the committee will be in-charge of the following:

- a) Plan, supervise and evaluate all the activities undertaken by this Agreement;
- b) Evaluate and review Health care needs of Tapovan Residents;

K. Varatharajan
R

c) Submit necessary report to the organization on agreements or decisions requiring sanction, modifications or rectification.

d) Follow up on functions deemed necessary and agreed upon

e) Disputes Settlement

Any difference or divergence derived from the interpretation or application of the present agreement shall be resolved amicably by mutual discussions and agreement between both parties.

f) Final Provisions:

The Agreement shall come into force from the date of signature affixed below, and shall remain in force for a period of ONE year from such date, and may be renewed for equal periods, with prior agreement and evaluation of both parties.

The present Agreement may be modified by mutual consent of both parties, formalized by written communication, specifying date of its enforcement or commencement. The anticipated termination of the present Agreement shall not affect the conclusion of cooperation activities, formalized while in force.

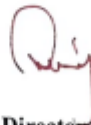
Signed on 09th November 2017.

At Karunya Nagar, Coimbatore 641114

(In two original copies of English Language, with both texts, equally authentic.)

FOR

SEESHA KARUNYA COMMUNITY HOSPITAL,



Dr. Gnanaraj, Director of Medical services

Seesha Karunya Community Hospital,

Karunya Nagar, Coimbatore India

DR. J. GNANARAJ

MS., MCh (Urology), FARS, FICS.

DIRECTOR MEDICAL SERVICES.

SEESHA - KARUNYA RURAL COMMUNITY HOSPITAL.

KARUNYA NAGAR - 641 114

COIMBATORE, TAMILNADU.

TAPOVAN SENIOR CITIZEN'S FOUNDATION,



Mr. K. Varatharajan, Secretary,

TAPOVAN SENIOR CITIZENS FOUNDATION

Karadimadai Road, Kuppanur, Coimbatore, India

Secretary
Tapovan Senior Citizens Foundation
Karadimadai Road, Kuppanur Post,
Coimbatore - 641 010.

Collaborations with colleges in Coimbatore:

3. Bishop Appasamy College: Since Jan 2021

10/15/23, 6:58 PM

SEESHA Mail - Requesting permission for Block placement training - REG



Sheila Dr <drsheila@seesha.org>

Requesting permission for Block placement training - REG

3 messages

SW I I PG <swpg2019@gmail.com>
To: drsheila@seesha.org

Sun, Jan 17, 2021 at 8:48 PM

To

The Manager

SEESHA - Centre for well-being

Karunya Nagar, Coimbatore

Respected Madam,

Warm Greetings from the Department of Social Work, Bishop Appasamy College of Arts & Science, Coimbatore.

We are offering three years Undergraduate, two years Postgraduate and Research programmes in Social work. As part of the curriculum, the III year BSW students have to undergo their Block placement training for 10 days. (18th January to 30th January 2021).

In this regard I request you to kindly grant permission for our Students (**B. Lakshita priya** and **E. Pratheep Joshua Thangam**) to do their training successfully in your esteemed organization. During this pandemic situation I assure that our Students will abide by the rules and regulations formulated by the Government and the agency.

Since, this exposure in your organization shall be an added advantage for our students towards fruitful career; We seek your earnest cooperation and fullest support for their better learning.

Hope your valuable consent reach us early.

Yours Truly,

Dr.L. Esther Shalini
Assistant Professor / Fieldwork In- Charge
Department of Social Work
Bishop Appasamy College of Arts & Science,
Coimbatore - 18 Tamil Nadu

4. Kumaraguru College of Arts & Science College: Since August 2021

10/16/23, 5:30 PM

SEESHA Mail - Requesting permission to visit Seesha Hospital on 26.11.2021



Shella Dr <drshella@seesha.org>

Requesting permission to visit Seesha Hospital on 26.11.2021

1 message

EMMANUEL DANIEL <emmanueldaniel@kclas.ac.in>

Mon, Nov 15, 2021 at 1:02 PM

To: "drsamuel@seesha.org" <drsamuel@seesha.org>, Shella Dr <drshella@seesha.org>
Cc: Lakshmi Narasimhan <lakshminarasimhan@kclas.ac.in>

Dear Dr. J Samuel Thomas,

Greetings from the Department of Social Work, Kumaraguru College of Liberal Arts and Science www.kclas.ac.in

As a part of the MSW program the students will be undergoing orientation visits to different agencies in the first semester. In regards to this, we will be happy if you can kindly permit us to visit SEESHA- Karunya Community Hospital on Friday, November 26, 2021 at 10.30 am.

Eighteen students along with one faculty will be the visiting team. We kindly request you or your senior administrators to address the students about Seesha Hospital, projects and its research. I am sure that vision of bridging the gap between quality and affordability of healthcare services and your amazing work will inspire our students

Looking forward to hearing from you

Regards,
Emmanuel Daniel
9944556919

5. Sri Krishna College of Arts: Since June 2021



SRI KRISHNA ARTS AND SCIENCE COLLEGE

An Autonomous Institution Affiliated to Bharathiar University

Reaccredited by NAAC with 'A' Grade

Ranked 29th in NIRF Ranking 2020, Govt. of India

Awarded 1st in National level Swachh Campus Ranking 2019

Kunlamuthur (P.O.) Coimbatore, Tamilnadu, India, PIN - 641 008

Phone : 0422 - 2678400, Fax : 0422 - 2678052

E-mail : principal@skasc.ac.in Website : www.skasc.ac.in



Dr. P. BABY SHAKILA M.Sc., M.Phil., Ph.D., M.Ed., M.B.A.,
Principal

SKASC/COE/BOS/MSW

Date: 29-06-2021

Dear Sir/Madam,

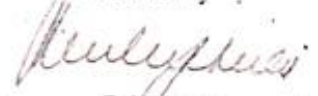
Sub: Intimation for Board of Studies Meeting- reg.

Greetings from Sri Krishna Arts and Science College.

We are glad to inform that the Board of Studies in Social Work for the academic year 2021-2022 will be conducted on 03-07-2021 (Saturday) at 10.00 am in Online. Meeting link will be shared by the Board Chairman. We request you to attend the meeting.

Thanking You

Yours faithfully


Principal

Copy to-
Dr. Sheila Daniel
Manager, Centre for Well Being,
SeeshaKarunya Rural Community Hospital,
Siruvani Main Road,
Coimbatore
9884072327

7. Nehru Arts & Science College: Since September 2021



NEHRU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution affiliated to Bharathiar University)
(Reaccredited with "A" Grade by NAAC, ISO 9001:2015 & 14001:2004 Certified
Recognized by UGC with 2(f) & 12(B), Under Star College Scheme by DIT, Govt. of India)
Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.



To

Date: 11.09.2022

Dr, Sheila Daniel
SecSha Hospital
Karunya, Coimbatore

Dear Sir/Madam,

Sub: Internship of MSW Students – Seeking permission – Reg

We are delighted to inform that our College has been offering Master of Social Work Course with Human Resource Management, Medical and Psychiatric Social Work and Community Development Specializations since 2003.

As a part of the curriculum, students of MSW have to undergo Internship training for 15 days. In this regard I humbly request you to place the following students in your esteemed Organization for the same from 12-09-2022 to 26.09.2022 for a minimum period of 15 days of Internship training. We request you to provide two copies of original certificates to students after their Internship training.

We take this opportunity to say "Thanks a Lot" to your organization for the best co-operation and support.

Name of the Students:

- 1) MS.KAVIYA SWETHA
- 2) MS.SRIVAISHNAVI

Thank You
Yours Truly

Dr.P.Nathiya
Head (i/c) – Dept of Social Work
Ph. No- +91-9943393371
E-mail Id- nasemswhod@nehrucolleges.com

- 8. Immaculate Conception Convent, Coimbatore:** From 2020 to the present, the collaboration with Immaculate Conception Convent has symbolized a joint effort to facilitate student engagement programs, women's health initiatives, and childbirth awareness workshops



☎ 2392186

IMMACULATE CONCEPTION CONVENT HOSPITAL

37, Ismail Rowther Street
COIMBATORE - 641 001

Date :.....

To
The Registrar,
Karunya deemed University,
Coimbatore.

17/12/2020

Dear Sir,

Greetings. Immaculate Conception Convent Hospital (ICC HOSPITAL) is a 30 bedded Hospital located at Town Hall, Coimbatore. Based on your request for a tie up for training your student Nurses, we are happy to communicate that the student Nurses from Karunya College of Nursing is permitted to under go training in our hospital during their course of Study in the departments of .

1. Obstetrics
2. Gynecology
3. General surgery
4. Laparoscopic surgery
5. Neonatal unit

Mary Joseph

ADMINISTRATOR
I. C. C. HOSPITAL
37, Ismail Rowther Street,
Coimbatore- 641 001.

3.3.2 - Outreach programmes and projects in the local community to improve or promote health & wellbeing including hygiene, nutrition, family planning, sports, exercise, aging well, and other health and wellbeing

Karunya University recognizes the importance of community engagement and actively participates in initiatives that contribute to the health and wellbeing of the local community.


The University addresses a wide range of programmes and activities through a variety of outreach programs and projects to create positive impact on health and wellbeing of community. The outreach programs often involve student volunteering programs, which provide students with opportunities to make positive impact and experience on the community. Additionally, KITS collaborates with local, national, and global government and non-governmental organisations, to further enhance health and wellbeing.

The university takes great pride in offering workshops, seminars, awareness campaigns on hygiene, cleanliness and various other health issues, vaccine and immunisation drives through free Corona vaccination and medical camps.

KITS organize sports events, fitness classes, and recreational activities to the community. We acknowledge the importance of healthy aging and actively supports programs that enhance the wellbeing of older adults also.

1. Awareness Programme on ‘Sexual and Drug Abuse’

The Division of Criminology conducted an awareness Programme on ‘Sexual and Drug Abuse’ on 8.12.2021 at Karunya Christian School for the students to protect themselves from prevailing issues of the society.



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)
A CHRISTIAN MINORITY RESIDENTIAL INSTITUTION
AICTE Approved & NAAC Accredited

Department of Criminology organizes
In collaboration with
Karunya Christian School, Karunya Nagar, Coimbatore - 641114

“Awareness Program on Child Sexual Abuse and Drug Abuse”
On 8/12/2021 [1PM – 3 PM]

Program Schedule

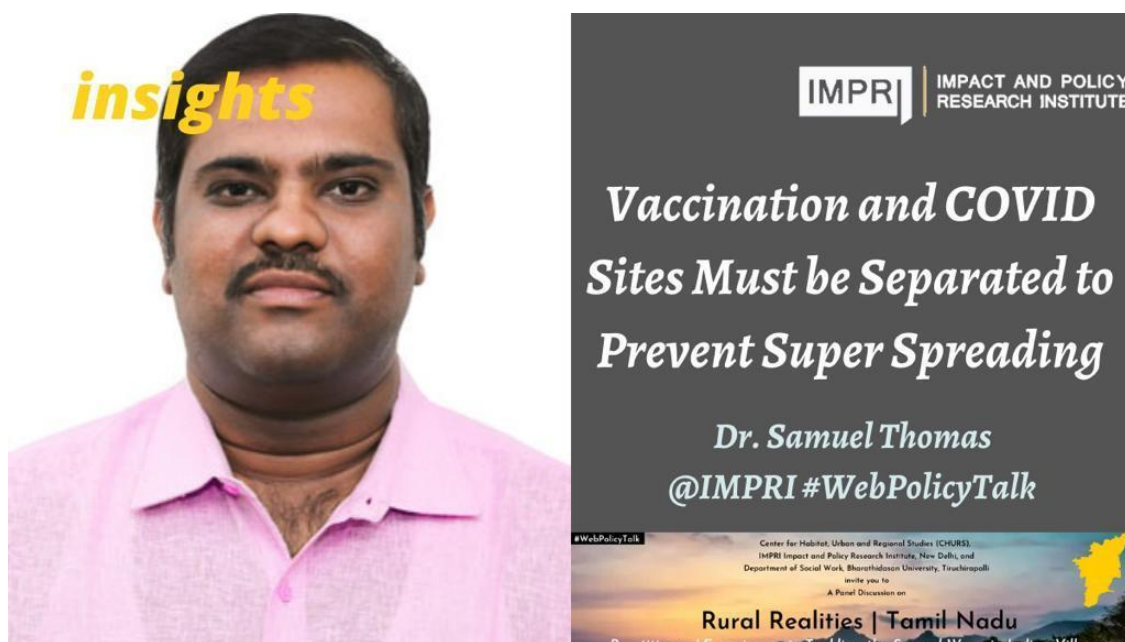
Name of the Faculty	Session Title	Time
Dr. Surbhi Girdhar, Assistant Professor	Child Sexual Abuse and Types	1:00 pm – 1:15pm
Ms. Jyoti Rana, Assistant Professor	Protection of Children from Sexual offences Act. 2012	1:15 pm – 1:30 pm
Ms. Anika Vashisth, Assistant Professor	Cyber Crime and Sexual Offence	1:30 pm – 1:45 pm
Mr. Nethaji Subash. I, Assistant Professor	Consent and Reporting of Child Sexual Abuse	1:45 pm – 2:00 pm
Mrs. Agneha Anna Gillbanks, Assistant Professor	Awareness and Coping Strategies	2:00 pm – 2:15 pm
Dr. Sunanda Bhagavathy, Professor and Head	Drug Abuse among Children and its impacts	2:15 pm – 2:30 pm
<i>Quiz and Q&A</i>		2:30 pm – 3:00 pm

Awareness Programme on ‘Sexual and Drug Abuse’

Karunya Christian School students participated and benefited through the awareness program on the following topics: Child Sexual Abuse & Types, Protection of children from sexual offences, cybercrime and sexual offence, consent and reporting of child sexual abuse, awareness and coping strategies, drug abuse among children and its impacts.

2. Panel discussion on Vaccination and Covid Sites for prevent super spreading

Dr Samuel Thomas was one of the panellist in the panel discussion to discuss the pertinent topic of the time, measures to tackle the spread of the second COVID wave in rural areas, the Centre for Habitat, Urban and Regional Studies (CHURS), Impact and Policy Research Institute (IMPRI), New Delhi and Department of Social Work, Bharathidasan University, Tiruchirapalli organized a Panel Discussion with eminent panelists on “Rural Realities Tamil Nadu Practitioners’ Experiences in Tackling the Second Wave” on May 22, 2021.



Panel discussion for Vaccination and Covid Awareness

3. World health day- 7th April 2022

World health day is celebrated every year to raise awareness about the ongoing health issues that concern people across the world. This day is also used as an opportunity to spread awareness about the overall health and well-being of people. Every year, a theme is chosen for the day and this year World Health Organization (WHO) declared the theme as “Our planet, our health”.



**Health awareness talk by Dr. Sheniya
Karunya Hospitals**



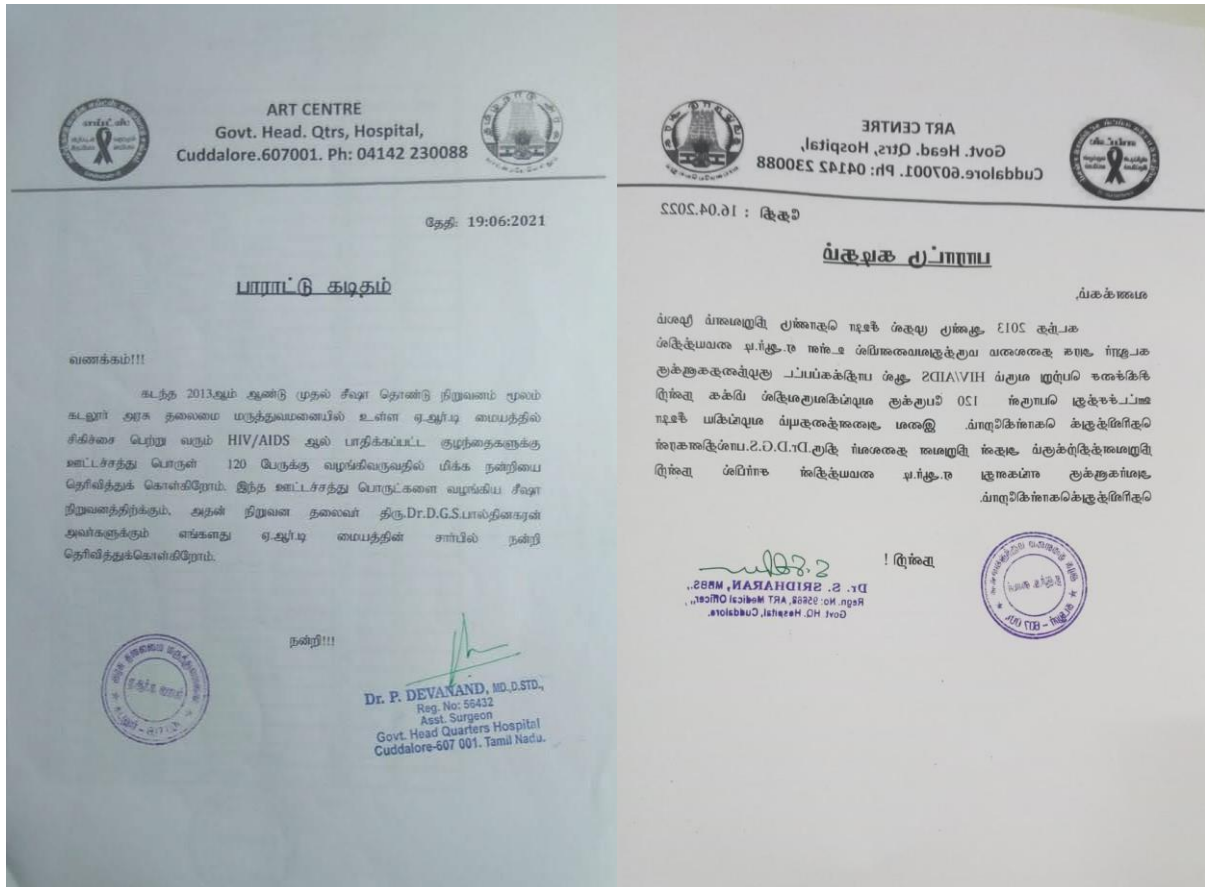
World health day

As the world celebrates Health Day, SEESHA CAP- Coimbatore organized a health awareness program on 7th April 2022 (Thursday) at Esther orphanage home, Thondamuthur. Students from Youth Red Cross (YRC), KITS and Social work students from Bishop Appasamy College, Coimbatore joined with SEESHA to conduct the program. During the program, Dr. Sheniya from Karunya Hospitals addressed the girls on how important to take care of their health.

4. Support to Children with HIV in government ART centres in Cuddalore

We are providing support to over 120 children living with HIV/AIDS and seeking treatment at the government ART centres in Cuddalore, Tamil Nadu.

On a monthly basis, these children are provided with nutritional supplements required in their diet to keep them healthy despite their failed immunity. Psycho-social support provided through home visits and one-to-one and family counselling. As these children are especially susceptible to opportunistic infections and diseases, we conduct awareness sessions to help them stay healthy.



Appreciation letter from Government ART Centres in Cuddalore, Tamil Nadu on June 2021 and April 2022

5. Convocation 2022 Assistive Devices to 5 Differently abled persons.

The students of Karunya Institute of Technology & Sciences, are privileged to be involved with SEESHA through volunteer work in the communities and Old Age Care Home. Today we, the Graduates of 2022, are providing assistive devices to 5 differently-abled persons to enable them move beyond disability and live a life of self-sufficiency.



Assistive Devices for 5 Differently abled persons



4. Proper Housing for the victims of Gaja Cyclone & Gypsy Cyclone

The first phase of Rehabilitation support at Thopaditheru hamlet, apart from building the 22-permanent concrete houses, SEESHA has installed bore-well and water storage facilities for the villagers' daily usage, by conducting geo-physical survey to detect water table and did potability tests to facilitate safe water supply for the hamlet. SEESHA has also laid concrete roads with L.E.D streetlights.

On September 4th, 2022 at Chennai Vanagaram Jesus Calls Campus Dr. Paul Dhinakaran handed over 69 concrete houses to families who were adversely affected by the Gaja cyclone, free of cost. This is part of SEESHA's Gaja Rehabilitation Housing Project, which was launched to provide stable homes and improve the quality of life for 100 worst-hit families from Pudukottai, Thanjavur, and Tiruvarur districts who lost their houses during the 2018 calamity.



Gaja Rehabilitation Housing Project by SEESHA's



5. Awareness Programme on ‘Substance Use Prevention’

The Ministry of Social Justice and Empowerment Government of India conducted a panel discussion on ‘Substance Use Prevention: Counsellors Perspective’ on 31.08.2021 in which Sheila Daniel, Program Manager SEESHA was one of the panellist representing KITS.



Ministry of Social Justice and Empowerment
Government of India

Nasha Mukta
Bharat Abhiyaan

A Panel Discussion on
Substance Use Prevention: Counsellor's Perspective

PANELISTS



Moderator
Ms. Radhika Chakravarthy
Joint Secretary | MoSJE



Dr. Shazia Veqar Siddique
Consultant Psychotherapist,
Healthy Minds
Expert - Mental Health



Ms. Aruna Arumugam
Head, Training & Counselling
Operations, 1to1help.net
Expert - TeleCounseling and EAP



Ms. Shabana Siddiqui
Psychologist
Expert - School Counsellor



Dr. Sheila Daniel
Program Manager, Transformation
Centre, SEESHA
Expert - Adolescence & College
Setting



Dr. Kavitha Manoj
State Coordinator, KAAVAL
Plus Project, Govt. of Kerala
Expert - Children in Conflict
with Law



Dr. Jacqueline Allenby David
Senior Counsellor, TTK Treatment
and Rehabilitation Centre
Expert - IRCA & SLCA



Mr. Tibhuwan Lama
Counselling Practitioner
Expert - TI Project &
Recovered Drug User



Dr. Renjith Pillai
Assistant Prof. Psy. Social Work
(PGIMER)
Expert - Medical Education and
Research

31st August, 2021
4PM - 5PM

Join the Discussion on
our Social Media Pages



6. Community Health Facilitator (CHF) Program in Cuddalore since 2013

Awareness about health, hygiene and the available Govt. health schemes. Facilitating the members getting help from health authorities. Awareness on menstrual hygiene, nutrition, pregnancy & childbirth among community women. Linking needy children with Anganwadis. Offering support for PHCs, immunization drives. For the benefit of the 11 target communities in Cuddalore, CHF Program plays a vital role.



Women's Day

SEESHA along with Karunya hospitals approached Panchayat Union Middle school, Irruttupallam and conducted an "awareness program on Malnutrition and Anemia for the school children as anemia and malnutrition are more prevalent among rural and tribal population of Mathuvarayapuram panchayat. for the students (27 girls and 34 boys)



Awareness on Anemia and malnutrition
By Dr. Shilpa Samuel Dhinakaran

Awareness speech to the Nallurpathy
community women by Dr. Suganthi



Enthusiastic women participated in the awareness program

To commemorate Woman's Day, SEESHA CAP organized an awareness program on “Anemia and menstrual hygiene” at Nallurpathy tribal village. 26 adolescent girls and women participated and interacted with the doctor.

University outreach programmes to the local community through You Tube

Karunya Institute of Technology and Sciences believes in a proactive approach to mental health, this awareness program aspires to create a university environment where students feel supported, understood, and equipped to navigate the challenges of academic and personal life.

The You tube channel mainly focused on educating students on common psychological issues, including stress, anxiety, and depression. It also aimed at breaking down societal stigmas surrounding mental health by fostering open discussions thereby offering coping mechanisms and resources to empower students in managing their mental well-being effectively.

1. ALL ABOUT GI CANCERS

19th September 2021, Dr. Madhura Prasad Suman – Gastroenterologist, explained about the types of Gastrointestinal Cancers, the different stages of such cancers, the symptoms and the treatment methods. Also, about the need for early detection of cancers and the everyday habits for prevention of gastrointestinal cancers.

<https://www.youtube.com/watch?v=evrLJoQ5KRw>

2. Giving them Wings to Fly- panel discussion

On **11th October 2021**, Dr. Sunandha (Retired SP & Professor of Criminology dept., Karunya Deemed University), Dr. Angel Anbu (Social Activist), Dr. Shilpa Dhinakaran and host Ms. Sharon participate in a panel discussion on the challenges faced by girl children in our Indian society and the possible solutions to the problems. They also discuss the government's special welfare schemes for girl children.

<https://www.youtube.com/watch?v=otAyaD-sek4>

3. Cancer -Early detection towards protection

On 7th November 2021, Dr. Shilpa Samuel Dhinakaran shares the importance of seeking early cancer detection/screening, making lifestyle modifications by avoiding risk factors and some guidelines for cancer prevention

<https://www.youtube.com/watch?v=4kai4QLX7CE>

4. PCOS and PCOD

On 19th November 2021, Dr. Kurinji Priya – Gynaecologist from SEESHA Karunya Community Hospital in this episode of ‘Maruthuva Neram’, as she explains about Polycystic ovary syndrome, its common symptoms, risk factors, PCOS-related health conditions and treatment options. Also, learn how the condition can be managed effectively with simple lifestyle modifications such as physical exercises, having a well-balanced diet and behavioural interventions.

<https://www.youtube.com/watch?v=lrLkSiX90s>

5. Cervical Cancer Awareness

On 17th December 2021, Dr. Shilpa Samuel Dhinakaran shares the importance of seeking early cancer detection/screening, making lifestyle modifications by avoiding risk factors and some guidelines for cancer prevention.

https://www.youtube.com/watch?v=A2D6A_IN7rU

6. Knee Joint problems and replacement

On 31st January 2022, Knee Joint problems and replacement an interview with a Doctor/Physiotherapist

https://www.youtube.com/watch?v=0b_WYEuDIH8

7. Overcoming Fears

On 4th February 2022, Dr. Shilpa Samuel Dhinakaran talk about the importance of conquering fear to experience life to the fullest.

<https://www.youtube.com/watch?v=FcxBNkGNcNo>

8. Third gender

On 23rd February 2022, Dr. Shilpa Samuel Dhinakaran discuss the accomplishments of transgenders, the government's welfare schemes available for them, and the importance of social inclusion for the third gender to rebuild empathetic & equitable communities

<https://www.youtube.com/watch?v=DEeX69bOLMQ>

9. Alcoholism among women

On 12th March 2022, Awareness for women about the bad impacts of women consuming alcohol.

<https://www.youtube.com/watch?v=o3YbCf8ECus>

10. How Postpartum Depression Affects a Woman

On 30th June 2022, a talk on the effects of postpartum depression on woman's mental and physical health was given.

<https://www.youtube.com/watch?v=dBzipODoVqE>

11. Let no child be denied

On 2nd July 2022, a session is delivered to spread awareness on the struggles and emotions of children who have lost their parents.

<https://www.youtube.com/watch?v=xnExLuEm8m8>

12. Let's win over anemia

On 3rd July 2022, awareness session was given on iron-deficiency anemia where the speaker explained anemia is the most common nutritional problem we often don't take much care about.

<https://www.youtube.com/watch?v=vXE5KRYWUo0>

13. Do You Want To Know The Dark Secrets Of People?

On 6th July 2022, a talk on how to support people when they share some of their very deep secrets without being judgmental.

<https://www.youtube.com/watch?v=EY1nKodoMZY>

14. Hope for Differently-Abled

On 18th July 2022, SEESHA Rehabilitation Centre has been conducting its community field visits to the nearby villages for the benefit of the differently abled who are otherwise unreached as part of its Community-Based Rehabilitation (CBR) program. Here is the testimony of Ms. Kasthuri, one of the beneficiaries of our CBR Program.

<https://www.youtube.com/watch?v=RwSyzTBydyw>

Free Medical Camps:

1. Nallurpathy, Karunya Nagar, Coimbatore, Tamil Nadu, India

Nallurpathy is a tribal village located in Thombilipalayam panchayat with 120 families in Karunya Nagar of Coimbatore district in Tamil Nadu, India. Their major occupation of the villagers is going for daily wages work (agriculture, cattle rearing, mess helper, driver, painter). The medical camp was planned to carry out a limited health care intervention at their doorstep amongst the underprivileged community.



Free Medical Camp – Nallurpathy



The camp was held at Nallurpathy tribal village on **25th February 2022** (Friday) from 3.30pm to 6.00pm. There are 64 people benefited through this medical camp and 45 patients came for their dental checkups, 11 patients were referred to hospital.

2. Kalimanagalam, Alandurai, Coimbatore, Tamil Nadu, India

Kalimanagalam is a rural village located in Thombilipalayam panchayat with 400 families in Alandurai of Coimbatore district in Tamil Nadu, India. Their major occupation of the villagers is going for daily wages work (agriculture, cattle rearing, mess helper, driver, painter). The medical camp was planned to carry out a limited health care intervention at their doorstep amongst the underprivileged community.



Free Medical Camp – Kalimanagalam

The camp was held at Kalimangalam village on **9th March 2022** from 3.30pm to 6.00pm. There are 110 people benefited through this medical camp and 4 patients were referred to hospital.

3. Moongilmadaikutaipathy, Alandurai, Coimbatore, Tamil Nadu, India

Moongilmadaikutaipathy is a **tribal village** located in Thombilipalayam panchayat with 70 families in Alandurai of Coimbatore district in Tamil Nadu, India. The major occupation of the villagers is going for daily wages work (agriculture labours and cattle rearing). The medical

camp was planned to carry out a limited health care intervention at their doorstep amongst the underprivileged community.



Free Medical Camp –Moongilmadaikutaipathy

The camp was held at Moongilmadaikuttaipathy village on **25th March (Friday) 2022** from 3.30pm to 6.00pm. There are 54 people benefited through this medical camp and 6 patients were referred to hospital.

4. Narasipuram, Thondamuthur, Coimbatore, Tamil Nadu, India

Narasipuram is one of the rural villages located in Thondamuthur block with over 7300 population. The major occupation of the villagers is going for daily wages work (agriculture labours, farming, unskilled labour woks and cattle rearing). The medical camp was planned to carry out a limited health care intervention at their doorstep amongst the underprivileged community.



Free Medical Camp – Narasipuram



The camp was held at Narasipuram village on **9th April** (Saturday) 2022 from 3.00pm to 6.00pm. There are 46 people benefited through this medical camp and 4 patients were referred to Karunya hospitals.

5. Mathuvarayapuram, Alandurai, Coimbatore, Tamil Nadu, India

On 20th April 2021, we organised a **paediatric medical camp** in Mathuvaraya Puram village where around 40 children were screened for prevention.



6. Perumalkovilpathy, Alandurai, Coimbatore, Tamil Nadu, India

The camp was held at Perumalkovilpathy village on 27th April 2022. Thirty people benefited through this medical camp.



Free Medical Camp – Perumalkovilpathy



7. Sadivayal, Alandurai, Coimbatore, Tamil Nadu, India

The camp was held at Sadivayal village on 3rd May 2022 and 7th September 2022. Seventeen and Thirty five people respectively benefited through these two medical camps.



8. Semmedu, Ikkarai Boluvampatti, Coimbatore, Tamil Nadu, India

Health screening program was conducted on 10th May 2021 through mobile clinic.



Mobile Clinic for tribal people in Semmedu Village



Vaccinating elderly and needy people in Semmedu Village

9. Rajivgandhi Colony Alandurai, Coimbatore, Tamil Nadu, India

The camp was held at Rajivgandhi Colony on 10th June 2022. Forty one people benefited through this medical camp.



10. Booluvapatti, Thondamuthur, Coimbatore, Tamil Nadu, India

Booluvapatti is a small village in Thondamuthur located in south Taluka of Coimbatore district in Tamil Nadu, in India. It is 29.9 km from Coimbatore. ‘Free Medical Camp’ was conducted at Booluvapatti on **17.06.2022**, which covered the common medical tests and medicines distributed to around 300 people.



Free Medical Camp – Booluvapatti

Dental Camps



Eye camps



Vaccination Drives and Dry Ration for Tribal Community



Vaccination Drive







VACCINATION DRIVE.

Vaccination drive along with Primary health centre was initiated to provide vaccines to the tribal Children.

A team of medical professionals along with SEESHA Ambulance is visiting everyday to the tribal and surrounding along with the village health nurses. Block medical officer of Pooluvapatti—PHC given permission for this initiative. Every Wednesday the vaccination drive is done to the tribal children and pregnant women.





Dry Ration for Tribal People

Psycho-social support to transgender community



We support the highly-discriminated and biased transgender community in Chennai and surrounding regions by promoting health, supporting them through dry rations in the crisis period of the Pandemic, providing income generating skills and livelihood assistance to live dignified lives.

ACTION AGAINST HUNGER



Nutritional supplements for poor pregnant women, children living with HIV/AIDS, undernourished children and lactating mothers.

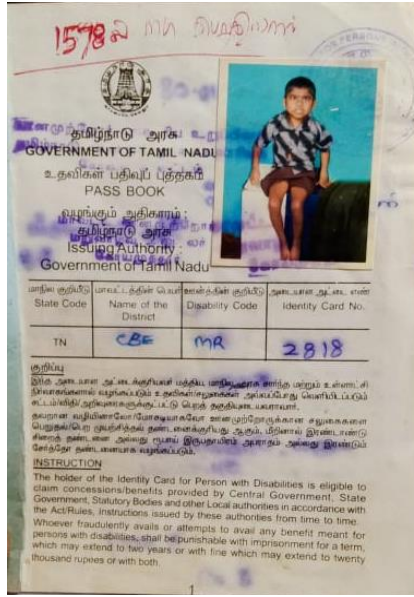
Assistive devices beneficiaries

Mrs. Baby is a polio affected person since childhood and lately after an accident she could not able to walk with her legs. She is a crawling disabled person from Idayarpalayam. Within the span of 6 months after her marriage, her husband abandoned her. She has a daughter Kanishka, completed her 12th std this year and waiting for counselling to pursue her higher studies. Earlier Mrs. Baby owns a tailor shop but due to her immobility she could not able to continue her business. At present her elder brother helps her financially and she lives with her mother. If she gets the free retro motor two - wheeler she could be able to sell vegetables and flowers for her survival and educate her daughter as well. Her educational qualification is 4th std.



Mrs. S. Baby – 43 years

Gowtham is 22-year-old boy from Sennanoor village. He is mentally challenged and her parents are finding hard to take care of him. Their parents are aged and her mother was taking care of Gowtham since childhood. But at present taking care of him single handed is becoming tough, so his father also quit his job and staying at home. They have an elder son – he is working in a private company. Gowtham’s parents feel very difficult to take him out of their home as they could not control him and hold him. So, they require wheel chair to take him out of their home when needed.

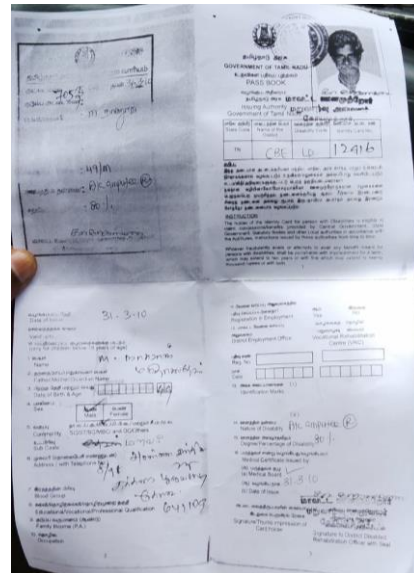


Mr. R. Gowtham – 22 years

Gurusamy was a lorry driver and goes to different places/ states across the country carrying construction materials. Two years before during the Covid 19 pandemic, while he was driving the lorry near Goa, he got stroke and there itself he was hospitalized and got treatment. His family heard the news, went there and bought him home safe. From then he was not able to walk and talk. His right side was paralysed and now his wife goes for daily wages and supports their children education. He has an elder son and twin daughters (completed 12th this year). His son is going for daily wages too. They reside at Kurinji nagar, Mathuvarayapuram.



Mr. G. Gurusamy – 50 year

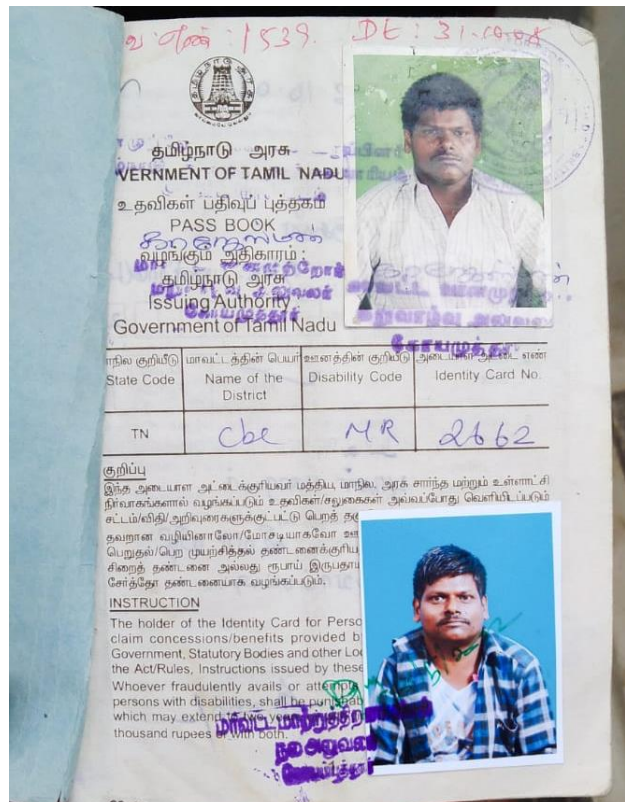


Mr. M. Nagaraj - 65 years



Nagaraj resides at Boluvampatti village with his wife. He was a mason, before 12 years he met with an accident and lost his right leg. Now he walks with a prosthetic leg but struggling to walk without any support. He owns a petty shop at the same village he resides in. He has a son, got married and settled in Coimbatore town. He and his wife are staying alone and his wife finds tough to balance him alone while walking. So, they require a wheel chair to go to his petty shop from home for their survival

Mr. Balamurugan is a mentally challenged person since childhood and he was raised in a hostel at Coimbatore. He has two brothers and they are also disabled and finding hard for their basic survival.



Mr. Balamurugan - 42 years

Mental Health

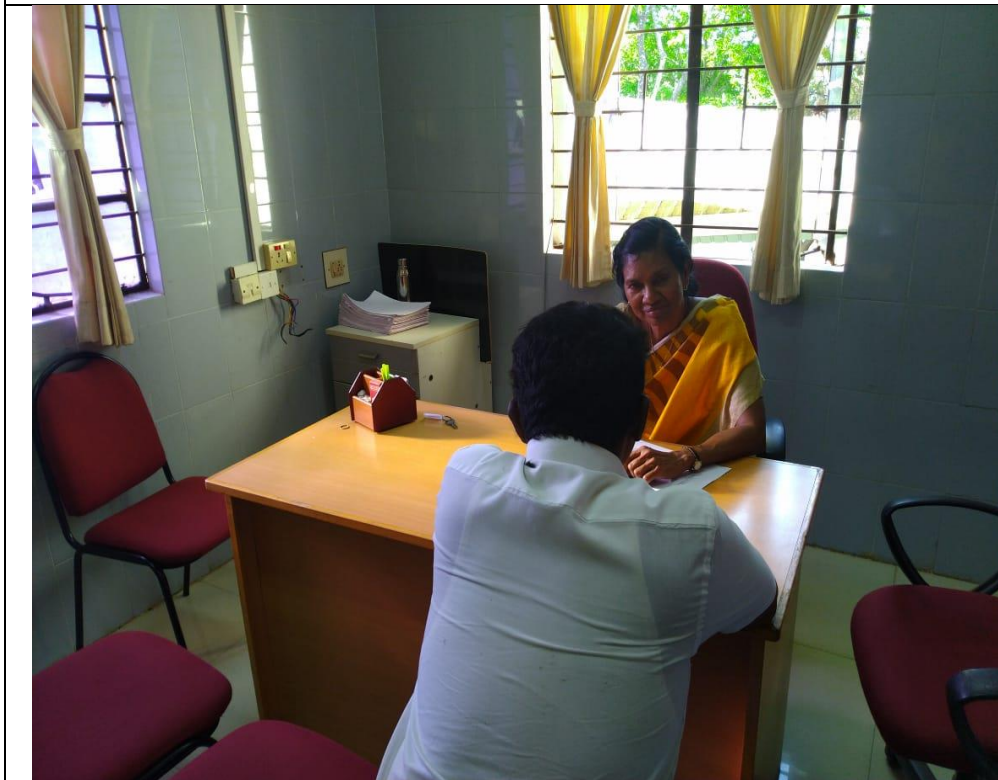
Karunya Institute of Technology and Sciences is dedicated to provide a nurturing and supportive environment that fosters emotional well-being for the students and staff, which is in align to one of the thrust areas of KITS. As part of this, we offer a range of mental health services and resources which encompass psychiatric consultation, counselling services, and access to rehabilitation centers. We believe that addressing mental health concerns is vital to ensuring that our students and staff can thrive in both their academic and personal lives. Our commitment to mental health is a testament to our university's belief that individuals should have access to the support and care they need for their mental well-being.

Mental Health		
SEESHA Karunya Community Hospital		
1	Psychiatric Consultations by Dr. Arun Vangli	
	Out Patients	95
	Rehab Centre Centre For Well Being	167
	Rehab Centre Centre For Well Being	167
	Old Age Care Home	48
2	Centre for Well Being	
	Counselling for Students	182
	No of Counselling Sessions	429
	Counselling for Community	114
	No of Counselling Sessions	366
	Telephonic Counselling	47
3	Psychosocial Rehabilitation	
	Centre Female Patients	12
	Centre male Patients	11
4	SEESHA Old Age Care Homes	18

Seesha Centre for Well-Being: Centre for well-being is a counselling, guidance support and de-addiction centre which functions to improve psychological well-being and quality of life of individuals from downtrodden communities and students from the regions Coimbatore.



Psychiatric Consultation



Individual Counselling

SEESHA Rehabilitation Centre provides institutional & home-based care for persons seeking disability care through physiotherapy, pain relief therapy, etc. Through a series of training, special needs children are also equipped with life skills.



SEESHA OLD AGE CARE HOME

SEESHA Old Age Care Home located in Coimbatore, provides residential care to the neglected and the abandoned seniors offering them a unique blend of healthcare, engagement and community living services. Our specialized care at the centre enables the residents to lead more dignified and fulfilling retired live.





Recognition for Best Services - Award rendered towards the differently abled SEESHA received the 'Recognition for Best Services



Award rendered towards the differently-abled', in Coimbatore district from Dr. G.S. Sameeran I.A.S, District Collector – Coimbatore, Government of Tamil Nadu on 3rd December 2021. This award was instituted by the State government to acknowledge and honour the organisations that render outstanding services for the welfare of the differently abled persons and distributes the awards each year during the commemoration of the 'International Day of the Differently Abled'.

3.3.3 - University sharing sports facilities with the local community

As part of our commitment to fostering positive relationships in the community and promoting its overall well-being, KITS shares its sports facilities with local schools and the general public. This inclusive approach not only enhances accessibility to sports amenities but also encourages physical fitness and a sense of oneness among all stakeholders.

KITS provides the local communities access to three well-equipped playfields provided with floodlights, making them suitable for volleyball and kabaddi enthusiasts. This initiative promotes physical activity, teamwork, and nurtures a healthy competitive spirit while strengthening the bond between the university and local residents.

In line with the university's strong commitment to inclusivity and community engagement, we've been actively supporting differently-abled individuals through a series of impactful initiatives. This includes participation in the 'Fit India Freedom Movement 2021', promoting team sports such as basketball and cricket, hosting State Level Wheelchair Basketball and Para Volleyball Tournaments for the differently-abled and advocating inclusivity in sports. Furthermore, KITS inaugurated the Community Sports Club, for sports enthusiasts to come together, bond and enjoy various sports and physical activities to promote unity in the community.

SPORTS ACTIVITIES

1. Tournament for the Differently Abled (Basketball & Cricket) as part of Fit India Freedom Movement 2021

KITS organized Cricket and Basketball games for the differently abled as part of the “**Fit India Freedom Movement**”- an initiative of the Honorable Prime Minister.

The participants included the mentally challenged and octogenarians from Care-homes. These games were conducted as a measure of social inclusivity, to encourage the differently able demonstrate their talent and skills and build their confidence quotient. The games were held on October 25, 2021 in the University Sports Complex. All guidelines laid down by the Government of Tamil Nadu for COVID-19 pandemic were strictly followed.



Fit India Freedom Movement

Fit India Freedom Movement - Press release

—44Q0/1, 0:45 AM Cricket and Basketball games organized for differently abled persons

Cricket and Basketball games organized for differently abled persons

[Cityai news \(https://www.cityainews.com/group/fitindiafreedom/\)](https://www.cityainews.com/group/fitindiafreedom/) Oct 29, 2021 06:53

Coimbatore, October 29, 2021: Karunya Institute of Technology and Sciences, under the direction of All India Council for Technical Education (AICTE) and guidance of Chancellor Dr. Paul Dhinakaran as part of the "Fit India Freedom Movement"-an initiative of Prime Minister-organized Cricket and Basketball games for the differently abled persons. The participants included the mentally challenged and octogenarians from the care-homes. These games were conducted with a view to help the differently abled people to stretch and do workouts, to release the stress of life and to provide a refreshing encounter with sports and games. The games were held on October 25, 2021 in the University playgrounds. The games were inaugurated jointly by Dr. Samuel Thomas, Chief Operating Officer, SEESHA, Dr. S. Albones Raj, Director (Student Affairs), KITS and Dr. Sheila Daniel, Psychiatrist (SEESHA). The games began at 5 p.m. with participants having a go at basketball at the outset. Participants played cricket under the floodlights with elan both as fielders and batsmen and the interesting evening came to an end at 7 p.m. After the games, Prof. Dr. Elijah Blessing, Registrar congratulated all the participants of all the events and the organizer. All guidelines laid down by the

<https://www.cityainews.com/content/cricket-and-basketball-games-organized-for-differently-abled-persons>

2. State Level Wheel Chair Basketball (Men & Women) & Para Volleyball (Men) Tournament

On September 15th & 16th, 2022, KITS organized a Commemorative Tournament for the Differently Abled on the occasion of the 60th birthday of the Chancellor of the University. The event was presided over by Shri. K. Shanmuga Sundaram, Member of Parliament (Lok Sabha), Pollachi Constituency, Tamil Nadu, who also handed over the Commemorative Cup to the winners. Several Teams from Pondicherry and Tamil Nadu competed in the tournament.

The Vellore team (Men) bagged the first place in the basketball wheelchair competition, the Women's Shooters team bagged the first place in the shooting competition and the Coimbatore team (Men) bagged the First place in the Para Volleyball competition.



State Level Wheel Chair Basketball & Para Volleyball Tournament





Recognition and Prize Distribution by the Chancellor, KITS

The winners were congratulated, and Dr. Paul Dhinakaran, the honourable chancellor of Karunya University, spoke to the group. The event was graced by Mr. Samuel Dhinakaran, Trustee, Karunya Educational and Research Trust.

3. Inaguration of Karunya Nagar Sports Club

As led by our beloved brother Dr. Paul Dhinakaran, the Karunya Nagar Sports Club was inaugurated on July 15th, 2022 by Bro. Samuel Paul Dhinakaran. The club comprises of local youths from in and around Karunya Nagar and provides an opportunity to identify talented youths and promote sports in the rural community.



Inauguration of Karunya Nagar Sports Club

The Kabaddi court was set up with flood lights and declared open to the rural youths to practice. 34 local youths participated in the inaugural event. Dr. Shilpa Dhinakaran graced the occasion and motivated the sports club members.

Sports Facilities shared with Local Schools

KITS extends its sports facilities to local community and students from local schools. The agreement with a school is shown below as a sample.



13.3.2019 தமிழ்நாடு தமில்நாடு TAMILNADU
Karunya Institute of Technology
and Sciences
Coimbatore

BU 084434

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MoU) is entered into at Karunya Nagar , Coimbatore on the 13th day of August 2019,

between

Karunya Institute of Technology and Sciences (Deemed to be University), Karunya Nagar, Coimbatore - 641 114, represented by its Registrar, Dr. R. Elijah Blessing, (hereinafter referred to as **KITS**), (which expression unless repugnant to the context and meaning shall mean and include its assigns, legal representative, nominee, successor in office, administrator, executor, etc.) of the **ONE PART**

and

Evangeline Matriculation Higher Secondary School, situated at Karunya Nagar Coimbatore - 641 114, represented by its Principal, Mrs. Vino Kalai Selvi (hereinafter called the **EMHSS**), (which expression unless repugnant to its context and meaning shall mean and include her assigns, legal representative, nominee, successor in office, administrator, executor, etc.) of the **OTHER PART**

2/2/19

K

EMHSS, which is having 1200 students and most of them are from the local Rural/Tribal community has approached the **KITS** to extend their sports facilities, such as play grounds and other sports complex to develop the mind and body of the rural and tribal student community of the said **EMHSS**, since they are not having sufficient sports facilities.

AND WHEREAS **KITS** has agreed to provide the said sport complex facilities for the upliftment of Rural/Tribal community and the **EMHSS** has agreed to enter into an MoU for making use of the sports complex facilities with following terms and conditions hereinafter contained:

NOW THIS INDENTURE WITNESSES AS FOLLOWS:

KITS has, after due consideration of the request of **EMHSS**, agreed to give to use the sports complex and its facilities, exclusively for the said purpose, on the following terms and conditions.







TERMS AND CONDITIONS

1. To use KITS Sports Facilities by EMHSS for a period of 5 years commencing from 01/08/2019.
2. **EMHSS** shall attend to the minor repairs and maintenance to keep the demised premises in good condition throughout the period of MoU.
3. **EMHSS** shall use the demised Sport Complex and the facilities exclusively for the purpose for which the said is given. **EMHSS** shall not use the demised premises for illegal, objectionable and dangerous purposes or for any other purposes opposed to any law.
4. **EMHSS** shall have no right to assign, sub-let, re-let, under-let the demised premises in any manner whatsoever or transfer the demised premises or any portion thereof, to any person, at any time, during the period of the MoU.
5. Any damages to the demised premises, not at the instance of **KITS** and excluding force majeure and unforeseen calamities (Act of God), shall be corrected by the **EMHSS** meeting such costs and expenses by itself.
6. **KITS** or its agents, whose names and identity, for the sake of security, are furnished to **EMHSS** by **KITS**, before hand, shall have a right to inspect the demised premises, with prior notice to **EMHSS**, for the sake of convenience.
7. To safe guard the interest of both **KITS** and **EMHSS**, it is mutually agreed by and between **KITS** and **EMHSS**, that during the currency of this MoU, either party may terminate this MoU, by giving 3 months advance notice in writing, to the other, about their intention to terminate the MoU.



8. Upon termination or sooner determination of this MoU, EMHSS agrees to dismantle, remove and take away all items of work, thing, articles, and equipments, if any, installed in the demised premises in connection with the deliberations carried on by EMHSS, during the period of the MoU.
9. Both the parties agree that in case of any doubt in respect of the meaning or interpretation of any word or terminology used in the Terms & Conditions of this MoU a liberal meaning may be given to such word or terminology, in the mutual interest of both the Parties.
10. Both parties agree that in case of any differences or dispute between the parties as regards any of the terms & conditions of this MoU, the same may be mutually discussed and resolved amicably. Both parties agree that in all matters of disputes or differences concerning the terms of this MoU, requiring judicial interference, only the Coimbatore courts shall have jurisdiction.
11. EMHSS shall have quiet and peaceful possession of the said premises without any hindrance from KITS.
12. EMHSS shall not have the right to take away any fixtures that KITS may attach to the said premises or any item owned by KITS and to make good any damage that are occasioned thereby.
13. EMHSS shall restore the said premises to KITS in original condition subject to normal wear and tear.
14. EMHSS shall carry out temporary structural additions or alterations in the said premises with the consent of KITS.
15. EMHSS agrees to maintain the said premises in good condition at all times.

IN WITNESS WHEREOF THE PARTIES HAVE SET THEIR RESPECTIVE HANDS, AT COIMBATORE, ~~CHENNAI~~, ON THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN

Signed for and on behalf of	Signed for and on behalf of
Karunya Institute of Technology and Sciences (KITS)	Evangeline Matriculation Higher Secondary School (EMHSS)
 Prof. Dr. R. Elijah Blessing Registrar Date: 01.03.2019 	 Mrs. Vino Kalai Selvi Principal Date: 01.03.2019 
Witness.  (A. JOHN BENNET)	Witness  (I.ATHISAYAMANI ASIRVATHAM)

3.3.4 - University providing students access to sexual and reproductive health-care services including information and education services

Karunya Institute of Technology and Sciences, emphasizes on the overall well-being of our students, and this includes their sexual and reproductive health. We offer orientation programs to make sure students have access to the care and information they need. We also run awareness programs to educate students about these topics, aiming to dispel myths and provide accurate information regarding sexual and reproductive health. Additionally, we have a gynaecologist on campus to consult with students on various health concerns, making it convenient for them to get expert advice.

KITS through SEESHA organized a series of informative and impactful events, addressing critical issues related to women's health and well-being. KITS hosted awareness campaigns through YouTube, featuring experts in various fields. These events covered a wide range of topics, including the challenges faced by girl children in Indian society and government welfare schemes, Polycystic Ovary Syndrome (PCOS) and lifestyle management, cervical cancer awareness and prevention, combating sexual exploitation, alcoholism among women, and the effects of postpartum depression on women's mental and physical health.

1. Giving them Wings to Fly- panel discussion

On 11th October 2021, Dr. Sunandha (Retired SP & Professor of Criminology dept., Karunya Deemed University), Dr. Angel Anbu (Social Activist), Dr. Shilpa Dhinakaran and host Ms. Sharon participate in a panel discussion on the challenges faced by girl children in our Indian society and the possible solutions to the problems. They also discuss the government's special welfare schemes for girl children.

<https://www.youtube.com/watch?v=otAyaD-sek4>



2. PCOS and PCOD

On **19th November 2021**, Dr. Kurinji Priya – Gynaecologist from SEESHA Karunya Community Hospital in this episode of ‘Maruthuva Neram’, as she explains about Polycystic ovary syndrome, its common symptoms, risk factors, PCOS-related health conditions and treatment options. Also, learn how the condition can be managed effectively with simple lifestyle modifications such as physical exercises, having a well-balanced diet and behavioural interventions.

<https://www.youtube.com/watch?v=lrbLKsiX90s>



3. Cervical Cancer Awareness

On **17th December 2021**, Dr. Shilpa Samuel Dhinakaran shares the importance of seeking early cancer detection/screening, making lifestyle modifications by avoiding risk factors and some guidelines for cancer prevention.

https://youtu.be/4kai4QLX7CE?si=cfOLRJIM_KIOZ06j



4. End Sexual Violence:

March 4th has been observed as the world day of fight against sexual exploitation. Sexual exploitation occurs when a perpetrator uses their position of power or trust to gain sexual favours against a vulnerable person in exchange for money, material gains, a job, or immaterial things like protection/a relationship

<https://www.youtube.com/watch?v=OdUGuc57c9M>

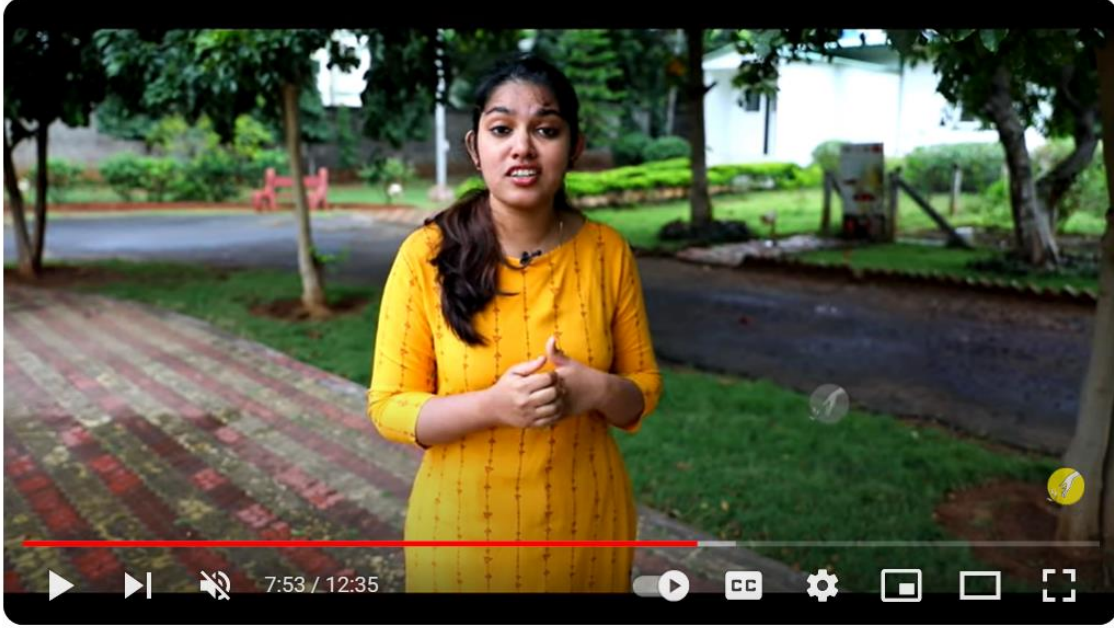


5. Alcoholism among women

On 12th March 2022, Awareness for women about the bad impacts of women consuming alcohol.

<https://www.youtube.com/watch?v=o3YbCf8ECus>





மதுவிற்கு அடிமையாகும் பெண் சமுதாயம் || பெண்கள் குடிப்பது சரியா? தவறா? | சிறகுகள் | Dr ஷில்பா தினகரன்

6. How Postpartum Depression Affects a Woman

On 30th June 2022, a talk on the effects of postpartum depression on woman's mental and physical health was given.

<https://www.youtube.com/watch?v=dBzipODoVqE>

3.3.5 - Does your university as a body provide students and staff with access to mental health support?

Karunya Institute of Technology and Sciences is dedicated to provide a nurturing and supportive environment that fosters emotional well-being for the students and staff, which is in align to one of the thrust areas of KITS. As part of this, we offer a range of mental health services and resources which encompass psychiatric consultation, counselling services, and access to rehabilitation centers. We believe that addressing mental health concerns is vital to ensuring that our students and staff can thrive in both their academic and personal lives. Our commitment to mental health is a testament to our university's belief that individuals should have access to the support and care they need for their mental well-being.

In addition to the health services provided, KITS has been hosting some important talks and events to raise awareness about various aspects of mental and emotional well-being. These programs cover various topics that aims to provide valuable information and encourage meaningful discussions to help students to understand and improve their mental and emotional health.

Mental Health

SEESHA Karunya Community Hospital

1	Psychiatric Consultations by Dr. Arun Vangli	
	Out Patients	95
	Rehab Centre Centre For Well Being	167
	Rehab Centre Centre For Well Being	167
	Old Age Care Home	48
2	Centre for Well Being	
	Counselling for Students	182
	No of Counselling Sessions	429
	Telephonic Counselling	47
3	Psychosocial Rehabilitation	
	Centre Female Patients	12
	Centre male Patients	11

Awareness Programs

1. Overcoming Fears

On 4th February 2022, Dr. Shilpa Samuel Dhinakaran talk about the importance of conquering fear to experience life to the fullest.

<https://www.youtube.com/watch?v=FcxBNkGNcNo>

2. How Postpartum Depression Affects a Woman

On 30th June 2022, a talk on the effects of postpartum depression on woman's mental and physical health was given.

<https://www.youtube.com/watch?v=dBzipODoVqE>

3. Do You Want To Know The Dark Secrets Of People?

On 6th July 2022, a talk on how to support people when they share some of their very deep secrets without being judgmental.

<https://www.youtube.com/watch?v=EY1nKodoMZY>

4. Online Quiz Competition-Mental health, Adolescent Health, Public health threat, Covid 19- YRC:

NACO
National AIDS Control Organisation,
India's Voice against AIDS
Ministry of Health & Family Welfare, Government of India
New Delhi, India

TAMIL NADU STATE AIDS CONTROL SOCIETY

RED RIBBON CLUB

STATE LEVEL ONLINE QUIZ COMPETITION

Participants :
Red Ribbon Club Students

Topics:
Adolescent Health ,
Mental Health, COVID 19 ,
Public Health Threat ..

Registration particulars from
20th December 2021,
10.00 am to 27th December
2021, 7.00 pm.

Quiz
competition
starts at
03.00 pm
and
closes by
03.45 am

Date: 29.12.2021

**Top Two Winners at State Level: ₹ 10,000-/
One winner from each DAPCU
districts : ₹ 5,000-/**

Visit URL: <https://rrcquiz2021.tnsacs.in/login>

Tamil Nadu State AIDS Control Society
#Stayhomestaysafe #TN_Together_AgainstCorona #TANSACS

For further Assistance Call
1097 | 1800 419 1800

[Twitter](#) [Instagram](#) [Facebook](#) [TNSACS](#) [TANSACStamilnadu](#) [www.tnsacs.in](#)

Poster of State Level Online Quiz Competition conducted by Tamil Nadu State AIDS Control Society on 27th September 2021, where Karunya Red Ribbon Club students participated.

3.3.6 - Smoke-free policy

At our university, we are deeply committed to creating a healthy and supportive environment for our students, staff, and visitors. In line with this commitment, we have implemented a comprehensive smoke-free policy across our campus premises. This policy reflects our dedication to promoting not only physical health but also overall well-being and quality of life.

Our smoke-free policy prohibits smoking in all indoor and outdoor areas of the university campus, including classrooms, offices, common areas, sports facilities, and outdoor spaces. This initiative is not just about compliance but stems from our concern for the health and safety of everyone associated with our university community.

SMOKE FREE CAMPUS POLICY- KITS

1. Purpose

This policy has been implemented to ensure that the Karunya Institute of Technology and Sciences (KITS) campus remains free from smoking. Its purpose is to prevent the possession, usage, and distribution of tobacco and narcotic substances in any form

- I. According to the guidelines for creating a Tobacco-free Educational Institution provided by the Ministry of Health & Family Welfare, Government of India, "Exposure to second-hand smoke or passive smoking causes numerous health problems in infants, children, and adults. These problems include more frequent and severe asthma attacks, respiratory infections, ear infections, coronary heart disease, stroke, and lung cancer
- II. Smoking within an academic and residential environment can cause difficulties for fellow members and peers, which in turn can lead to distractions in studies and negatively impact the academic atmosphere

2. Policy

“It is the policy of Karunya Institute of Technology and Sciences that all our academic and residential campuses, sports and play fields, cafeterias, including transportation facilities, are designated as smoke-free areas. All our students and employees have the right to work in a smoke-free environment. Smoking is strictly prohibited throughout the entire campus and workplace, without any exceptions. This policy applies to all students, staff, parents, visitors, workers, contractors, service providers, and anyone who stays on the campus”

3. Implementation

The overall responsibility for policy implementation and reviews rest with the following committee

- i. Director (Student Affairs) -Chair person
- ii. Deputy Director (Security and Intelligence)-Secretary
- iii. Chief Wardens-Members
- iv. Students -Representatives

The aforementioned committee shall ensure that the entire KITS campus, including student and staff residences, is a tobacco-free environment, free from smoking. This committee will also act as the designated Tobacco Monitors of the institution.

4. Preventive measures

- i. The above committee (Tobacco Monitors) shall create awareness with appropriate displays on the campus premises, organize awareness programs among the community members, and closely monitor to ensure a smoke-free environment.
- ii. The Tobacco Monitors must also be vigilant to identify the use of tobacco substitutes such as e-cigarettes and similar devices among the campus community.
- iii. Every student and employee of KITS must agree to the institution's smoke-free policy upon joining.
- iv. The Chief Wardens and hostel authorities are empowered to inspect student hostel rooms and verify any complaints or reports of policy violations.
- v. Every external service provider must adhere to the campus's general rules and regulations, including the smoke-free policy.
- vi. The committee members responsible for implementation shall coordinate with local police administration and law enforcement authorities to initiate administrative actions to prohibit the sale of tobacco products around the campuses.
- vii. The tobacco monitoring committee shall maintain records and submit an action taken report to the Registrar of KITS for documentation and further action.

5. Non-Compliance:

Noncompliance with the smoke-free policy is a clear violation according to the institution's code of conduct. Strict disciplinary action(s) will be initiated against students and staff who violate the policy.

- i. Complaints:
- ii. Any staff member, student, or visitor who observes an individual or group violating the policy can file a complaint with the committee responsible for implementing the policy.
- iii. Enquiry Committee:
- iv. The findings of the constituted inquiry committee will be submitted to the Institution's disciplinary committee, which will take appropriate disciplinary action against the student or staff member in question.
- v. Visitor Violations:
- vi. Visitors found violating the smoke-free campus policy will not be allowed to participate in campus activities and will be directed to leave the premises.
- vii. Contractors and Service Providers:

viii. Contract service providers who violate the campus's smoke-free policy will be subject to arbitration based on the contract terms. Repeated violations may result in the termination of the contract agreement.

6. References

- i. Guidelines for Tobacco free Educational Institution (revised) by the Ministry of Health & Family Welfare, Government of India.
- ii. Guidelines on Safety of students on and off campuses of Higher educational institutions.
- iii. Prohibition of use of electronic cigarettes in Higher educational Institutions (HEIs) from University Grants Commission, New Delhi dated 7th Jan 2020.

Implementation of the measures on prohibition of Cigarettes and other tobacco products in educational institutions by University Grants Commission, New Delhi dated 2 April 2013.



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved

NAAC A++ Accredited

Sustainable Development Goal 4 (SDG 4) - Quality Education

Karunya Institute of Technology and Sciences (KITS) is a premier institution with a strong focus on Quality education articulated in Sustainable Development Goal 4 (SDG 4). With a deep commitment to providing a world-class education, the institute has initiated specific programs and measures that actively engage in ensuring inclusive and equitable quality education for all.

4.1 Research on Early Years and Lifelong Learning Education

KITS, an esteemed institution in the field of Sciences and Technical education has produced 621 first-generation graduates in the assessment year, showcasing the institution's commitment to empower students overcome socio-economic challenges. These graduates, who are the first in their families to obtain a degree reflect the transformative power of education in our effort to eradicate illiteracy. Their success not only embodies their personal triumphs but also serves as a source of inspiration, encouraging others in similar circumstances to pursue their aspirations.

The quantum of research and academic papers on early childhood and lifelong learning indicates the institution's dedication in the upliftment of the underprivileged. Research initiatives undertaken by faculty members are aimed at curriculum enrichment, introduction of innovative teaching practices and enhancing student learning outcomes. KITS has to its credit 63 publications in Quality Education with 395 citations. These articles provide valuable insights into creative solutions and best practices for delivering high-quality education.

List of Research Articles

S. No	Authors	Title	Volume	Issue	Year	Cited by
1	Goyal R., Chandran D., Garg K., Mohankumar P., Gupta S., Gautam R.K., Chopra H., Dhama K.	Medicalization of sexuality and sexual health: A perspective review	10	6	2022	
2	Purushothaman P., Susila T., Santhanakrishnan I., Rajamanickam S., Karthikeyan K., Babu S.R.	Psychosocial Perceptions as Significant Impact Modifiers A Mixed Method Research Among Hospitalized Covid-19 Patients in A Tertiary Care Hospital in Coimbatore District, Tamil Nadu	13	12	2022	1

3	Hepsiba D., Justin J.	Enhancement of single channel speech quality and intelligibility in multiple noise conditions using wiener filter and deep CNN	26	23	2022	1
4	Vinolia T.L., Nesaraj A.S., Arunkumar M.	UV Light Photo-Degradation of Rhodamine B and Methylene Blue Dyes using Gd ₂ O ₃ Nanoparticles	34	11	2022	
5	Stephan T., Al-Turjman F., Ravishankar M., Stephan P.	Machine learning analysis on the impacts of COVID-19 on India's renewable energy transitions and air quality	29	52	2022	3
6	Andrew J., Eunice J., Popescu D.E., Chowdary M.K., Hemanth J.	Deep Learning-Based Leaf Disease Detection in Crops Using Images for Agricultural Applications	12	10	2022	20
7	Velliangiri S., Pandiaraj S., Iwin Thanakumar Joseph S., Muthubalaji S.	Multiclass recognition of AD neurological diseases using a bag of deep reduced features coupled with gradient descent optimized twin support vector machine classifier for early diagnosis	34	21	2022	3
8	Shemitha P.A., Dhas J.P.M.	Crow Search with Adaptive Awareness Probability-Based Deep Belief Network for Detecting Ransomware	36	11	2022	1
9	Johnson J., Chitra R., Bamini A.M.A.	Efficient bi-traits identification using CEDRNN classifier for forensic applications	202		2022	
10	Bisht D.S., Srivastava A.K., Singh V., Tiwari S., Gautam A.S., Gautam S., Santosh M., Kumar S.	High-Altitude Air Pollutants Monitored from Rainwater Chemistry in the Central Himalaya	233	9	2022	7
11	Sharma N., Radha, Kumar M., Zhang B., Kumari N., Singh D., Chandran D., Sarkar T., Dhumal S., Sheri V., Dey A., Rajalingam S., Viswanathan S., Mohankumar P., Vishvanathan M.,	Aegle marmelos (L.) Correa: An Underutilized Fruit with High Nutraceutical Values: A Review	23	18	2022	3

	Sathyaseelan S.K., Lorenzo J.M.					
12	Kanagaraj B., Anand N., Johnson Alengaram U., Samuvel Raj R., Kiran T.	Exemplification of sustainable sodium silicate waste sediments as coarse aggregates in the performance evaluation of geopolymer concrete	330		2022	27
13	Radhakrishnan B.L., Kirubakaran E., Jebadurai I.J., Selvakumar A.I., Peter J.D.	Efficacy of Single-Channel EEG: A Propitious Approach for In-home Sleep Monitoring	10		2022	2
14	Bhavadharini R.M., Karthik S., Sabitha R.	An energy-efficient priority-based packet scheduling mechanism for enhancing quality of service in mobile ad hoc network	34	6	2022	1
15	Zafar M., Aggarwal A., Rene E.R., Barbusiński K., Mahanty B., Behera S.K.	Data-Driven Machine Learning Intelligent Tools for Predicting Chromium Removal in an Adsorption System	10	3	2022	5
16	Gautam S., Setu S., Khan M.G.Q., Khan M.B.	Analysis of the health, economic and environmental impacts of COVID-19: The Bangladesh perspective	1	1	2022	28
17	Jebitta R.S., Allwin J.S.I., Pandian K.N.S.	Sorption isotherm study on vacuum and freeze-dried jamun pulp	6	1	2022	
18	Priya K., Senthilkumar V., Samson Isaac J., Kottu S., Ramakrishna V.S., Jogendra Kumar M.	Breast Cancer Segmentation by K-Means and Classification by Machine Learning			2022	
19	Eunice R.J., Hemanth D.J.	Deep Learning and Sign Language Models Based Enhanced Accessibility of e-governance Services for Speech and Hearing-Impaired	1666 CCIS		2022	
20	Deepa K., Aruna K., Jawahar G.G., Christinal H., Bhagavathi S., Amudha K.	The Application of Artificial Intelligence in Online Teaching Tools, appertained during the Pandemic period for effective and uninterrupted teaching	3338		2022	

21	Mercy Golda S., Sella Dharshini C., Jegan R., Nimi W.S.	Techniques on Kidney Stone Detection using Machine Learning: A Descriptive Study			2022	
22	Kumar P.S.V.V.S.R., Sudha S., Das P., Pradeep D., Isaac J.S., Vijaipriya K.	Pomegranate Quality Analysis and Classification Using Feature Extraction and Machine Learning			2022	
23	Muthulakshmi S., Chitra R.	Secure Privacy and Utility Preserving Transformation of Smart Grid Networks			2022	
24	Durga S., Daniel E., Onesimu J.A., Sei Y.	Resource Provisioning Techniques in Multi-Access Edge Computing Environments: Outlook, Expression, and Beyond	2022		2022	1
25	Iwin Thanakumar Joseph S., Shanthini Pandiaraj N., Sarveshwaran V., Mythily M.	Ship Detection and Classification Using Hybrid Optimization Enabled Deep Learning Approach by Remote Sensing Images			2022	
26	Anjali C., Dhas J.P.M., Singh J.A.P.	A Study on Predicting Software Defects with Machine Learning Algorithms			2022	
27	Velliangiri S., Joseph I.T., Pandiaraj S., Jancy P.L., Madhubabu Ch.	An enhanced security framework for IoT environment using Jaya optimisation-based genetic algorithm	13	1	2022	1
28	Baby H., Jayakumar J., Mathew M., Hussien M.G., Kumar N.M.	Analysis of reactive power loadability and management of flexible alternating current transmission system devices in a distribution grid using whale optimization algorithm			2022	
29	Mythily M., Samson Arun Raj A., Thanakumar Joseph I.	An Analysis of the Significance of Spring Boot in The Market			2022	2
30	Onesimu J.A., Karthikeyan J., Eunice J., Pomplun M., Dang H.	Privacy Preserving Attribute-Focused Anonymization Scheme for Healthcare Data Publishing	10		2022	10
31	Muthulakshmi S., Chitra R.	IoT technologies, applications and	12	4	2022	5

		challenges, blockchain and its role in IoT: a survey				
32	Hepsiba D., Justin J.	Computational Intelligence for Speech Enhancement using Deep Neural Network	29	01-Feb	2022	2
33	Lanitha B., Poornima E., Sudha R., David D.B., Kannan K., Jegan R., Peroumal V., Kirubagharan R., Tesfaye M.	IoT Enabled Sustainable Automated Greenhouse Architecture with Machine Learning Module	2022		2022	2
34	Webb M.M., Bridges P., Aruparayil N., Chugh C., Beacon T., Singh T., Sawhney S.S., Bains L., Hall R., Jayne D., Gnanaraj J., Mishra A., Culmer P.R.	The RAIS Device for Global Surgery: Using a Participatory Design Approach to Navigate the Translational Pathway to Clinical Use	10		2022	3
35	Paul Sathiyam S., Benin Pratap C., Stonier A.A., Peter G., Sherine A., Praghash K., Ganji V.	Comprehensive Assessment of Electric Vehicle Development, Deployment, and Policy Initiatives to Reduce GHG Emissions: Opportunities and Challenges	10		2022	17
36	Rahul T.S., Brema Karunya J., John Wessley G.J.	A Novel Remote Sensing Based Approach to Estimate the Water Quality Index Using Sentinel-2 Multispectral Data			2022	1
37	Thomas B., Senith S., Alfred Kirubaraj A., Jino Ramson S.R.	Does management graduates' emotional intelligence competencies predict their work performance? Insights from Artificial Neural Network Study	58		2022	4
38	Swamidason I.T.J., Pandiyarajan S., Velswamy K., Leela Jancy P.	Futuristic IoT based Smart Precision Agriculture: Brief Analysis	18	3	2022	3
39	Jeyajothi E.S., Anitha J., Rani S., Tiwari B.	A Comprehensive Review: Computational Models for Obstructive Sleep Apnea Detection in Biomedical Applications	2022		2022	11
40	Roopa Jayasingh J., Jeba Kumar R.J.S., Telagathoti D.B., Martin Sagayam K., Pramanik S., Jena O.P., Bandyopadhyay S.K.	Speckle Noise Removal by SORAMA Segmentation in Digital Image Processing to Facilitate Precise Robotic Surgery	11	1	2022	21

41	David A., Joy E., Kumar S., Bezaleel S.J.	Integrating Virtual Reality with 3D Modeling for Interactive Architectural Visualization and Photorealistic Simulation: A Direction for Future Smart Construction Design Using a Game Engine	300 LNNS		2022	3
42	Rejula V., Anitha J., Belfin R.V., Peter J.D.	Chronic Pain Treatment and Digital Health Era-An Opinion	9		2021	5
43	Mariamammal B.G.V., Devarajan D.W., Jerrin R., Viswanathan S., Siddikuzzaman, Gopal R.	In Vivo Treatment Efficacy of Essential Oil Isolated from Seeds of Momordica charantia in Streptozotocin-Induced Diabetes Mellitus	15	4	2021	1
44	Sajil Kumar P.J., Kokkat A., Kurian P.K., James E.J.	Correction to: Nutrient chemistry and seasonal variation in the groundwater quality of a Riverine Island on the west coast of Kerala, India	7	6	2021	
45	Sree Jyothi K.R., Venkatesh Kumar P., JayaKumar J.	A Review of Different Configurations and Control Techniques for DSTATCOM in the Distribution system	309		2021	2
46	Sujithra T., Banu N.M.M.	Gaming pedagogy for effective learning in engineering colleges	35	2	2021	1
47	Ramanathan S., Moorthy S., Ramasundaram S., Rajan H.K., Vishwanath S., Selvinsimpson S., Durairaj A., Kim B., Vasanthkumar S.	Grape Seed Extract Assisted Synthesis of Dual-Functional Anatase TiO ₂ Decorated Reduced Graphene Oxide Composite for Supercapacitor Electrode Material and Visible Light Photocatalytic Degradation of Bromophenol Blue Dye	6	23	2021	14
48	Huq S., Das P.C., Islam M.A., Jubayer M.F., Ranganathan T.V., Mazumder M.A.R.	Nutritional, textural, and sensory quality of oil fried donut enriched with extracted dietary fiber and okara flour	45	3	2021	2
49	Vasudevan S., Kumar F.J.P.	Distance to distrust: the dilemma for internal	4	02-Mar	2021	1

		stakeholders in post COVID-19 hospitality				
50	Babu R.M.H., Shebana M., Harish R.M., Kanimozhi V., Kumar K.A.	Data science: A survey on the statistical analysis of the latest outbreak of the 2019 pandemic novel coronavirus disease (COVID-19) using ANOVA			2021	
51	Hepsiba D., Anand L.D.V., Isaac J.S.	Statistical Analysis on the Effects of Lockdown and Its Impact on Childhood Education During Covid-19	13	2	2021	
52	Cao Q., Hao H., Sabitha R., Thanjai V.	Occupational stress management of college English teachers under flipped classroom teaching model			2021	3
53	Kalaiselvi K., Bazil Wilfred C., Bijolin Edwin E., Arya N., Jain P., Sentamilselvan K.	Cross-vehicle communication based on packet network theory	10	9	2021	
54	Jiang Y., Sabitha R., Shankar A.	An IoT Technology for Development of Smart English Language Translation and Grammar Learning Applications			2021	10
55	Hemalatha J., Geetha S., Geetha R., Balasubramanian C., Popescu D.E., Hemanth J.	Reversible data hiding based on varying radix numeral system	69	1	2021	1
56	Gerkin R.C., et.al	Recent smell loss is the best predictor of COVID-19 among individuals with recent respiratory symptoms	46		2021	91
57	Kaliyaperumal S., Vijayakumar M.	Learners' feedback on the effectiveness of replacing an instructional MOOC video with augmented reality in a practice-based course	12		2021	
58	Goyal S., Sharma N., Bhushan B., Shankar A., Sagayam M.	IoT Enabled Technology in Secured Healthcare: Applications, Challenges and Future Directions	311		2021	53
59	Vinayaka A.S., Mahanty B., Rene E.R., Behera S.K.	Biodiesel production by transesterification of a	12	2	2021	12

		mixture of pongamia and neem oils				
60	Sujithra, T. ,Banu, N.M.M	Gaming pedagogy for effective learning in engineering colleges	35	2	2021	1
61	Qiu, X. ,Li, W., Li, Y., ...Song, F., Sabitha, R.	Machine Learning in Human Emotion Detection from the Speech	22	1	2022	-
62	Jiang, Y., Sabitha, R., Shankar, A.	An IoT Technology for Development of Smart English Language Translation and Grammar Learning Applications	-	-	2021	10
63	Kaliyaperumal, S., Vijayakumar, M.	Learners feedback on the effectiveness of replacing an instructional MOOC video with augmented reality in a practice-based course	12	-	2021	-

4.2 Proportion of Graduates with Teaching Qualification

4.2.1 Proportion of graduates with relevant qualification for teaching (2022)

KITS identifies potential students with unique skills for a teaching career and provides adequate support and resources to enable them to adopt innovative strategies in teaching and learning.

DATA	DEFINITION
Total no of graduates	1697
No of graduates gained teaching qualification for schools	149

4.3 Lifelong learning measures

4.3.1 Public resources (lifelong learning)

Around 135 free online YouTube videos with 6181 views have been created by experienced faculty members that serve as an exceptional resource for students. These videos are in a wide range of subject domains that offer valuable insights for understanding and mastering complex concepts. By granting free access to these educational resources, KITS provides access to all learners in its commitment to reach the unreachable.

LECTURE TITLE	SUBJECT DOMAIN	URL_CODE	FACULTY NAME
Introduction to Digital Signal	Digital System Design	https://www.youtube.com/embed/6ydxCV91ofU	Dr.N.M.Siva Mangai
Introduction to Combinational Logic Circuit	Digital System Design	https://www.youtube.com/embed/9oTwxZKjfOY	Dr.N.M.Siva Mangai

Introduction to Logic Families	Digital System Design	https://www.youtube.com/embed/IDo6h_J3nes	Dr.N.M.Siva Mangai
MSI Circuit	Digital System Design	https://www.youtube.com/embed/rJkQlGsCN3I	Dr.N.M.Siva Mangai
Introduction to Sequential Logic Circuit	Digital System Design	https://www.youtube.com/embed/WSdtqhYMLfI	Dr.N.M.Siva Mangai
Introduction to Memory Devices	Digital System Design	https://www.youtube.com/embed/Q2rIZzYC7Bo	Dr.N.M.Siva Mangai
Drivers	Digital System Design	https://www.youtube.com/embed/sU3Nt_3tLCY	Dr.N.M.Siva Mangai
Introduction to Boolean Algebra	Digital System Design	https://www.youtube.com/embed/658irKGDq94	Dr.N.M.Siva Mangai
Introduction to Carry Lookahead Adder	Digital System Design	https://www.youtube.com/embed/1NffmttNqV4	Dr.N.M.Siva Mangai
4 bit Adder/Subtractor Circuit	Digital System Design	https://www.youtube.com/embed/pGS42GMRjEk	Dr.N.M.Siva Mangai
Introduction to Asynchronous Sequential Logic Circuit	Digital System Design	https://www.youtube.com/embed/gxby-8NCqLQ	Dr.N.M.Siva Mangai
Introduction to Verilog HDL	Digital System Design	https://www.youtube.com/embed/pq1C9IEl2W8	Dr.N.M.Siva Mangai
Programmable Logic Devices (PLD)	Digital System Design	https://www.youtube.com/embed/sNY3OXzeUQs	Dr.N.M.Siva Mangai
Characteristics of Digital Logic Families	Digital System Design	https://www.youtube.com/embed/DNg7z4FyLOo	Dr.N.M.Siva Mangai
Field Programmable Gate Array (FPGA)	Digital System Design	https://www.youtube.com/embed/xRlieoPJtsk	Dr.N.M.Siva Mangai
Integral Calculus	Calculus	https://www.youtube.com/embed/auPHdj5IMO0	Dr. J. Daphy Louis Lovenia
Definite Integrals	Calculus	https://www.youtube.com/embed/BJom1ZDpCuw	Dr. J. Daphy Louis Lovenia
Statistics - Frequency Distribution	Calculus	https://www.youtube.com/embed/aLo7X6L39oM	Dr. J. Daphy Louis Lovenia
Statistics - Measures of Central Tendency	Calculus	https://www.youtube.com/embed/OJ8bCAIVVn4	Dr. J. Daphy Louis Lovenia
Statistics - Median	Calculus	https://www.youtube.com/embed/cPdwaI6PYSE	Dr. J. Daphy Louis Lovenia
Statistics - Mode	Calculus	https://www.youtube.com/embed/t2W2gaYfKcY	Dr. J. Daphy Louis Lovenia
Differentiation	Calculus	https://www.youtube.com/embed/Iy0q11EqQHs	Dr.A. Hepzibah Christinal

Differentiation - Rules on Differentiation with Examples	Calculus	https://www.youtube.com/embed/l8WouCWWdHU	Dr.A. Hepzibah Christinal
Differentiation - Definition and Standard Functions Derivatives	Calculus	https://www.youtube.com/embed/RYYFrLRj1fQ	Dr.A. Hepzibah Christinal
Classes and Objects	Object Oriented Programming	https://www.youtube.com/embed/6-xLJxPvL0o	Dr. M. Mythily
Constructors	Object Oriented Programming	https://www.youtube.com/embed/PoWZ4dCWkk8	Dr. M. Mythily
Array of Objects	Object Oriented Programming	https://www.youtube.com/embed/UICXwNKcJnM	Dr. M. Mythily
"this" Keyword	Object Oriented Programming	https://www.youtube.com/embed/IwC_VqEiUbs	Dr. M. Mythily
Inheritance	Object Oriented Programming	https://www.youtube.com/embed/4EWuaOFIGjA	Dr. M. Mythily
Inheritance- Demonstration	Object Oriented Programming	https://www.youtube.com/embed/hs1B78R2BVs	Dr. M. Mythily
Method Overloading and Overriding	Object Oriented Programming	https://www.youtube.com/embed/qYMS8btXv_0	Dr. M. Mythily
"super" Keyword	Object Oriented Programming	https://www.youtube.com/embed/vDNhdRj0blU	Dr. M. Mythily
Multi - Level Inheritance	Object Oriented Programming	https://www.youtube.com/embed/UyYOUoVSElo	Dr. M. Mythily
Interface in Java	Object Oriented Programming	https://www.youtube.com/embed/ziI-3BEi41Q	Dr. M. Mythily
Abstract Class and Interface	Object Oriented Programming	https://www.youtube.com/embed/rBtBf1wkJz0	Dr. M. Mythily
Final Keyword	Object Oriented Programming	https://www.youtube.com/embed/gdVtL4veHl8	Dr. M. Mythily
Packages	Object Oriented Programming	https://www.youtube.com/embed/iLgaWK1OG-Q	Dr. M. Mythily
Access Modifiers	Object Oriented Programming	https://www.youtube.com/embed/BV-IhvilfEE	Dr. M. Mythily
Exception Handling	Object Oriented Programming	https://www.youtube.com/embed/mymVqSkjsxk	Dr. M. Mythily
User - Defined Exceptions	Object Oriented Programming	https://www.youtube.com/embed/a3H9StRUi_Q	Dr. M. Mythily
Threads In Java	Object Oriented Programming	https://www.youtube.com/embed/jBogybmgJ6c	Dr. M. Mythily
Threads in Java Example	Object Oriented Programming	https://youtube.com/embed/Be-febXMmtI	Dr. M. Mythily
Stack Data Structure	Data Structures and Algorithms	https://www.youtube.com/embed/1a6CC63kNG4	Dr. Rexie
Forms of Arithmetic Expressions	Data Structures and Algorithms	https://www.youtube.com/embed/AYXJytJBRu0	Dr. Rexie
Evaluation of Postfix	Data Structures and Algorithms	https://www.youtube.com/embed/yTAlbUb3e5s	Dr. Rexie

Expression using Stack			
Application of Stack Recursive Function Calls	Data Structures and Algorithms	https://www.youtube.com/embed/Xj4i-6cmj_g	Dr. Rexie
Queue Data Structure	Data Structures and Algorithms	https://www.youtube.com/embed/3FbFKaODMU0	Dr. Rexie
Circular Queue Data Structure	Data Structures and Algorithms	https://www.youtube.com/embed/0XokgNexlsg	Dr. Rexie
Linked List	Data Structures and Algorithms	https://www.youtube.com/embed/o3A-pzSZtpY	Dr. Rexie
Singly Linked List Insertion	Data Structures and Algorithms	https://www.youtube.com/embed/w973-NdQVhg	Dr. Rexie
Singly Linked List Deletion	Data Structures and Algorithms	https://www.youtube.com/embed/1FId2QoOby4	Dr. Rexie
Circular Linked List	Data Structures and Algorithms	https://www.youtube.com/embed/DfVfM0VdrQ8	Dr. Rexie
Doubly Linked List	Data Structures and Algorithms	https://youtube.com/embed/WewG5Ls6rH8	Dr. Rexie
Searching Algorithms	Data Structures and Algorithms	https://youtube.com/embed/vn_kv49Cf0Y	Dr. Rexie
Insertion Sorting	Data Structures and Algorithms	https://youtube.com/embed/8PRikZBeEhU	Dr. Rexie
Bubble Sorting	Data Structures and Algorithms	https://youtube.com/embed/XIPW2biuG_A	Dr. Rexie
Merge Sort	Data Structures and Algorithms	https://youtube.com/embed/IF_a7h4qNMM	Dr. Rexie
Quick Sort	Data Structures and Algorithms	https://youtube.com/embed/RFcSX5srH3s	Dr. Rexie
Hashing	Data Structures and Algorithms	https://www.youtube.com/embed/cvvEGXluylyY	Dr. Rexie
Binary Tree Traversal	Data Structures and Algorithms	https://youtube.com/embed/DaPGdo7w_E8	Dr. Rexie
Construction of Binary Tree from Traversal	Data Structures and Algorithms	https://youtube.com/embed/HnfZp_IZYAI	Dr.. Rexie
Graph Data Structure	Data Structures and Algorithms	https://youtube.com/embed/bbxr_1Thkh4	Dr. Rexie
Tree Data Structure	Data Structures and Algorithms	https://youtube.com/embed/IT0sR7cKja0	Dr. Rexie
Python Features	Python Programming	https://www.youtube.com/embed/IWEMMO5e6i0	Dr.Naveen Sundar
Python Variable	Python Programming	https://www.youtube.com/embed/ov60WnFj0z4	Dr.Naveen Sundar
Python Variable Names	Python Programming	https://www.youtube.com/embed/oiLfh8iY-H8	Dr.Naveen Sundar
Python Data Types	Python Programming	https://www.youtube.com/embed/7BOjtyjAqRI	Dr.Naveen Sundar
Python Arithmetic Operators	Python Programming	https://www.youtube.com/embed/-b7pHI3KvBY	Dr.Naveen Sundar
Python Comments	Python Programming	https://www.youtube.com/embed/S6Bgt6euOww	Dr.Naveen Sundar

Python Assignment Operators	Python Programming	https://www.youtube.com/embed/DH5zYNMJAQ8	Dr.Naveen Sundar
Python List Introduction	Python Programming	https://www.youtube.com/embed/8qAQXLeWB2w	Dr.Naveen Sundar
Python List Access	Python Programming	https://www.youtube.com/embed/fvR39azq8JY	Dr.Naveen Sundar
Python List Change Items	Python Programming	https://www.youtube.com/embed/Pc2vDEiyPnM	Dr.Naveen Sundar
Python Module	Python Programming	https://www.youtube.com/embed/DZT3r9Fwxj4	Dr. Naveen Sundar
Variables in Module	Python Programming	https://www.youtube.com/embed/haTJgTkz3js	Dr. Naveen Sundar
Naming and Renaming Module, Import from Module	Python Programming	https://www.youtube.com/embed/89bxXDhFgQg	Dr. Naveen Sundar
Python Function Creation and Function Call	Python Programming	https://www.youtube.com/embed/Jdi2MplUbPk	Dr. Naveen Sundar
Python Function Arguments	Python Programming	https://www.youtube.com/embed/m0IIRmJCOkY	Dr. Naveen Sundar
Python Function - Passing a List as Argument & Return Statement	Python Programming	https://www.youtube.com/embed/i6YMZQB5Ipo	Dr. Naveen Sundar
Python List Introduction	Python Programming	https://www.youtube.com/embed/G9IJ3t8Qc1s	Dr. Naveen Sundar
Python Access List Item	Python Programming	https://www.youtube.com/embed/m-XjxWnNrKI	Dr. Naveen Sundar
Python Add List Items	Python Programming	https://www.youtube.com/embed/TxAcPvxzrGQ	Dr. Naveen Sundar
Python Remove List Item	Python Programming	https://www.youtube.com/embed/vXdJ38EfTe8	Dr. Naveen Sundar
Python Dictionary Introduction	Python Programming	https://www.youtube.com/embed/DmECqGxNs9A	Dr. Naveen Sundar
Python Access Dictionary Items	Python Programming	https://www.youtube.com/embed/JNkITlm3EPw	Dr. Naveen Sundar
Python Add Dictionary Items	Python Programming	https://www.youtube.com/embed/AvEamKRIOjY	Dr. Naveen Sundar
Python Remove Dictionary Item	Python Programming	https://www.youtube.com/embed/fGMedfFKFvo	Dr. Naveen Sundar
History Of Improvement of Ornamental plants	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/iEWzcPoFJN0	Dr. Ranchana
Centre of Origin of Flowers and ornamental Crops	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/6Uz0zSt3ubc	Dr. Ranchana
Objectives and Techniques in	Breeding and seed production of flower	https://www.youtube.com/embed/DoDddXc-gks	Dr. Ranchana

Ornamental Plant Breeding	and ornamental plants		
Rose Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/hDpJanSmZFE	Dr. Ranchana
Carnation Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/6PJqt9teNpA	Dr. Ranchana
Lilium Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/GdB7gajkge0	Dr. Ranchana
Orchid Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/N200tinwfCg	Dr. Ranchana
Anthurium Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/_-u4cOb-Npc	Dr. Ranchana
Gerbera Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/z80j0gEoW20	Dr. Ranchana
China Aster Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/ZOeqLo5Wg_s	Dr. Ranchana
Gladiolus Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/-P4en0KMI1M	Dr. Ranchana
Heliconia Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/nMaiCR4fwfY	Dr. Ranchana
Tuberose Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/IdJmDfcO4zE	Dr. Ranchana
Marygold Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/yBMPHWSIxrw	Dr. Ranchana
Crossandra Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/a2LFhXOhSbY	Dr. Ranchana
Hibiscus Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/f9uX_01QR58	Dr. Ranchana

Bougainvillea Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/qI1MGzgsDqE	Dr. Ranchana
Petunia Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/uNlj9WvEFC8	Dr. Ranchana
Pansy Breeding	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/kGx17lfj_a4	Dr. Ranchana
Biological Control of Insect Pests	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/zDWZujG6UQA	Dr. E. Adlin Pricilla Vasanthi
Importance and Scope of Ornamental Crops, Medical and Aromatic Plants and Landscaping	Breeding and seed production of flower and ornamental plants	https://www.youtube.com/embed/YoIc8sjfSRY	Dr. Manjula
Virtual Lan (VLAN)	Networks	https://www.youtube.com/embed/S_IQ_YVGDys	Dr . A. Kathivel
Introduction to Semiconductor	Electron Devices	https://www.youtube.com/embed/Uc76yVxWk7Y	Dr. G Shine Let
Energy Band Diagram of Solids	Electron Devices	https://www.youtube.com/embed/PVL7Y3FXXMU	Dr. G Shine Let
Types of Semiconductor	Electron Devices	https://www.youtube.com/embed/OKi9R2stJsU	Dr. G Shine Let
Introduction to Machine Learning	Machine Learning	https://www.youtube.com/embed/bQSR9gkdPNQ	Dr. Shamila Ebenezer
Linear Regression	Machine Learning	https://www.youtube.com/embed/3FVKwhM0Ayg	Dr. Shamila Ebenezer
Logistic Regression	Machine Learning	https://www.youtube.com/embed/xsMYDnfnnyg	Dr. Shamila Ebenezer
Circuit Theory vs. Field Theory	Electromagnetic Fields & Waves	https://www.youtube.com/embed/c77LBJCMs4c	Dr.S. Merlin Gilbert Raj
Introduction to Embedded Systems and Embedded Real-time Operating Systems	Embedded Systems Design	https://www.youtube.com/embed/Yys2KNqGgZU	Dr. Victor Du John H
Numerical Integration: Trapezoidal Rule	Numerical Methods	https://www.youtube.com/embed/y9wCpjcCYpk	Dr. P. Xavier
Non Linear Programming	Optimization Techniques	https://www.youtube.com/embed/pZGW8AsveKU	Dr.J.Daphy Louis Lovenia
Block Diagram Reduction	Process Control for Food Engineers	https://www.youtube.com/embed/UytlQsdNCVQ	Mr. Kingston Stanley P

Arrays in C Programming	Fundamentals of Computing and Programming	https://www.youtube.com/embed/uymwu89HeJo	Mr. Andrew J
Time Management	Value Education	https://www.youtube.com/embed/_BhyNvvQL3w	Mrs. B. Paulin Ebenezer
Inhibition Kinetics	Enzyme Engineering	https://www.youtube.com/embed/qJuovwksBXA	Dr. Reya Issac
Expected Value of 2D Random Variables	Probability and Distributions	https://www.youtube.com/embed/s5Md4dkDPh4	Dr.K.Rebecca Jebaseeli Edna
Closure Properties of Regular Languages	Theory of Computation	https://www.youtube.com/embed/SDMpu75zxG8	Dr. Rexie J A M
Be a Leader	Value Education	https://www.youtube.com/embed/MJ3H-DM4JBI	Mrs.K.Jamuna
Normal Distribution	Probability and Statistics	https://www.youtube.com/embed/LVyPCtqzUGY	Dr. J. Catherine Grace John
Introduction to Nanoscale Transistors	Nanoelectronics	https://www.youtube.com/embed/ECRARNOy7WE	Dr. Surseh
PHP Functions and Objects	Web Technology	https://www.youtube.com/embed/0WJutwpzNwg	Dr.J.Anitha
Finite Field Extension	Field Theory	https://www.youtube.com/embed/BnaSU0ZTIDs	Dr. B Elavarasan
Ultrasonic Waves- Definition and Production	Engineering Physics	https://www.youtube.com/embed/qAw9t0DzPGc	Dr.R.Jeba Beula
Properties of Matrix	Mathematical Foundation	https://www.youtube.com/embed/t4jwRLI-h3k	Dr S Jebasingh
Nonlinear systems	Control theory	https://www.youtube.com/embed/jN6pD1ShaUY	Dr. V. Kavitha
Origin of the Universe	Nuclear Physics	https://www.youtube.com/embed/XfUUv-1e4A0	Dr. D. Khanna
Leadership	Value education, Entrepreneurship	https://www.youtube.com/embed/CbNWobCAy6w	Prof. Anandaraj

4.3.2 Public events (lifelong learning)

KITS provided a platform for Conferences, webinars and seminars for knowledge sharing through interactions and forging collaboration.

Details of the Technical Conferences / Symposium / Workshops organized in the AY 2021-22				
Sl.No.	Event	Date	No. of participants	Collaborator
1.	International Conference on Big-Data and Cloud Computing (ICBDCC'21)	20.08.2021 & 21.08.2021	85	Technical Sponsor - Springer

2.	International Conference on Circuits, Devices and Systems (ICDCS'22)	21.04.2022 & 22.04.2022	95	Technical Sponsor - IEEE
3.	International Conference on Robotics, Automation, and Intelligent Systems (ICRAINS-21)	12.11.2021 & 13.11.2021	55	Technical Sponsor - AIP Publishing
4.	Autodesk Training on Fusion 360 Workshop	13.08.2021	122	Nil
5.	MSC Software Indo-Pacific User Conference 2021 Accelerate Smarter Engineering	02.09.2021	51	Nil
6.	Webinar on Prospective Research Aspects In Microelectromechanical Systems (MEMS)	09.09.2021	60	Nil
7.	How to Publish Scholarly Books in Science and Technology	22.09.2021	100	Nil
8.	Webinar on Ethics of Publication	23.11.2021	50	Nil
9.	Webinar on Recent Trends in Additive Manufacturing Technology	29.01.2022	50	Nil
10.	Webinar on Product Life Cycle Management	03.02.2022	45	Nil
11.	One day Indo-USA SPARC workshop on Additive Manufacturing: Materials and Applications	07.02.2022	60	Nil
12.	Online FDP program on Modern Trends in Manufacturing and Thermal Science (MTMTS-2022)	05.04.2022	35	Nil
13.	Smart Manufacturing: Electro-Pneumatics with Illustrated library and Janatics catalogues	13.04.2022	49	Nil
14.	FDP on Applications of Artificial Intelligence in Modern Manufacturing	03.08.2021 to 07.08.2021	114	Nil
15.	FDP on Green and Renewable Energy Technologies for Sustainable Development	28.10.2021 to 03.11.2021	53	Nil

KITS has successfully executed numerous educational initiatives through the student Society.

Name of the student society	Title of the event organised by the club or society	Event organised On/Off campus	Date of the event	Event duration	Participants in the event
RACE	Trends in Technology	On-campus with internal and external stakeholders	2.9.2021 to 4.9.2021	3 days	12
IEEE	Webinar on Global Humanitarian Challenges – Assistive Technology Engineering	On-campus with internal and external stakeholders	15.10.21	0.5 day	140
BMESI	International Conference on Novel Approaches and Developments in Biomedical Engineering (ICNADBE- 2021)	On-campus with internal and external stakeholders	22.04.2021, 23.04.2021	2 days	112
Student Association-Creative Automation and Innovative Robotic Association (The Robotics Society)	ZESTRO	On-campus with internal and external stakeholders	30.03.2022	1 day	280
CAIRA	A Green Mile The Fifteenth of August Soldiers of fortune Young Warrior Movement Art of Any Sort Sweet Distribution Club Orientation Python Bootcamp Inter College Debate- Impact of Artificial intelligence on Humanity National Cleaning	On-campus with internal and external stakeholders	July 2021 - December 2021	1 day	250

	Day La Veintiocho - 28th Club Installation Indian Cultural Heritage-Quiz Indian Cultural Heritage-Poster Making Swachhta Pakhwada Pledge Taking Green Backyard				
CAIRA	COBOTS	On-campus with internal and external stakeholder s	23.08.2021	1 day	160
Association of Biotechnology	Operations in Pharmaceutical Industry Organized by Dr. S. Murugan and Dr. Jibu Thomas with 8 industry Resource Persons	On-campus with internal and external stakeholder s	19.07.2021 to 04.08.2021	15 days	45
Association of Biotechnology	5 Day Internship on Essential Techniques in Biosciences-Sept 2021	On-campus with internal and external stakeholder s	13.09.2021 to 17.09.2021	5 days	31
Association of Biotechnology	An Online Seminar on “Promising Career Prospects in Biological Sciences”	On-campus with internal and external stakeholder s	02.09.2021	1 day	136
Association of Biotechnology	Inaugural function of the Department of Association “INVICTUS’21 and International Webinar on Deconstructing the Plant Cell Wall: Fungal Degradative	On-campus with internal and external stakeholder s	27.10.2021	1 day	188

	Mechanisms and Their Exploitation				
Association of Biotechnology	Ten Days Internship on Molecular and Analytical Techniques for Plant Sciences	On-campus with internal and external stakeholders	24.01.22 to 29.01.2022 & 21.02.22 to 25.02.22	10 days	66
Entrepreneurial Talk	"Unique Challenges faced by Entrepreneurs"	On-campus with internal and external stakeholders	18.03.2022, AN	0.5 days	97
Industry Interactive Sessions	Sales and Distribution in Fertiliser Industry	On-campus with internal and external stakeholders	09.04.2022, FN	0.5 days	98
Logistics Club	Current Trend in Logistics	On-campus with internal and external stakeholders	03.11.2022 AN	0.5 days	85
Aerospace Engineering	Career Development Webinar	On-campus with internal and external stakeholders	28.07.2021 to 30.07.2021	0.75 days	100
Aerospace Engineering	Career Development Webinar	On-campus with internal and external stakeholders	13.10.2021	0.25 days	75
Aerospace Engineering	Engineering career in Armed forces and Career Guidance	On-campus with internal and external stakeholders	11.03.2022	0.25 days	142
Aerospace Engineering	Career Counselling and Guidance	On-campus with internal and external stakeholders	28.01.2022	0.25 days	74

Aerospace Engineering	Success story of an Entrepreneur E-Cell	On-campus with internal and external stakeholders	18.02.2022	0.25 days	74
Aerospace Engineering	Mock interview – 2018-22 B.Tech	On-campus with internal and external stakeholders	23.03.2022	0.25 days	51
Aerospace Engineering	Entrepreneurial Potential- Emerging Trends in Entrepreneurship Development	On-campus with internal and external stakeholders	10.03.2022	0.25 days	60
Aerospace Engineering	Business Environment, Opportunities- Elements of Entrepreneurial Ventures	On-campus with internal and external stakeholders	22.03.2022	0.25 days	60
Aerospace Engineering	New technology in Entrepreneurship	On-campus with internal and external stakeholders	24.03.2022	0.25 days	60
Aerospace Engineering	Advance Training Programme – Gateway to Core Placements	On-campus with internal and external stakeholders	08.04.2022	1 day	142
Real world Open Source Intelligence (OSINT) Hacking	Real world Open Source Intelligence (OSINT) Hacking	On-campus with internal and external stakeholders	17.07.2021	1 Day	150
Smart Rural Community Hackathon	Smart Rural Community Hackathon	On-campus with internal and external stakeholders	22.03.2022 – 22.03.2022	2 Days	17

Training Session by Microsoft Azure	Training Session by Microsoft Azure	On-campus with internal and external stakeholders	31.0.2022	1 Day	30
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4.3.3 Vocational Training Events (lifelong learning)

- Several vocational training courses are provided to women in order to help them "learn and earn." These courses are conducted at vocational training centers located across various parts of India through SEESHA, where women are trained in a range of skills including tailoring, computer proficiency, bag making, and soft toy manufacturing. It is worth noting that some of these projects are carried out in collaboration with esteemed government agencies, such as Jan Shikshan Sansthan.



- SEESHA has provided vocational training to 934 women and girls from underprivileged backgrounds. These training programs focus on in-demand skills such as Commercial Tailoring, Beautician services, Aari work, Embroidery, Artificial Jewellery & soft toy making, soft skills, and Entrepreneurship Development training. The training courses were offered at the following 9 project locations:
 - Arakkonam
 - Bengaluru
 - Chennai
 - Coimbatore
 - Cuddalore
 - Hyderabad

- Mumbai
- Ranchi
- Vyara Gujarat

After the completion of the training, Self-Help Groups were formed and seed money was disbursed to aspiring women entrepreneurs in Cuddalore, Ranchi, Chennai, Mumbai and Coimbatore project locations.

4.3.4 Educational Outreach activities beyond campus

KITS actively promotes and encourages educational outreach activities and competitions that extend beyond the confines of our campus.

- KITS Collaborations has partnered with the Primary Health Centre in Pooluvapatti to enhance healthcare services for local communities. Through this joint effort KITS has successfully improved medical facilities and accessibility, ensuring that essential healthcare services are readily available to those in need. Initiatives include Mobile Health Screening, Vaccination Drives, Immunization of Children, and Covid Testing Kiosk.
- KITS has partnered with DXC Technology to drive advancements in healthcare initiatives and promote digital solutions in the field. This collaboration aims to make a significant impact by organizing vaccine drives and empowering women through training programs across nine locations in India.
- A testament to the university's commitment to geriatric care is its collaboration with Tapovan. As part of this collaboration, a 24/7 dispensary has been established at the Old Age Care Home in Kuppanur, Madhampatty. The dispensary is staffed with dedicated nurses and regular doctor visits, ensuring the well-being of the elderly residents.
- KITS collaborations extend to tribal communities in conjunction with the Forest Department. The institutions commitment to education is clearly demonstrated through its partnerships with esteemed academic institutions such as Bishop Appasamy College, Sri Krishna College of Arts, Nehru Arts & Science College, and Kumaraguru College of Arts & Science. These collaborations not only enhance educational opportunities but also provide valuable internship programs, fostering holistic development.
- Collaborations with SEESHA and Immaculate Conception Convent exemplify the university's unwavering dedication to research training, community service, and the promotion of women's health and childbirth awareness.
- Rural Agricultural Work Experience (RAWE) and Experiential Learning Programme (ELP) are designed to provide a holistic learning experience, combining theoretical knowledge with practical application. By participating in these programs, our students not only enhance their academic qualifications but also develop the necessary skills and competencies to excel in their future careers.
- Karunya Institute of Technology and Sciences offers students a unique opportunity to create positive transformations within rural communities. The institution has established the Karunya Centre for Community Academia Collaboration (KCCAC) on September 9th, 2021. This collaborative platform brings together all student members and dedicated faculty program coordinators across nine different clubs.

Following are the events conducted by various clubs of KCCAC during the assessment year.

S.No	Club Name	Activity	Date	No. of students
1	Youth Red Cross Club	Free Corona Vaccination Camp	3.09.2021-4.09.2021	50
2	Youth Red Cross Club	Seminar on First Aid	12.02.2022	175
3	Youth Red Cross Club	Medical Camp	08.02.2022	30
4	Rotaract Club - TECH UNIT	A Green Mile	24.07.2021	25
5	Rotaract Club - TECH UNIT	Covid Warrior Movement	14.08.2021	250
6	Rotaract Club - TECH UNIT	National Cleaning Day	18.09.2021	250
7	Rotaract Club - TECH UNIT	Green Backyard	28.11.2021	250
8	Rotaract Club - TECH UNIT	Campus Cleaning	12.03.2021	150
9	Rotaract Club - TECH UNIT	International Day of Action for Rivers	22.03.2022	200
10	Rotaract Club - TECH UNIT	My Peace of Mind Matters	26.03.2021	200
11	Rotaract Club - SSAMM Unit	MEDICINAL PLANTATION	01.07.2021	40
12	Rotaract Club - SSAMM Unit	WORLD PAPER BAG DAY	12.07.2021	51
13	Rotaract Club - SSAMM Unit	FIRST AID TRAINING	02.09.2021	45
14	Rotaract Club - SSAMM Unit	CHARITY OF GOODNESS	11.09.2021	39
15	Rotaract Club - SSAMM Unit	WALKING WITH THE POOR	30.09.2021	16
16	Rotaract Club - SSAMM Unit	SWACHH BHARAT	28.10.2021	19
17	Photography and Video Club	Voting Awareness	12.03.2022	225
18	NSS	Environmental Day : Tree Plantation by NSS Volunteers	05.06.2021	121
19	NSS	Blood awareness campaign	14.06.2021	55
20	NSS	Webinar on Fire and Safety	11.12.2021	127
21	NSS	Webinar on Road Safety	02.02.2022	55
22	NSS	Swachh Bharat- Madawarayapuram	12.03.2022	55
23	NSS	School walls and gates painting - Mundandurai	14.03.2022	62
24	NSS	Swachh Bharat - Ramanthapuram Village	15.03.2022	57
25	NSS	Wall and black board painting - Nathegoundamputhur	17.03.2022	64
26	NSS	Little hearts- Orphanage Visit	21.04.2022	56
27	NSS	Swachh Bharat - Kallipalyam Village	22.04.2022	66
28	NSS	Swachh Bharat - Pudur	24.04.2022	64

29	NSS	Wall painting in Government School - Thondamuthur	26.04.2022	64
30	NCC	Tree Plantation	02.01.2022	110
31	NCC	Anti-Plastic Day	02.01.2022	126
32	Youth Red Cross Club	Orientation Program	14.08.2021	177
33	Youth Red Cross Club	Poster presentation – Seven principles of YRC	14.08.2021	295
34	Youth Red Cross Club	Webinar on How to secure my dream job in the current turbulent environment?	23.10.2021	295
35	Youth Red Cross Club	Online Quiz Competition- Mental Health, Public health Threat	27.12.2021	15
36	Youth Red Cross Club	Webinar on FRAGILE: Handle Us With Care	12.02.2022	269
37	Youth Red Cross Club	Three Days Zonal Level Orientation Programme	24.03.2022-26.03.2022	114
38	Rotaract Club - TECH UNIT	The Fifteenth of August	14.08.2021	250
39	Rotaract Club - TECH UNIT	Soldiers of Our Nation	14.08.2021	250
40	Rotaract Club - TECH UNIT	Art of Any Sort	14.08.2021	250
41	Rotaract Club - TECH UNIT	Freedom to Remember	15.08.2021	20
42	Rotaract Club - TECH UNIT	Club Orientation	04.09.2021	80
43	Rotaract Club - TECH UNIT	Python Bootcamp	08.09.2021 - 30.10.2021	10
44	Rotaract Club - TECH UNIT	Inter College Debate Impact of Artificial intelligence on humanity	18.09.2021	250
45	Rotaract Club - TECH UNIT	La Veintiocho - 28th Club Installation	26.09.2021	50
46	Rotaract Club - TECH UNIT	Indian Cultural Heritage-Quiz	09.10.2021	250
47	Rotaract Club - TECH UNIT	Indian Cultural Heritage-Poster Making	09.10.2021	250
48	Rotaract Club - TECH UNIT	Swachhta Pakhwada Pledge Taking	27.11.2021	250
49	Rotaract Club - TECH UNIT	Picture Perfect	12.02.2021	200
50	Rotaract Club - TECH UNIT	Women's Day	12.03.2021	100
51	Rotaract Club - TECH UNIT	Women Empowering Women	12.03.2021	100
52	Rotaract Club - TECH UNIT	Art Time	12.03.2021	150
53	Rotaract Club - TECH UNIT	Food Style	26.03.2021	200
54	Rotaract Club - TECH UNIT	Epilepsy Awareness	26.03.2021	200
55	Rotaract Club - SSAMM Unit	PICTURA ESPERANTO	01.07.2021	35

56	Rotaract Club - SSAMM Unit	RESUME RECIPE	01.07.2021	46
57	Rotaract Club - SSAMM Unit	MEDICO DAY - A joint Project	01.07.2021	32
58	Rotaract Club - SSAMM Unit	YOUTH GOT TALENT	15.07.2021	104
59	Rotaract Club - SSAMM Unit	LINKEDIN - Digital Reputation	19.07.2021	25
60	Rotaract Club - SSAMM Unit	CLUB ORIENTATION	21.07.2021	22
61	Rotaract Club - SSAMM Unit	ALL FOR ONE & ONE FOR ALL	23.07.2021	52
62	Rotaract Club - SSAMM Unit	BE THE LEADER NOT THE BOSS	06.08.2021	23
63	Rotaract Club - SSAMM Unit	ARTICLE 15	14.08.2021	17
64	Rotaract Club - SSAMM Unit	INTER COLLEGE DEBATE	30.08.2021	29
65	Rotaract Club - SSAMM Unit	e-MYTH	30.09.2021	22
66	Rotaract Club - SSAMM Unit	NUTRITION EVERYDAY	09.10.2021	26
67	Rotaract Club - SSAMM Unit	SYNC OR SWIM	25.10.2021	30
68	Rotaract Club - SSAMM Unit	SCHMALTZ MOMENT	20.11.2021	27
69	Rotaract Club - SSAMM Unit	SECRET TO START - UPS	15.01.2022	50
70	Rotaract Club - SSAMM Unit	ABODE AND BEYOND	21.01.2022	40
71	Rotaract Club - SSAMM Unit	THE CONSTITUTION DAY	20.01.2022	104
72	Photography and Video Club	Photography Challenge on Independence	14.08.2021	281
73	Photography and Video Club	Matribhasha Diwas – Seminar and Video Production	12.02.2022	163
74	Photography and Video Club	Women Empowerment – Seminar and Poster Design Challenge	26.03.2022	241
75	NSS	Pledge on “World Environment Day”	05.06.2021	75
76	NSS	Poster preparation - on “Anti Child Labour Day”	12.06.2021	25
77	NSS	Training Programme for MIT APP Inventor	21.07.2021	72
78	NSS	Training Programme for Python Programing	12.08.2021	71
79	NSS	Poster preparation on World Peace Day	21.09.2021	55
80	NSS	Unity-The great proponent in Gandhian era	02.10.2021	75
81	NSS	Poster making on: International Day for the Eradication of Poverty	17.10.2021	45
82	NSS	Shrestha Bharat webinar	09.10.2021	63

83	NSS	Awareness video making on reusable mask	07.09.2021	45
84	NSS	Webinar on Leadership	19.12.2021	125
85	NSS	Republic Day Webinar- India at 75	26.01.2022	73
86	NSS	TRAINING ON MIT APP INVENTOR	12.02.2022	72
87	NCC	Conservation of Water Bodies	02.01.2022	135
88	NCC	Waste Management	02.01.2022	145
89	NCC	Plog Run	02.01.2022	98
90	NCC	Cycle Rally	02.01.2022	112
91	NCC	Awareness Drive for Digital Payments	02.01.2022	136
92	NCC	Cleanliness Drive (Swachh Bharat Abhiyaan)	02.01.2022	95
93	NCC	Fit India Run	10.02.2021	157
94	NCC	Unity in Diversity	02.01.2022	128
95	NCC	Road Safety Awareness	02.01.2022	147
96	NCC	International Day of Yoga	21.06.2021	118
97	NCC	Online EBSB	04.10.2021 09.10.2021	146
98	NCC	International Women's Day	03.08.2022	126
99	NCC	Cyber Crime Awareness	15.03.2022	144
100	NCC	International Day for Girl Child/ Child Marriage/ Beti Bachao/ Beti Padhao	24.01.2022	125
101	NCC	World Water Day	25.07.2021	138
102	NCC	Elimination of one time use plastic plog run	25.07.2022	129
103	Outreach Club	Overhead tank for Piped water supply	23.02.2022- 30.3.2022	500
104	Outreach Club	Medical Camp at Pachinampathy tribe village	09.02.2022	75
105	Outreach Club	Medical Camp at tribe village	13.02.2023	75
106	Outreach Club	Solar lamps for community meeting	28.03.2022	50
107	Outreach Club	Agriculture crop planting	31.03.2022	250

4.3.5 Lifelong learning access policy

KITS has framed a policy in such a way that it promotes equitable access to learning opportunities for all, regardless of age, background, or location. Such policies encourage participation in lifelong learning initiatives. Supporting and increasing the proportion of first-generation students is a critical step towards achieving inclusive and equitable education. KITS has implemented targeted strategies to facilitate their success and ensure that they have the same educational opportunities as their peers. A higher proportion of first-generation students in higher education institutions signifies progress towards a more diverse and inclusive educational landscape, aligning with the goals of SDG 4.



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved

NAAC A++ Accredited

SDG 5 - Gender Equality

Gender equality is a fundamental human right which encompasses equal access to opportunities, protection from discrimination, and freedom from violence and abuse for all individuals, regardless of their gender. Promoting gender equality is essential for economic growth and development of a society. When women and girls have equal access to education, employment, and entrepreneurship opportunities, it results in a more robust and diverse workforce, contributing to the overall development of a nation.

5.1 Research on Gender Equality

5.1.1 Proportion of female authors

Gender equality in research publications is a critical aspect of promoting diversity and inclusivity in the scientific community. Efforts have been taken to promote gender equality in research publications which addresses not only the quantity of research authored by women but also the quality, visibility, and influence of their work in the academic community.

- Seed money for research
- Summer internships
- Incentives for publications
- Financial support for patent filing and publishing
- Financial support for presenting papers in international conferences abroad
- Academic workload relaxation for carrying out funded research.

These efforts have contributed to a more inclusive and equitable research environment that benefits researchers. 430 papers have been published by women faculty members in the year 2021& 2022.

5.1.2 Gender Equality: Cite Score

Various initiatives taken by the institution to support and advance female researchers has influenced the quality and impact of research published by the women faculty, which is reflected in their cite scores.

5.1.3 Publication

One of the significant publications on Gender Equality is “Analysis of the health, economic and environmental impacts of COVID-19: The Bangladesh perspective” by Dr. Sneha Gautam. The study assesses the socio-economic impacts of COVID-19 in Bangladesh by collecting data from different sources. This study also discussed the impact of COVID-19 on mental health and found that women faced more depression and anxiety than men as well as 43% of children had subthreshold mental disturbances. Three-fourths of the adolescents have been distressed with household stress during the pandemic. Women and girls have encountered increased domestic violence. Decreasing remittance from non-residents and shutting down of RMG industry resulted in loss of job and have badly affected economic section. Almost 20 million workers lost their jobs in Bangladesh from the informal sector. Moreover, the healthcare workers who have treated the corona virus patients have been socially stigmatized due to the fear of infection. Corona Virus has jeopardized the agriculture sector and 66% farmers (53% crop and vegetables, 99% fish farmers) got lower price than they used to get in a normal situation.

5.2 Proportion of first-generation female

The institution recognizes and supports the achievements and contributions of first- generation females who are breaking traditional barriers and advancing the cause of gender equality within their families and communities.

5.3 Student Access Measure

5.3.2 Policy for women Applications and Entry

To ensure equal opportunity for women to access education, training, and job openings a gender-neutral recruitment and selection process has been implemented. Girl students are encouraged to pursue STEM and other non- traditional courses like Criminology and Forensic Science.

5.3.3 Women Access Schemes

To ensure that women have access to higher education and alleviate the financial barriers that often hinder women from pursuing higher education, the institution facilitates the students to receive various scholarships offered by Central / State Governments and from KITS which will be duly notified to the students through notices / e-mail / institute website such as Pragati Scholarship Scheme for Girl Students (Technical Degree) from All India Council for Technical Education (AICTE). KITS offers special Scholarship of Rs. 40,000 per annum to Women students to pursue technical degree programmes.

5.4 Proportion of female Senior Academics

Initiatives have been taken to increase the representation of women in leadership roles. Women are encouraged to take administrative roles and serve as members of various boards and committees. More than 50% of the faculty members are women and 31 of the 91 professors are in leadership roles.

5.5 Proportion of Women receiving Degree

The institution aims to eliminate gender disparities in education and ensure that girl students and women faculty have the same opportunities as boys and men faculty for professional development. Increasing the number of women receiving degrees and ensuring they have equal access and opportunities in higher education is given top priority. Out of 1303 students graduated, 420 were girls.

5.6 Women's Progress Measures

5.6.1 Policy for non-discrimination against women

Equal Employment Opportunity Policy and Policy Against Harassment

<https://online.karunya.edu/uploads/hr/policy/HRPolicyJan2023.pdf>

(a) Equal Employment Opportunity Policy

Karunya Institute of Technology and Sciences is a self-financing Christian Minority Institution. No employee or applicant will be subjected to discrimination because of race, colour, age, sex, religion, marital status, disability, military status or any other characteristic protected by law. This policy is applicable to all terms and conditions of employment, including recruitment, hiring, promotion, training assignment, evaluations, compensation and termination.

(b) Policy Against Harassment

In General Karunya Institute of Technology and Sciences is committed to provide all employees with an environment that is free of discrimination and harassment. We will not tolerate conduct that constitutes or could lead or contribute to harassment based on sex, race, colour, religion or any characteristic or status protected by law. Examples of such prohibited conduct include, but are not limited to

- Ethnic slurs
- Use of computer (including the internet and email) to view or distribute racially offensive communications
- Threatening, intimidating or hostile acts directed at a particular sex or religious group
- Harassment does not require intent to offend. Thus, inappropriate conduct meant as a joke or even a compliment can constitute prohibited harassment.

Sexual harassment

Sexual harassment is a specific type of discriminatory harassment. It includes unwelcome sexual advances, requires for sexual favors and other verbal or physical conduct of a sexual nature when:

- Submission to the action is either an explicit or implicit condition of employment
- Submission to or rejection of the action is used as a basis for employment decisions or
- Such conduct has the purpose or effect of interfering with the employee's work performance
- or creating an intimidating, hostile or offensive environment
- Prohibited conduct includes, but is not limited to:
- Unwelcome sexual flirtations, advances or propositions
- Inappropriate touching
- Graphic verbal comments about an individual's body or appearance
- The use of sexually degrading words
- The use of computers (including the internet and email) to display or distribute sexually explicit images, messages or cartoons
- In addition to the foregoing, no one with a supervisory role may at any time:

- Threaten or imply that an individual's submission to or rejection of a sexual advance will in
- any way influence any decision regarding that individual's employment, performance
- evaluation, advancement, compensation, assignments, discipline, discharge or any other
- term or condition of employment
- Make any employment decision concerning an individual on such a basis

(c) Procedures

If you believe that you or anyone else has been subjected to prohibited conduct, you are required to report the relevant facts as promptly as possible. At your option, the report can be made to your higher authority Head of the Department (HoD) / Director / Dean / Registrar / Pro-Vice Chancellor /Vice Chancellor. You should report the conduct regardless of

- The offender's position at Karunya Institute of Technology and Sciences
- The fact the offender is not employed in Karunya Institute of Technology and Sciences eg. Vendor, visitor, temporary employee. Your time report is critical in order for the Karunya Institute of Technology and Sciences to take action to stop the conduct before it is repeated.

All reports will be addressed promptly, with further investigation where needed to confirm facts or resolve dispute facts. In conducting its investigation, Karunya Institute of Technology and Sciences will strive to keep the identity of individuals making reports as confidential as possible.

Appropriate disciplinary action including unpaid suspensions and terminations will be taken against the personnel found to have violated these policies. Individuals who violate these policies may also be vulnerable to additional, personal exposure under applicable law.

(d) No Retaliation

Threats or acts of retaliation against individuals who report inappropriate conduct or participate in an investigation will not be tolerated. If you think you have been subjected to retaliation, you are obligated to use the above procedure to report the pertinent facts. The Institution will investigate and take appropriate action in the manner described above.

5.6.2 Non- discrimination Policy for transgenders

To eliminate discrimination against women in all aspects of the organization's activities, a non-discrimination policy for women and transgenders is in place which covers all areas of the organization, including recruitment, hiring, promotion, compensation, training, and work eco system.

5.6.3 Maternity and Paternity Policies

Maternity leave on full pay is granted to permanent female faculty for a period not exceeding 90 days once in service. Maternity leave can be combined with EL, half pay leave or LLP.

5.6.6 Women's Mentoring Schemes

Senior Resident Advisors and Mentors are appointed to address the needs and concerns of women students, women counsellors provide professional counselling in areas related to academics, career, health, family and relationships. Regular talks on domestic violence and abuse, legal remedy on various women related issues are being organized to sensitize women.

5.6.8 Policies protecting those reporting discrimination.

To create a safe and inclusive learning environment that is free from sexual harassment and discrimination, an Internal Compliance committee has been constituted in KITS comprising of 12 members including a Legal Consultant and a Psychiatric Specialist. Details regarding the constitution and composition of the committee, details of the e-mail IDs, contact numbers, the procedure prescribed for submitting online complaints, the regulations and internal policies are posted on the institution website. To familiarize the members with their duties, members were sponsored by the institution to attend a Safe Campus program conducted by Association of Indian Universities and Martha Farrell Foundation. Seminars and awareness programmes are regularly conducted to educate women faculty and students about the policies regarding discrimination. Workshops, awareness programmes and various competitions were held to sensitize the stakeholders of a safe working environment without any discrimination.

Scholarship Details

B. SCHOLARSHIPS FROM THE STATE GOVERNMENTS

i. Government of Tamil Nadu

Incentive Schemed for full-time Ph.D. Scholars belonging to SC/ST & Converted Christians

The Directorate of Adi-Dravidar Welfare, Government of Tamil Nadu offers Incentive to the Scholars belonging to SC / ST / converted Christian Students who pursue full-time Ph.D. programme.

ii. Government of Jharkhand

e-kalyan Scholarship to backward classes and SC/ST students from the State of Jharkhand

The Welfare Department of the Government of Jharkhand offers Post Matric Scholarship for the welfare of the students belonging to backward classes and the SC/ST who are studying outside the State of Jharkhand.

Karunya Institute of Technology and Sciences (Deemed to be University) has registered at the e-kalyan Scholarship portal for the benefit of such students from the State of Jharkhand studying in KITS.

For further details students may visit <https://ekalvan.cgg.gov.in>

II. INSTITUTIONAL SCHOLARSHIPS:


II.1. Karunya Institute of Technology and Sciences offers various scholarships from the first year and renewable for subsequent years subject to fulfilment of renewal norms:

- i) Institutional Merit Scholarships
- ii) Minority Scholarships
- iii) Scholarships to Women students
- iv) Scholarships to Siblings / wards of alumni, faculty and staff
- v) children of Ex-servicemen for MBA students
- vi) Scholarships for KITS alumni students
- vii) Scholarships to B.Tech. students who have cleared JEE (Main) examination
- viii) Scholarships to Young Innovators and Inventors

Note : The candidate is eligible for any ONE of the above scholarships.

II.2. M.Tech. (GATE scholarship for Indian Nationals & NRI / Foreign Nationals)

Scholarship	Amount	Eligibility/Renewal Criteria
M.Tech. - GATE Scholarship	GATE Stipend of ₹ 10,000 per month	valid GATE Score and CGPA inUG > 7 will be renewed every year, if the student achieves - 7.5 CGPA - No arrear - No disciplinary cases

Click here for more information 

[Scholarships | Admissions - Karunya](#)

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Click here for more information 

[Scholarships | Admissions - Karunya](#)

SCHOLARSHIPS AND AWARDS

The Office of the Student Affairs facilitates the students to apply and receive various scholarships offered by Central / State Governments and also from KITS which will be duly notified to the students through notices / e-mail / institute website.

I. GOVERNMENT SCHOLARSHIPS

Students can avail the following scholarships offered by the various Departments / Ministries of the Government of India and the details are available at the National Scholarship Portal (www.scholarships.gov.in)

A. SCHOLARSHIPS FROM THE CENTRAL GOVERNMENT

- i) Merit cum Means Scholarship & Post Matric Scholarship Scheme from the G.O.I., Ministry of Minority Affairs
- ii) Central Sector Scheme of Scholarships from the Department of Collegiate Education:
- iii) Prime Minister's Scholarship Scheme for Central Armed Police Forces and Assam Rifles from the Ministry of Home Affairs
- iv) Prime Minister's Scholarship Scheme for RPF / RPSF from the Ministry of Railway
- v) Post-matric Scholarships for Students with disabilities from the Department of Empowerment of persons with Disabilities
- vi) Financial Assistance for Education of the Wards of Beedi/Cine/IOMC/LSDM Workers – Post-Matric from the Ministry of Labour & Employment
- vii) Financial Support to the students of N.E.R. for Higher Professional Courses (NEC MERIT SCHOLARSHIP) from North Eastern Council (N.E.C.)
- viii) Ishan Uday – Special Scholarship Scheme for North Eastern Region from University Grants Commission (UGC)
- ix) Scholarships from All India Council for Technical Education (AICTE)
 - a) Pragati Scholarship Scheme for Girl Students (Technical Degree)
 - b) Saksham Scholarship Scheme for specially abled student (Technical Degree)
 - c) Swanath Scholarship Scheme (Technical Degree)
 - d) Post Graduate (PG) Scholarship Scheme for GATE qualified students – through AICTE website (www.aicte-india.org)
 - Scholarship is awarded to full time GATE/GPAT qualified students admitted to M.Tech. programs.

For further details please refer to:

(www.aicte-india.org)



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec. 3 of the UGC Act. 1956)

A CHRISTIAN MINORITY RESIDENTIAL INSTITUTION

AICTE Approved & NAAC Accredited

Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India.

Dr. A. Albert Rajan, M.E., Ph.D.,
Deputy Registrar (Student Affairs)

KU/DR(SA)/MCM/026/2021,
August 24, 2021.

NOTICE

MERIT CUM MEANS SCHOLARSHIP FOR PROFESSIONAL AND TECHNICAL COURSES TO THE STUDENTS BELONGING TO MINORITY COMMUNITIES FOR THE YEAR 2021-2022 (Fresh & Renewal)

The Ministry of Minority Welfare, G.O.I. has invited applications for *Merit Cum Means Scholarship for the academic year 2021-2022* from the students belonging to notified religious Minorities Viz. Muslims, Christians, Sikhs, Buddhists, Zoroastrians (Parsis) & Jains for **Fresh & Renewal**. [Degree or Post graduate level professional / Technical Courses]

Mode of application: online through *National Scholarship Portal (NSP)*
Website: www.scholarships.gov.in

Eligibility Criteria :

<u>Fresh</u>	<u>Renewal</u>
<ul style="list-style-type: none">❖ Students pursuing technical / professional courses❖ However, such students should have not less than 50% marks at higher secondary / graduation level / polytechnic for lateral entry.❖ <i>Selection will be done strictly on merit basis.</i>❖ Annual income of whose parents / guardian from all sources does not exceed Rs. 2.5 lakhs	<ul style="list-style-type: none">❖ Students who have been awarded Fresh Scholarship in the previous year can apply for Renewal Scholarship provided if he/ she scored not less than 50% of marks in the previous year examination with out any arrears
Last date for submission of online application : 30.11.2021	

Students are expected to upload all the required documents clearly scanned (refer annexure) for online verification by the institution.

Further, a scanned copy of the application (submitted online through NSP portal) should be sent to the Student Affairs Office through studentsection@karunya.edu for verification and record.

For further information and clarification the students shall contact Student Affairs Office .
(Ph.: 0422-2614324/2614323)


DEPUTY REGISTRAR (SA)

To
All B.Tech. / M.Tech. / M.B.A. - students through e-mail

Cc to: Dean (ET, SABS & SSAMM) and all HODs
The Registrar – for kind information



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Dr. A. Albert Rajan, M.E., Ph.D.,
Deputy Registrar (Student Affairs)

KU/DY.REG/AICTE/027/2021,
August 24, 2021.

NOTICE

AICTE – PRAGATI / SAKSHAM SCHOLARSHIP FOR THE YEAR 2021-'22

The All India Council for Technical Education has invited applications *for the following Scholarships for the academic year 2021-'22* from the students admitted into I year B.Tech. or II year B.Tech. (Lateral Entry) programs.

I. Pragati Scholarship (Exclusively for Girl Students)	
Eligibility Criteria :	Amount of Scholarship: Rs.50,000 p.a.
❖ Girl Students admitted into I year Degree or II year Degree (Lateral Entry) Technical Courses	
❖ Family Income from all sources is not more than Rs.8 lakhs per annum during the current financial year.	
❖ <i>Maximum two girl children per family are eligible</i>	
II. Saksham Scholarship for Specially Abled Students	
Eligibility Criteria :	Amount of Scholarship: Rs.50,000 p.a.
❖ Specially Abled Students admitted into I year Degree or II year Degree (Lateral Entry) Technical Courses	
❖ Family Income from all sources is not more than Rs.8 lakhs per annum during the current financial year.	
❖ <i>Specially abled student having disability of not less than 40%</i>	
Last date for submission of online application : 30.11.2021	

Mode of application: online through *National Scholarship Portal (NSP)*

Website: www.scholarships.gov.in

Students are expected to upload all the required documents clearly scanned (refer annexure) for online verification by the institution.

Further, a scanned copy of the application (submitted online through NSP portal) should be sent to the Student Affairs Office through studentsection@karunya.edu for verification and record.

For further information and clarification the students shall contact Student Affairs Office .

(Ph.: 0422-2614324/2614323)

DEPUTY REGISTRAR (SA)

To
All I B.Tech. / I B.Tech. (Lateral Entry) students - through e-mail

Cc to: Dean (ET) and all HODs of Engg. Departments
Cc to: The Registrar – for kind information



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved

NAAC A++ Accredited



Times Higher Education
Impact Rankings



6.1 Research on water

6.1 Genesis of Water Institute of KITS

Karunya Institute of Technology and Sciences (KITS) identified four thrust areas of societal importance in 2008, namely water, food, healthcare, and sustainable energy.

The Water Institute (WI) was established at KITS in 2008 as a flagship programme to encourage interdisciplinary research aiming at scientific water management and to ensure water security, especially in the semi-arid zone. WI was initiated keeping in view the MDGs, the focus of which shifted to SDGs in 2016. The Dublin Conference-1992, Rio Conference-1992 and Johannesburg Conference-2012, and the initiatives of GoI, namely the National Drinking Water Mission and WAR for Water, prompted by the Supreme Court of India, motivated KITS to focus on water. The WI gained significance with more areas coming under water stress or water scarcity in India. The water initiative of KITS succeeded in bringing together the faculty and students of different Departments - arts, science, agriculture, engineering, and management and the alumni on a single platform to focus on interdisciplinary research in multifarious areas in the water sector. As an outcome of the effort, several projects, papers, products, consultancy, capacity building and extension activities emerged. Karunya also could play a role in the policy formulation in the water sector of international agencies and national, state and local governments.

6.2 Interdisciplinary Research Team

An interdisciplinary group of 75 faculty and other staff members and a large cross-section of students are involved in water research and extension activities at KITS. More than 100 papers on the theme of water have been published in Scopus/WoS indexed journals. Around 12 patents have been filed; one of them is filed in collaboration with Ben-Gurion University and another with Cape Breton University. There are around 100 *alumni* collaborating with their *alma mater* in activities pertaining to water. The interdisciplinary teams meet frequently and formulate interdisciplinary water related activities.



6.3 Infrastructure for Research and Consultancy

To carryout academic and research activities in the are of water, four laboratories have been established in the water treatment areas of hydrology, water quality testing, central instrumentation and computational and simulation. The laboratories have been provided with sophisticated instruments and software such as Atomic Absorption Spectrophotometer (AAS), Total Organic Carbon (TOC) analyser, UV spectrophotometer, Ion Chromatography, BET Analyser, table coater for membrane preparation, flow cells, automatic weather station, ocean current meter, electrical resistivity meter, hydrometeorological sensors, iGIS software for GIS and remote sensing applications and FEFLOW for groundwater flow and contaminant transport modeling. In addition to that sophisticated instrument such as NMR, FTIR, SEM, AFM, XRD,

EDX, HPLC, GC testing and characterization facilities are available in Centre for Nanotechnology, Department of Chemistry and Department of Biotechnology.

ACADEMIC AND RESEARCH INFRASTRUCTURE



Atomic Absorption Spectroscopy



SEM



Total Organic Carbon Analyser



HPLC

- Water Quality Testing Lab
- Central Instrumentation
- Hydrology Lab
- Microbiology Lab



NMR- spectroscopy



XRD Unit

- Electrochemical Lab
- Advanced Analytical Lab
- Algal Biomass Lab
- Nanomaterials Research Lab



Spray Pyrolysis



FT-IR Spectrophotometer



UV Spectrophotometer



6.4 Externally Funded Projects (Completed / Ongoing)

During the 2021-2022, three external funded project with total outlay of more than Rs.10 Million, most of which are funded by DST and MoEF&CC. The faculty members of Karunya, under the umbrella of WI, have taken up consultancy assignments worth around Rs.10 Million from international agencies like Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Wetlands International - South Asia (WISA) and motion study for MGNREGA works (mainly on soil and water conservation and agriculture). The methodologies and models evolved can be replicated in other parts of the country. The details are given below.

S. No	Title of the Project	Funding Agency	Duration	Grant	Status
1	Nano bio remediation of textile industrial effluent in Tirupur District, Tamil Nadu	Ministry of Environment Forests & Climate Change (MoEFF& CC)	2016-2021	Rs.4.2 Million	Completed
2	A Novel TiO ₂ coated Aluminium Electrode (TiO ₂ /Al) for treatment of textile dyeing wastewater using real time controlled multichannel electrocoagulation process	Water Technology Initiative, Department of Science and Technology, GoI	2017-2022	Rs3.70 Million	Completed
3	High performance integrated two-stage electrochemical technology for recovery of water from electroplating effluent with real time monitoring and control system	Demonstration of Lab Scale Project, TMD, DST, GoI	2020-2023	Rs. 4.32 Million	Ongoing
4	Ramsar Regional Convention - East Asia	Ramsar Regional Convention - East Asia	2023 - 2024	Rs.0.9 Million	Ongoing

Funded Consultancy Projects

S.No	Client	Title of the Project	Duration	Grant
1	German Development Cooperation, GIZ office New Delhi	Hydro-ecological assessment for Integrated Management of Point Calimere Ramsar site	2020-2021	Rs. 4.3 Million
2	National Institute of Rural Development and Tamil Nadu Government (DRDPR)	Time and Motion Study for Estimating Schedule of Rates for MGNREGA	2021- 2022	Rs. 5.2 Million

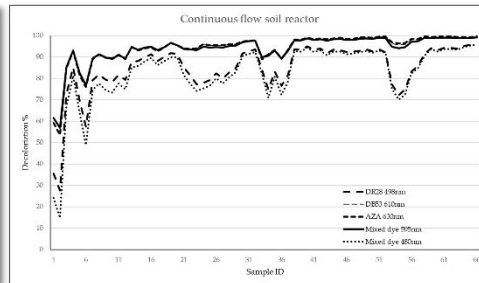
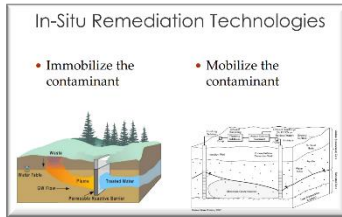


IN-SITU BIOREMEDIATION OF TEXTILE DYEING EFFLUENT (Phase 1)

Funded by Ministry of Environment, Forests & Climate Change (MoEF&CC), GoI

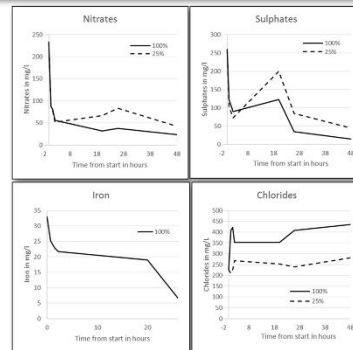
Project Outlay (Phase 1-3) : ₹ 43.24 Lakh

Performance of mixed microbial culture isolated from STPs on Campus and Textile Dyeing Units in the decolourisation of dye using flow cells



HIGHLIGHTS

- ❖ The domestic sewage treatment plant in KITS is a viable source of mixed microbial culture for biodegradation of textile effluent
- ❖ Mixed microbial culture-mediated in-situ bioremediation is a feasible solution to clean-up textile dye contaminated soil-aquifer systems



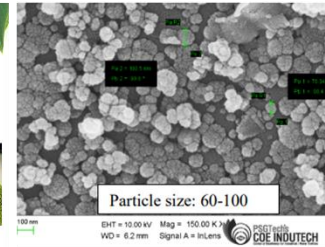
ECO-FRIENDLY HYDROGELS FOR BIOREMEDIATION (Phase 2)

Funded by Ministry of Environment, Forests & Climate Change (MoEF), GoI

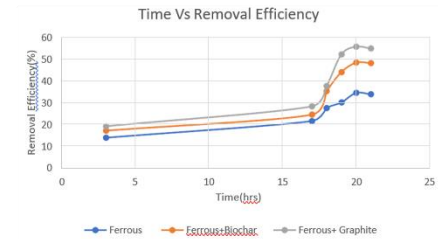
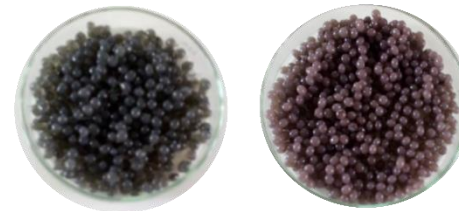
Project Outlay (Phase 1 -3) : ₹ 43.24 Lakh

OBJECTIVE

Performance evaluation study of nano-adsorbents encapsulated alginate beads (hydrogels) in dye removal



Types of Beads	Colour Removal Efficiency (%)
Moringa Magnetite beads	73.25
Pomegranate Magnetite beads	93.72
Tea Magnetite beads	71.56
Mosambi Magnetite beads	81.34



HIGHLIGHTS

- ❖ Magnetite nanoparticles prepared using Ferrous sulphate, Biochar and Graphite showed high specific capacitance leading to more adsorption
- ❖ Under the optimized experimental conditions, the cationic dye removal efficiency of 93.72% by Pomegranate magnetite nanoparticle was achieved which has proven to be efficient and environment friendly adsorbent

PUBLICATION



Nano Bioremediation of Textile Dye Effluent using Magnetite Nanoparticles Encapsulated Alginate Beads

A. Lincy ^{1*}, P. Jegathambal ¹, Martin Mkdandawire ², Stephanie MacQuarrie ²

¹Water Institute, Karunya Institute of Technology and Sciences, Coimbatore, India
²Department of Chemistry, Cape Breton University, Nova Scotia, Canada

Received: 02/04/2020 Accepted: 12/06/2020 Published: 20/09/2020



PERFORMANCE OF TiO₂/Al & MILD STEEL ELECTRODES IN REMOVAL OF INDUSTRIAL TEXTILE DYES

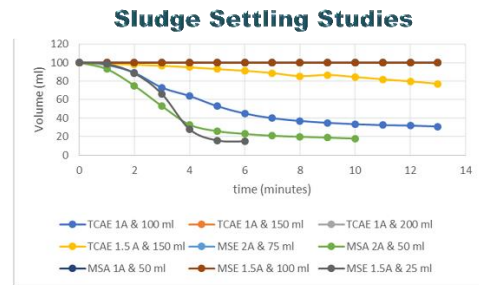
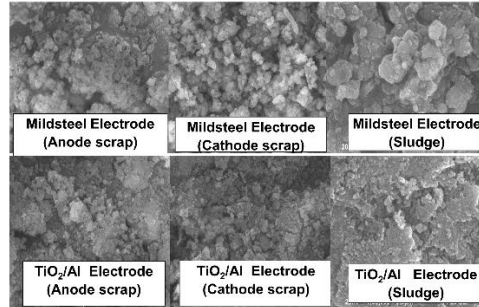
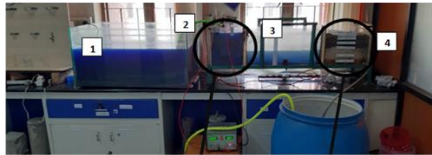
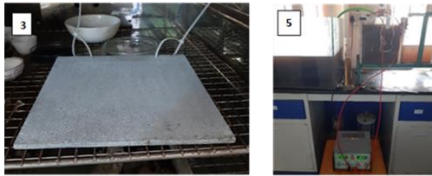
Funding Agency: Department of Science & Technology, Water Technology Initiatives, GoI

Project Outlay : ₹ 37.096 Lakh



OBJECTIVE

Evaluate the performance of modified electrode in dye removal using multichannel baffle type continuous flow electro-coagulation reactor



HIGHLIGHTS

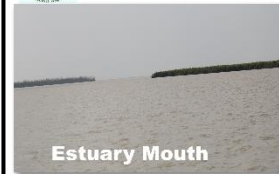
- ❖ 95.1% and 92.1% dye removal efficiency using Ti coated Al electrode and MS electrode
- ❖ 60% reduction in COD level at neutral pH.
- ❖ Removal of dye by metal hydroxide flocs - confirmed by SEM and XRD studies

HYDRO-ECOLOGICAL ASSESSMENT FOR INTEGRATED MANAGEMENT OF POINT CALIMERE



Consultancy Outlay : ₹ 42.690 lakh

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH



KEY CHALLENGES

- ❖ Increase in water spread area in Muthupet Estuary due to siltation
- ❖ Decline in migration of Water birds in the Bird Sanctuary due to interfering Salt Pans
- ❖ Lack of freshwater inflow into Estuary
- ❖ Reduction in Estuary Mouth
- ❖ Pollution due to increase in aquafarms



RECOMMENDATIONS



- ❖ Flow of 10 m³ /s to be maintained in the Estuary for healthy mangroves
- ❖ Aquaculture farms - to be restricted within 500 m from the existing water sources
- ❖ 10 m³ /s flow to be made available to Mulliyar, Valavanar and Marakkakoraiyar to bring down the salinity levels
- ❖ Bringing down the number of large-scale salt production by companies

Research Publication by KITS in the Area of Water and Wastewater

Authors	Title	Year	Journal	Volume	Issue
Rose L.; Mary X.A.; Johnson I.; Srinivasan G.; Priya L.; Bhagavathsingh J.	Polyaza functionalized graphene oxide nanomaterial based sensor for Escherichia coli detection in water matrices	2021	Scientific Reports	11	1
Mariappan S.; Issac R.	Removal of heavy metals from textile industries with natural adsorbents	2022	Journal of Current Science and Technology	12	2
Tahir U.; Yasmin A.	Decolorization and discovery of metabolic pathway for the degradation of Mordant Black 11 dye by Klebsiella sp. MB398	2021	Brazilian Journal of Microbiology	52	2
Shabbirahmed A.M.; Haldar D.; Dey P.; Patel A.K.; Singhanian R.R.; Dong C.-D.; Purkait M.K.	Sugarcane bagasse into value-added products: a review	2022	Environmental Science and Pollution Research		
Murmu A.; Sevanan M.	Modern bioremediation approaches for clean and green environment	2021	Strategies and Tools for Pollutant Mitigation: Avenues to a Cleaner Environment		
Deepthi V.; Sebastian A.; Vidhya B.	Influence of precursors and formation of heterostructures towards the enhanced photocatalytic activity of ZnO thin films deposited by spray pyrolysis	2022	Journal of Materials Science: Materials in Electronics	33	31
Debnath B.; Haldar D.; Purkait M.K.	Environmental remediation by tea waste and its derivative products: A review on present status and technological advancements	2022	Chemosphere	300	
Chidaraboyina S.; Nesaraj A.S.; Arunkumar M.	Facile Chemical Synthesis of Pure Cu doped CeO ₂ Nanoparticles: Evaluation of	2022	Asian Journal of Chemistry	34	12



	Fundamental Properties and Photocatalytic Activity on Rhodamine B Dye				
Karunya S.; Prakas S.J.; Prathapatim G.; Shaik F.	Application of response surface methodology for optimizing processing conditions for the adsorption of pollutants from refinery effluent of Oman	2021	Research Journal of Biotechnology	16	2
R. S.; Jebasingh J.A.; S. M.V.; Stanley P.K.; Ponmani P.; Shekinah M.E.; Vasanthi J.	Excellent Photocatalytic degradation of Methylene Blue, Rhodamine B and Methyl Orange dyes by Ag-ZnO nanocomposite under natural sunlight irradiation	2021	Optik	231	
Mohanty S.S.; Das A.P.	A Systematic Study on the Microbial Degradation of Glyphosate: A Review	2022	Geomicrobiology Journal	39	03-May
Satpathi N.S.; Hoque S.Z.; Nampoothiri K.N.; Malik L.; Mirkale K.; Desu H.; Narendran G.; Sen A.K.	Applications of Microfluidics	2022	Microfluidics and Multi Organs on Chip		
Gollakota A.R.K.; Munagapati V.S.; Gautam S.; Wen J.-C.; Shu C.-M.	Hydrothermal tuning of morphology of aluminophosphate (AlPO-14) framework for the adsorption of Rhodamine 6G dye	2021	Advanced Powder Technology	32	8
Ceretta M.B.; Nercessian D.; Wolski E.A.	Current Trends on Role of Biological Treatment in Integrated Treatment Technologies of Textile Wastewater	2021	Frontiers in Microbiology	12	
Kenawy E.-R.; Shabaka A.A.; Abou-Zeid A.M.; Hassouna M.S.; Elhiti M.A.	Silica-based nano-adsorbent for enhancement of bacterial biodegradation of methylene blue dye	2021	Desalination and Water Treatment	241	
Gandi S.S.; Gandhi S.; Parne S.R.; Lakavat M.; Lakkimsetty N.R.; Gedda G.	Bio-Inspired C/N/TiO ₂ Hybrid Composite Heterostructure: Enhanced Photocatalytic Activity under Visible Light	2022	Journal of Nanotechnology	2022	



Thamaraiselvan C.; Lau W.-J.	Nanofiltration of Textile Dye Effluent	2021	Nanofiltration: Principles, Applications, and New Materials: Volume 1 and 2	01-Feb	
Jose V.; Jose V.; Christy C.F.; Nesaraj A.S.	Development of Perovskite Based Electrode Materials for Application in Electrochemical Supercapacitors: Present Status and Future Prospects	2022	Asian Journal of Chemistry	34	3
Philus C.D.; Mahanty B.	Dynamic modelling of tetrazolium-based microbial toxicity assay—a parametric proxy of traditional dose-response relationship	2021	Environmental Science and Pollution Research	28	33
Barik M.; Das C.P.; Raut S.; Mahanty B.; Sahoo N.K.	Effect of Culture Condition and Growth Kinetics on Phenol Biodegradation by an Indigenous Rhodococcus pyridinivorans Strain PDB9T NS-1	2022	Geomicrobiology Journal	39	03-May
Kishor R.; Raj A.; Bharagava R.N.	Synergistic role of bacterial consortium (RKS-AMP) for treatment of recalcitrant coloring pollutants of textile industry wastewater	2022	Journal of Water Process Engineering	47	
Sivakumar A.; Bagath Singh N.; Arulkirubakaran D.; Praveen Vijaya Raj P.	Prediction of Equipment Effectiveness using Hybrid Moving Average-Adaptive Neuro Fuzzy Inference System (MA-ANFIS) for decision support in Bus Body Building Industry	2022	Anais da Academia Brasileira de Ciencias	94	
Somu P.; Singh V.; Paul S.	Effective removal of proteins using carbon-based nanoadsorbent: relevancy to the application of membrane-driven pre-water treatment	2021	Journal of Chemical Technology and Biotechnology	96	7



Krishnan S.K.; Subbiah K.; Kalivel P.; Subramanian K.	Degradation of azo dye RED ME4BL treated with immobilised bimetallic zero-valent iron nanoparticles doped with palladium	2021	International Journal of Environmental Analytical Chemistry		
Ceretta M.B.; Irazoqui J.M.; Pérsico M.M.; Nercessian D.; Wolski E.A.	Population dynamics of microbial native consortia efficient for textile wastewater degradation	2022	Environmental Science: Water Research and Technology	8	5
Kasipandian K.; Saigeetha S.; Samrot A.V.; Abirami S.; Emilin Renitta R.; Dhiva S.	Bioelectricity production using microbial fuel cell—a review	2021	Biointerface Research in Applied Chemistry	11	2
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Thathapudi J.J.; Raj R.S.D.P.; Anbu G.L.; Jobin J.; Shepherd R.; Somu P.	Ammonification in the oral microbiome with plausible link to diet and health and their systemic role in the salivary entero-nitrate channel—A reality or farce	2022	Development in Wastewater Treatment Research and Processes: Microbial Ecology, Diversity and Functions of Ammonia Oxidizing Bacteria		
Arunkumar M.; Samson Nesaraj A.	One pot facile chemical synthesis of Mn doped ZnAl ₂ O ₄ nanostructured spinel materials for efficient photocatalytic degradation of malachite green dye under visible light irradiation	2021	Inorganic and Nano-Metal Chemistry		
Pandiyaraj V.; Murmu A.; Pandey S.K.; Sevanan M.; Arjunan S.	Metal nanoparticles and its application on phenolic and heavy metal pollutants	2021	Physical Sciences Reviews		



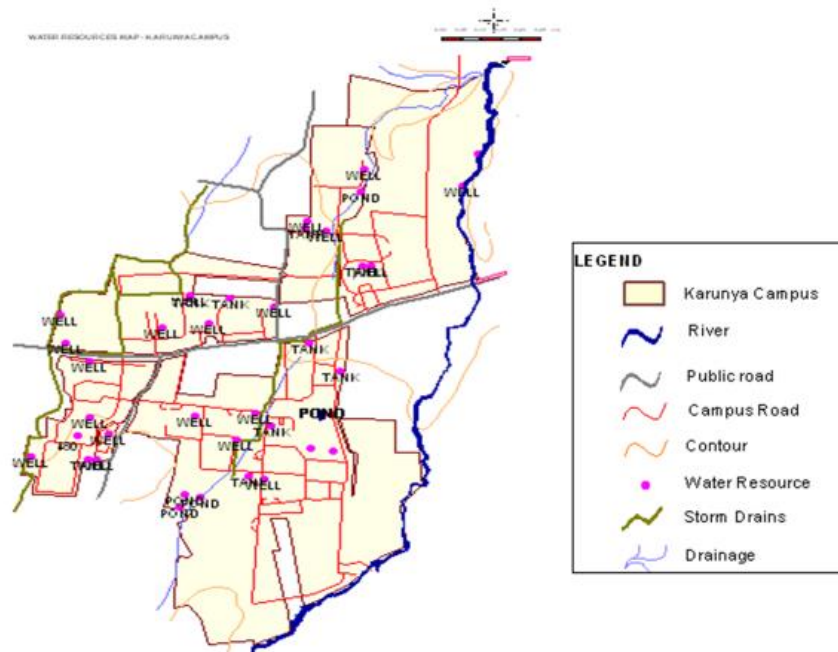
Arunkumar M.; Nesaraj A.S.	One pot chemical synthesis of ultrafine NiAl ₂ O ₄ nanoparticles: physico-chemical properties and photocatalytic degradation of organic dyes under visible light irradiation	2021	Inorganic and Nano-Metal Chemistry	51	6
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6.2 Water consumption per person

6.2.1 – Measurement of Volume of Water Used

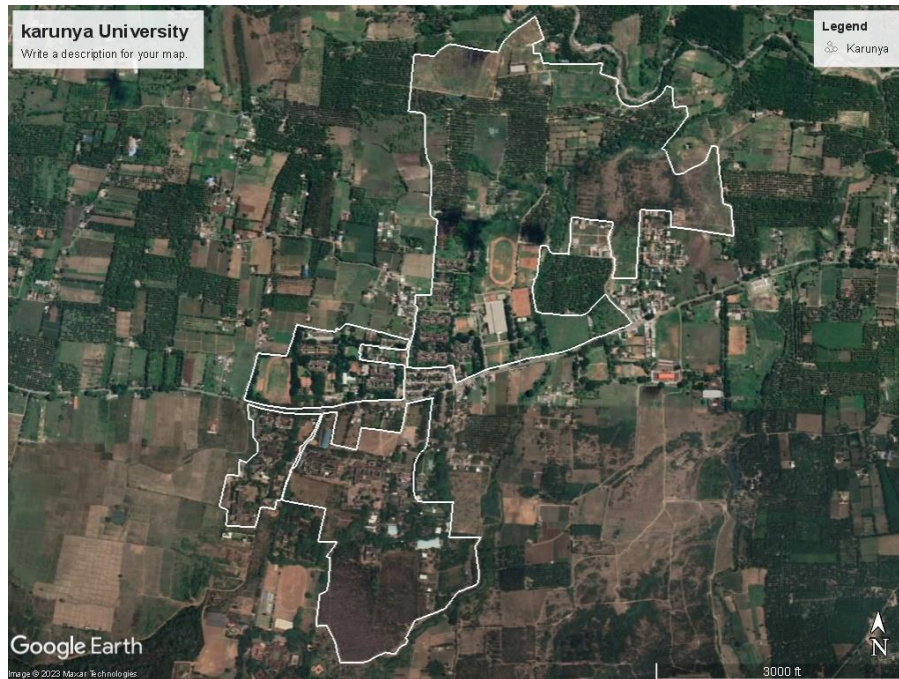
- Karunya Institute of Technology and Sciences (KITS), comprises of 17 departments, accommodating a total of 7625 students and 661 faculty and staff members.
- It's a fully residential campus with 15 hostels for both girls and boys, along with 17 apartment complexes (quarters) that house approximately 500 faculty and staff.
- Additionally, the School of Agriculture and Biosciences utilizes a vast expanse of 329 acres of agricultural land for their academic pursuits, research endeavours, and community development initiatives.

There are 5 open wells and 23 bore wells on campus supplying water to 177 storage tanks which meet the water demand of the students, faculty and staff.



Location of Water Resources (wells and tanks)

Layout of the campus with areas earmarked for university, student hostels, staff quarters and the agriculture farm



Sources of Water Supply:

- **Groundwater:** 95% of water supply from aquifers to meet the demand in campus
- **Potable water supply from Siruvani reservoir:** For drinking purpose
- **Desalinated Water using RO plants:** For cooking and drinking.
- **Ferrocement -based roof top water harvesting structure and recycled water from STP units in the student's hostel:** For gardening and irrigation.

Measurement of Volume of Water Supply and Consumption:

Water demand in the campus and hostels are met by above five sources of water supply. The measurement of volume of water supply and consumption is done in the following ways:

- **Water Supply measurement:** Based on the information on the motor power, pumping time for each tank, and building height the flow of water into each tank is determined.
- **Water demand calculation in academic blocks and hostels:**



- The volume of water used by the students in the hostel, was obtained by conducting a semi-structured interview covering details such as the amount of water used for bathing, washing clothes, flushing, drinking, and other minor uses.
- A semi-structured interview survey was conducted at the university campus, covering all demand sites including the canteen and construction sites during working hours, and laboratory staff to assess water consumption for laboratory purposes.
- **Flow meters** have been installed *at the inlet of the sewage treatment plant to measure inflow into the collection tank and at the outlet to measure the reuse water* for gardening and irrigation.
- **Flow meters** have been installed in both *intake and delivery points of RO plants* to measure the volume of treated water being used drinking and cooking.

Description:

a. Water supply from subsurface (groundwater) and Siruvani Reservoir / Water Treatment Plant through storage tanks:

The water demand of the campus is met from available surface and groundwater resources (through 23 bore wells, 5 open wells, storm water storage in the campus and through the Siruvani water supply scheme).

Water distribution

Water is supplied from all the sources simultaneously to have 24 hours continuous supply of water in the whole campus. The main components of the water distribution system are:

- ☛ Main water supply sources
- ☛ Pump house
- ☛ Primary pipelines
- ☛ Overhead tanks
- ☛ Secondary pipelines
- ☛ End users



Details of Over Head Tank and Under Ground Sumps for Water Supply

S.No.	LOCATION	CAPACITY (Litres)
EVANGILINE Hostel		
1	EVR WEST TANK 1-A	18770
2	EVR 1-B	27602
3	EVR 2-A	17665
4	EVR 2-B	28706
5	EVR 3-A	18770
6	EVR 3-B	27602
7	EVR EAST 1-A	18770
8	EVR 1-B	27602
9	EVR 2-A	18770
10	EVR 2-B	28706
11	Oprah SIRUVANI-A NORTH	18770
12	Oprah SIRUVANI-B	28706
13	Oprah BOREWELL 1-A	27602
14	Oprah BOREWELL 1-B	18770
15	Oprah BOREWELL 2-A	27602
16	Oprah BOREWELL 2-B	18770
17	EVR SUMP-BOREWELL-A	54143
18	EVR SUMP-BOREWELL-B	54143
19	EVR SUMP-SIRUVANI	23780
SUNDRARAJ Hostel		
20	SRR 1-A	16646
21	SRR 1-B	15457
22	SRR 2-A	16646
23	SRR 2-B	14491
24	SRR B-BLOCK -1	20383
25	SRR B-BLOCK -2	20383
26	SRR B-BLOCK SIRUVANI	14013
27	SRR SINTEX OHT	3000
P R GARG BLOCK		
28	P R GARG BLOCK-1	19109



29	P R GARG BLOCK-2	18154
30	P R GARG SINTEX	3000
DAKSHINAMOORTHY BLOCK		
31	DMR BLOCK 1-A	19969
32	DMR BLOCK 1-B	19969
33	DMR BLOCK 2-A	19969
SEVUGAPANDIAN Hostel		
34	DMR BLOCK SINTEX	5000
35	DMR BLOCK 2-B	19969
36	DMR SUMP SINTEX	5000
37	DMR SUMP -1	55035
38	DMR SUMP -2	56754
39	DMR SUMP -3	55035
EDWARD GEORGE Hostel		
40	SEVAGA PANDIAN BLOCK-1-A	13249
41	SEVAGA PANDIAN BLOCK-1-B	7006
42	SEVAGA PANDIAN BLOCK-2-A	13279
43	SEVAGA PANDIAN BLOCK-1-B	7006
44	SEVAGA PANDIAN SIRUVANI SUMP	55035
45	SHOPPING COMPLEX	4076
FATHER DURAISAMY Hostel		
46	EGR SIRUVANI-A	10829
47	EGR SIRUVANI-B	10829
48	EGR BOREWELL-WEST	16561
49	EGR BOREWELL-EAST(3.5X4X2)	17100
50	LUKE BLOCK-A	20242
51	LUKE BLOCK-B	15287
52	MATHEW BLOCK-A	20242
53	MATHEW BLOCK-B	16561
54	FDR SUMP-1	70067
55	FDR SUMP-2	36435
56	FDR EXTENSION	5000
57	FDR EXTENSION	5000



GROUND SIRUVANI SUMP		
58	SUMP-1	36435
59	SUMP-2	35331
60	SUMP-3	36435
JHONSON VICTOR Hostel		
61	JVR EAST BOREWELL-A	19817
62	JVR EAST BOREWELL-B	15854
63	JVR WEST BOREWELL-A	19817
64	JVR WEST BOREWELL-B	15854
65	JVR WEST SIRUVANI-EAST	5096
66	JVR WESTSIRUVANI-WEST	5096
67	JVR SIRUVANI SUMP-1	50958
68	JVR SIRUVANI SUMP-2	50958
69	JVR BOREWELL SUMP-1	52338
70	JVR BOREWELL SUMP-2	50958
JERRY MANUAL Hostel		
71	JMR EAST-A	19817
72	JMR EAST-B	15854
73	JMR WEST-A	19817
74	JMR WEST-B	15854
75	JMR EAST-SIRUVANI	5096
76	JMR WEST-SIRUVANI	5096
77	JMR – RESIDENCE	7079
78	JMR – RESIDENCE	7079
BOBARAJ Hostel		
79	BOBARAJ RESIDANCE- EAST-A	19817
80	BOBARAJ RESIDANCE- EAST-B	15854
81	BOBARAJ RESIDANCE- WEST- A	19817
82	BOBARAJ RESIDANCE- WEST- B	15854
83	BOBARAJ RESIDANCE- EAST SIRUVANI	4812
84	BOBARAJ RESIDANCE- WEST SIRUVANI	5096



BETHANI Hostel		
85	BETHANI RESIDANCE-EAST A	21303
86	BETHANI RESIDANCE-EAST B	16844
87	BETHANI RESIDANCE-WEST A	21303
88	BETHANI RESIDANCE-WEST B	16844
89	BETHANI RESIDANCE-EAST SIRUVANI	5096
90	BETHANI RESIDANCE-WEST SIRUVANI	5096
M	MESS- JMR CAMPUS	
91	BOREWELL SUMP	29428
92	SIRUVANI SUMP	14169
93	LABOUR QTR SINTEX	5000

S.No.	LOCATION	CAPACITY (Lit)
HEBZIBA & ANGELINA Hostel		
94	HEBZIBA EAST OHT	20242
95	HEBZIBA WEST OHT	23780
96	HEBZIBA SINTEX	5000
97	HEBZIBA SUMP	50732
98	HEBZIBA SUMP SINTEX	5000
99	ANGILINA OHT	33689
COLLEGE CAMPUS		
100	PRODUCTION OHT	23780
101	BIOTECH OHT	20383
102	MAIN BLDG-REGISTRAR OFFICE	16816
103	MAIN GATE SUMP-A	35883
104	MAIN GATE SUMP-B	35884
105	MAIN GATE SUMP-SIRUVANI	23554
106	S&H SIRUVANI SUMP	63761
107	S&H SUMP	64773
108	S&H OHT	32203
109	S&H OHT	16349
110	MECH SINTEX	3000



111	IT BLOCK OHT	17198
112	IT BLOCK SIRUVANI SINTEX OHT	2000
113	IT BLOCK SIRUVANI SINTEX GROUND	2000
114	LIBRARY OHT	14013
115	CIVIL DEPT OHT	23441
116	NEW CIVIL OHT	8493
117	CHELLADURAI Bldg SIRUVANI	17446
118	CHELLADURAI Bldg BOREWELL	24290
119	CHELLADURAI Bldg EAST-A	23780
120	CHELLADURAI Bldg EAST-B	23780
121	LIBRARY SINTEX-2	4000
122	AUDITORIUM OHT-1 (Indoor) DGS Centre	10192
123	AUDITORIUM OHT-2 (Indoor) DGS Centre	10829
QUARTERS		
124	ELIM OHT-A	4530
125	ELIM OHT-B	5662

S.No.	LOCATION	CAPACITY (Lit)
126	CANNON-A	6341
127	CANNON-B	2718
128	ELIM SUMP BOREWELL	11961
129	ELIM SUMP SIRUVANI	5520
130	BETHAL OHT BOREWELL	4530
131	BETHAL OHT SIRUVANI	2718
132	ALPHA OHT BOREWELL	2803
133	ALPHA OHT SIRUVANI	1592
134	BETHAL SUMP BOREWELL	11041
135	BETHAL SUMP SIRUVANI	5520
136	CARMEL OHT BOREWELL	9625
137	CARMEL OHT SIRUVANI	8663
138	KIDRON OHT BOREWELL	8153
139	KIDRON OHT SIRUVANI	4076
140	CARMEL SUMP-A	9710
141	CARMEL SUMP-B	9711
142	HEBRON OHT	10191



143	FRANKECENSE Quarters	9085
144	SUMP-1	31053
145	SUMP-2	30915
146	ZION RESIDENCE SIRUVANI OHT	5980
147	ZION RESIDENCE OHT	5980
148	ZION RESIDENCE SUMP	4048
149	SINAI QUARTERS SUMP-1	29626
150	SINAI QUARTERS SUMP-2	26208
151	SINAI QUARTERS SUMP-3	18232
152	SINAI QUARTERS OHT	8153
153	SINAI QUARTERS OHT	7700
154	TABOR QUARTERS OHT	3288
155	TABOR QUARTERS OHT	9746
156	PAT ROBINSON QUARTERS SINTEX	3000
157	PAT ROBINSON QUARTERS SINTEX	3000
158	PAT ROBINSON QUARTERS SINTEX	3000
159	HA1 QUARTERS	10873
160	HA2 QUARTERS	10873
161	HA3 QUARTERS	10873
162	HA4 QUARTERS	10873
GUEST HOUSE CAMPUS		
163	BANK OHT	15924
164	POST OFFICE SINTEX	1000
165	G.H. TANK	28992
166	LABOUR QUARTERS-1	2000
167	LABOUR QUARTERS-2	2000
168	SUMP-1	14332
169	SUMP-2	17198
170	BETHSTHA OHT -BOREWELL	56283
171	BETHSTHA OHT -SIRUVANI	11237
R	HOSPITAL CAMPUS	
172	SIRUVANI-OHT	3185
173	BOREWELL-OHT	3185
174	SUMP-SIRUVANI	6936
175	CARE HOME -1	5000



176	CARE HOME -2	5000
177	CARE HOME	500

Water demand calculation in University Campus

A semi-structured interview survey was conducted at the university campus, covering 19 demand sites including the canteen and construction sites. The survey involved students, staff, and workers to determine their water demand during working hours, and laboratory staff to assess water consumption for laboratory purposes, drinking, wash rooms, cleaning and leakage. The average water demand for above purposes is 20 lpcd.

Water demand calculation in hostels

To determine the water demand of each hostel, a semi-structured interview was conducted in each hostel, covering details such as the amount of water used for bathing, washing clothes, flushing, drinking, and other minor uses. The amount of water required for flushing and bathing was calculated based on buckets of water, while drinking water was calculated based on bottles of water, with one bottle equalling one litre and one bucket equalling 15 litres. The calculation was only conducted for the ladies' hostel, and all minor water uses were considered. Additionally, the water consumption in each hostel mess was calculated by surveying the mess workers, considering the number of people in each mess, including the mess workers who also reside in the hostel.

Model Calculations (DEMAND)

SRR old block	Bathing in Lit/day	Washing in Lit/day	Drinking in Lit/day	Flushing in Lit/day	Others in Lit/day	Total in Lit/day
1	45	60	3.5	40	3	151.5
2	45	43	2.5	45	4	139.5
3	45	25	2	42	4.5	118.5
4	30	15	2	28	5	80
5	30	17	1.5	35	3	86.5
6	30	15	2	35	2	84
7	22.5	45	3	28	2.5	101
8	45	45	1	45	2	138
9	45	15	1	35	2.5	98.5
10	37.5	30	3	45	3	118.5
Total						1116
Per Capita Consumption						

**111 Lpcd
– 120
lpcd**

Water Supply Calculation

The University's maintenance department assists in conducting the water supply calculation by providing information on the motor power, pumping time for each tank, and building height. Utilizing this data, the flow of water into each tank was determined. The hostel line and residential line have separate pumping schedules, with dedicated pumps for each line. In the campus and ladies' hostel, predominantly 10Hp pumps are utilized, while the JMR hostel for boys employs a 20Hp pump for water supply. The pump house is staffed by three workers who operate on an 8-hour shift. They are responsible for operating all the pumps and maintaining a logbook. The logbook records the working hours of each pump, which was analyzed to calculate the pumping time and subsequently determine the water supply.

The pumping schedule in the ladies hostel (Adjacent to opera block) in the first shift is shown below:

1. Mess block to tank : 7.00 am – 9.00 am
2. SPR block to tank : 7.00 am – 9.00 am
3. SRR extension block to tank : 7.15 am – 4.45 pm
4. A block to tank : 7.15 am – 7.40 am
5. B block to tank : 7.15 am – 8.20 am
6. Kidran block to sump : 11.00 am – 2.00 pm
7. S & H bore to sump : 11.00 am – 9.00 pm
8. DMR bore to sump : 12.00 pm – 2.00 pm
9. PRG block to tank : 7.30 am -9.45 am
10. DMR block to tank : 8.00 am – 10.30am
11. Kidran quarters to siruvani tank : 9.30 am – 10.30 am
12. Carmel quarters to siruvani tank : 9.30 am -10.15 am
13. Carmel quarters to tank : 9.30 am – 11.00 am
14. Mess block to tank : 10.45 am – 1.40 pm
15. SRR extension block to tank : 11.00 am -11:40 am
16. Mess block to siruvani tank : 11.00 am -11.45 am
17. SPR block to tank : 11.00 am – 2.00pm
18. PRG block to siruvani tank : 11.00 am – 11.15 am
19. A & B block to tank : 11.00 am – 12.00 pm
20. S&H bore to sump : 11.00 am – 2.00 pm
21. Carmel quarters to tank : 1.15 pm – 1.30 pm



By using these pumping hours and the power of pump and height of overhead tanks the amount of water being pumped into the tank was Type equation here. calculated.

Model Calculations (Water Supply)

Angelina Tank:

1.30 hours (9:00 am to 10:30 am)

FDR Tank:

1.45 hours (10:00 am to 11:45 am)

EGR Tank:

0.45 hours (10:15 am to 11:00am)

Hepzibah Old Tank

1.00 hours (11:00 am to 12:00 pm)

Water supply can be calculated by using the equation

$$P_{whp} = \frac{Q \times h \times \rho}{3960}$$

Where P_{whp} – water horsepower (whp)

Q – Flow (gallon per minute)

h –head (ft)

ρ – Specific gravity of water

Since 2019, in University campus, the wireless water level controller operating through modbus communication system has been installed for automatic valve control at the inlet of the sump and over head storage tanks. This helps in avoiding overflow of water and power consumption of the motor there by wastage of water and energy is prevented

b. Rainwater Harvesting Structures:

During monsoon season, the volume of water collected from terrace of each building is calculated using the terrace area and the depth of rainfall over the area. The water collected over the terrace is directed to augment the groundwater through soak pits located in each of the building.

Ferrocement Storage Tank (Partially underground)

In the campus, a roof top rainwater structure (with capacity of 25,000 litres) made of ferrocement has been installed to collect the storm water from the roof of administrative block with an area of 1900 sq. m. The rain water that is being collected in the tank is supplied for washing purposes in the same block.



Soak Pit (Groundwater Recharge)

Around 33 soak pits (3 m depth with 1.8 m diameter) are used to harvest roof top water, which are located in front / behind the academic departments and student hostels. These structures improve the groundwater recharge in the campus and augment the groundwater potential. The details of locations of these structures and the area of catchment are furnished along with photographs.

Location of Rain Water Harvesting System in KITS Campus		
Sl.No	Location	Area of Terrace
1	Behind Administrative Block	1900 m ²
2	Adjacent to Administrative Block	
3	Adjacent to Aerospace Lab	278 m ²
4	Adjacent to Old Bio Tech Block	766 m ²
5	Adjacent to Ebenezer Auditorium	1,100 m ²
6	Adjacent to CST Department	1,247 m ²
7	Adjacent to Elohim Auditorium	450 m ²
8	Adjacent to Mechanical Lab	2960 m ²
9	Adjacent to Civil Department	2812 m ²
10	Adjacent to Civil Lab	
11	Adjacent to Mechanical Workshop	2,218 m ²
12	Adjacent to Food Processing Lab	4,277 m ²
13	Adjacent to Computer Centre	1,023 m ²
14	Adjacent to S & H Block	5,590 m ²
15	Adjacent to Visitor Waiting Hall - LH	150 m ²
16	Adjacent to Old DMR Dinning Hall	600 m ²
17	Adjacent to Sewage Treatment Plant - LH - EVR	2,814 m ²
18	Adjacent to Sewage Treatment Plant - LH - SRR Extn	1,502 m ²
19	Adjacent to Oprah Residence	1,800 m ²
20	Adjacent to Sundaraj Residence	1,600 m ²
21	Adjacent to Sevagapandian Residence	1,306 m ²
22	Adjacent to PRGR Residence	1,910 m ²
23	Adjacent to DMR Residence	1,609 m ²
24	Adjacent to Indoor Games - FDR	748 m ²
25	Adjacent to FDR Mess	1,841 m ²



26	Adjacent to FDR Residence	2,324 m ²
27	Adjacent to EGR Residence	1,484 m ²
28	Adjacent to Student Amenity Centre - AR/HR	147 m ²
29	Adjacent to Hepzibah Gents hostel	1,220 m ²
30	Adjacent to Post Office	39 m ²
31	Adjacent to Baburaj Residence	2,275 m ²
32	Adjacent to Guest House	1,892 m ²
33	Adjacent to JMR Mess	2,185 m ²



(a) Administrative block (b) Aerospace lab (c) Civil lab (d) Guest house (e) Hepzibah hostel and
(f) Father Duraisamy hostel

c. Recycled Water from STPs:

Average water treated from STPs in KITS				
Sl.No	Location	Capacity of STP	Wastewater Flow Rate in STP	Output (Treated Water)
1	JMR STP	1000 KLD	650 KLD	600 KLD
2	FDR STP	400 KLD	250 KLD	240 KLD
3	Ladies Hostel STP	450 KLD	250 KLD	220 KLD
4	PR GARG STP	600 KLD	350 KLD	320 KLD
5	Bethesda STP	8 KLD	4 KLD	4 KLD
	Total	2458KLD	1544KLD	1384 KLD

d. Desalinated Water:

There are two Desalination Units with capacity of 2000 Litres/day for cooking (washing rice) and 500 Litres/day for drinking. The measurement of water is done at the intake and delivery point.

e. Main Supply (Drinking water supply from Siruvani Water Treatment Unit):

Given as annexure

f. Treated / New /Recycled water from STP:

The water from the treatment plants is used for gardening in the campus and irrigation for agricultural use in addition to groundwater. The flow meters have been fixed at the collection point of the treated water to measure the amount of water used for gardening and irrigation.



Flow Meters at the Filter Unit of Treatment Plant to measure the Treated Water

6.2.2 – Volume of Water Used

Campus Population: 7625 students and 661 faculty and staff - **8286**

Karunya Institute of Technology and Sciences (KITS), comprises of **17 departments**, accommodating a total of **7625 students and 661 faculty and staff members**. It's a fully residential campus with 15 hostels for both girls and boys, along with 17 apartment complexes (quarters) that house approximately 500 faculty and staff. Additionally, the School of Agriculture and Biosciences utilizes a vast expanse of 329 acres of agricultural land for their academic pursuits, research endeavours, and community development initiatives.



- | | | |
|--|--|---|
| 1. Administrative Block | 4. ECE, Biotechnology & Food Processing Technology Departments | 8. Computer Science Department |
| 2. Civil, Mechanical & Aerospace Departments | 5. Computer Technology Centre | 9. EEE, Arts, Science & Agriculture Departments |
| 3. Emmanuel Auditorium | 6. Central Library | 10. Placement Centre |
| | 7. Karunya Media Centre | 11. Ladies Resident Halls |



Hostels (Boys and Girls) in KITS

SOUTH FARM

200 acres

**(150 acre-field crops
50 acres-agro forestry)**



Two cents are ear marked for each student to raise crops and gain the much needed field experience, from sowing to harvesting during their semester.



Polyhouse



Shade Net



Mist Chamber

1000 m² of Polyhouse, 2 green houses, mist chambers, Class-B Met Yard of IMD specifications

North Farm – 129 Acres



Pomology



Olericulture



Floriculture



Spices & Plantation

Sources of Water Supply:



There are 5 open wells and 23 bore wells on campus supplying water to 166 storage tanks which meet the water demand of the students, faculty and staff.

- **Groundwater:** 95% of water supply from aquifers to meet the demand in the campus
- **Potable water supply from Siruvani reservoir: Drinking water in the campus and hostels**
- **Desalinated Water using RO plants:** For cooking and drinking.
- **Ferrocement -based roof top water harvesting structure and recycled water from 4 STP units in the student’s hostel:** Water demand for gardening and irrigation.

Users	Consumption per person per day
Departments, Labs and Wash Rooms (m ³ pcd)	0.25
Hostel Residents (m ³ pcd)	0.120

Volume of water used /consumed – 1201.5 m³ / day

The volume of water consumed/used in the hostel and university campus (1201.5 KLD -1201.5 m³/day) is being met by groundwater (1136.82 m³ / day), RO treated water (4.68 m³/ day) and drinking water from TWAD Board (60 m³ / day)

6.3.3 Free Drinking Water Provision

KITS is committed to provide safe, accessible, and sustainable drinking water for the health and well-being of students, faculty, and staff. The campus comprises of 17 departments, accommodating a total of 7625 students and 661 faculty and staff members. It’s a fully residential campus with 15 hostels for both girls and boys, along with 17 apartment complexes (quarters) that house approximately 500 faculty and staff. Additionally, the School of Agriculture and Biosciences utilizes a vast expanse of 329 acres of agricultural land for their academic pursuits, research endeavours, and community development initiatives.

- **Water Sources:** KITS has provided 86 water purifiers/ dispensers/coolers in all floors in the academic blocks and hostels. Two RO plants have been installed for cooking and drinking.
- **Water Quality Testing:** Testing of the water quality is done to ensure that drinking water quality standards are met for safe drinking.
- **Maintenance and Cleaning:** KITS ensures that all drinking water sources are well-maintained and regularly cleaned to prevent the growth of bacteria and mold.

A. Water Purifiers for Drinking in the University Campus:

For drinking purposes, purified water is supplied through water purifiers & RO Plant for which Annual Maintenance Contract (AMC) has been made with an authorized vendor for regular servicing. TDS value and filters are checked on a routine basis to monitor the quality of water as per the IS_10500 and revised module IS 10500:2012 - Drinking Water Quality Monitoring Protocol and for regular maintenance of the plant.

In KITS, 86 water purifiers have been placed in all the departments (as given in Table below) for drinking purpose by faculty, staff, and students at the University.



Water Purifiers/ Dispenser / Cooler – For Drinking



R.O Treated Water – For drinking and cooking



S.No	Location	Floor	Qty
1	Science and Humanities Block	Ground Floor	3
2	Electrical and Electronics Engineering	Ground Floor	2
3		First Floor	2
4		Second Floor	2
5		Third Floor	2
6	Science and Humanities Block	First Floor	3
7	Science and Humanities Block	Second Floor	3
8	Science and Humanities Block	Third Floor	3
9	Karunya Media Centre	Ground Floor	3
10	Karunya Media Centre	Second Floor	1
11	Department of Aerospace Engineering	Ground Floor	1
12		First Floor	1
13		Second Floor	1
14	Department of Aerospace Engineering (Lab)	Ground Floor	2
15	Registrar's Office	Ground Floor	1
16	Admission Office	Ground Floor	1
17	Student Affairs Office	Ground Floor	1
18	Vice Chancellor's Office	First Floor	1
19	Controller of Examinations Office	First Floor	1
20	Trustee Office	Second Floor	1
21	Department of Management	Second Floor	1
22	Department of Mechanical Engineering	Ground Floor	1
23	Department of Mechanical Engineering	First Floor	1
24	Department of Mechanical Engineering	Second Floor	1
25	Mechanical Lab	Ground Floor	1
26	Mechanical Workshop	Ground Floor	3
27	Computer Technology Centre - II	Ground Floor	1
28		First Floor	1
29		Second Floor	1
30	Elshaadi Auditorium	Ground Floor	4
31	Elohim Auditorium	Ground Floor	2
32	Emmanuel Auditorium	Ground Floor	4
33	Food Court	Ground Floor	3
34	Computer Science and Technology	Ground Floor	1
35		First Floor	1
36		Second Floor	1



37		Third Floor	1
38	Department of Civil Engineering	Ground Floor	1
39		First Floor	1
40		Second Floor	1
41	Computer Technology Centre - I	Ground Floor	1
42		Third Floor	1
43		Fourth Floor	1
44	Library	Ground Floor	1
45	Department of Electronics and Communication Engineering	Ground Floor	2
46		First Floor	2
47		Second Floor	2
48		Third Floor	2
49	Biotechnology Block	Ground Floor	2
50		First Floor	2
51		Second Floor	2
52		Third Floor	2
Total			86

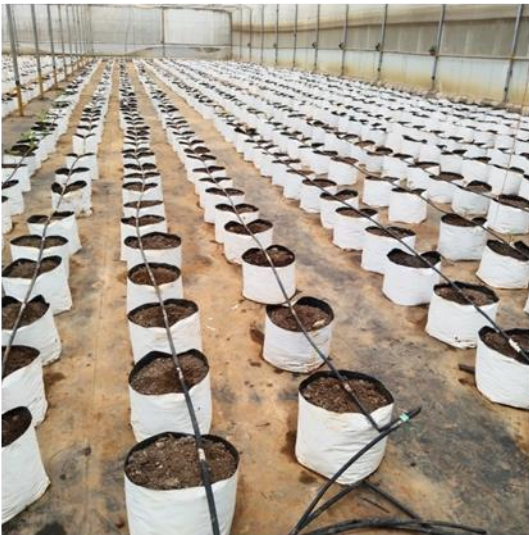
B. R.O Treated Water for Drinking and Cooking

- The RO Plant with a capacity of 2000 LPH (Litres per Hour) has been installed in the Mess. In order to conserve drinking water, the cooking activities in the mess are carried out using RO treated groundwater, which amounts to 1400 KL/year or 1212 m³ / year .
- Similarly, Sinai/Tabor Staff Quarters has a 500 LPH (Litres per Hour) RO Plant. The treated water from this RO Plant is exclusively used for drinking purposes, amounting to 473000 L/year or 473 m³ / year.

6.3.5 Plant landscapes to minimize water usage

KITS maintains a well-designed and water efficient landscape by adopting the following landscaping strategies that minimize water usage in the campus to reduce water costs and maintenance contributing to sustainable goals.

1. **Native and Drought-Tolerant Plants:** KITS campus has native plant species and drought-tolerant varieties that are well-suited to the local climate. These plants have adapted to survive with minimal water.
2. **Efficient Irrigation:** In agricultural farm, KITS has implemented drip irrigation for effective water scheduling based on soil moisture data.



3. **Rainwater Harvesting:** KITS has constructed 33 soak pits to conserve water by recharging the groundwater (**Indicator: 6.2.1**)

4. **Permeable Surfaces:**

Apart from plantation area, KITS has 14 % area as permeable pavement & surfaces to infiltrate the ground rather than running off. This helps recharge groundwater and reduces the need for irrigation.

**Car Parking****Agri Block Corridor****Girls Hostel Yard****Agri Block Atrium**

5. **Maintenance:** KITS has an effective mechanism to regularly maintain landscape by pruning and weeding which help plants stay healthy and use water more effectively.

6. **Educational Initiatives:**

The faculty and staff use the different landscapes as educational tool to teach students and the community about water-efficient landscaping practices and the importance of sustainability.

7.



S. No.	Name of the Tree/ Plant	S & H Building	Dr. Chellathurai Pathway	CTC/ Library /Media	Bethesda	ECE to CTC/ Media	Admin	ECE to Admin	Main Parking Area	Total
1.	<i>Acacia auriculiformis</i>			1	1					2
2.	<i>Albizzia</i>								5	5
3.	Almond					4				4
4.	<i>Araucaria cookie</i>		1	1	4	1				7
5.	Fase badam/ India Almond- <i>Terminalia catapa</i>	1		2	4					7
6.	<i>Bahunia purpurea</i>			7	26	96		2	37	168
7.	Banyan								3	3
8.	Bottle brush			1	4					5
9.	Blue gulmohar			2						2
10.	<i>Butea monosperma</i>			1		3				4
11.	<i>Caesalpinia pulcherima</i>	2		1						3
12.	<i>Casine paniculata</i>			1						1
13.	<i>Cassia fistula</i>				4					4
14.	<i>Cassia javanica</i>				3					3
15.	Casuarina				8				24	32
16.	<i>Catha edulis</i>				3					3
17.	Coconut tree	81	1	1		1		2		86



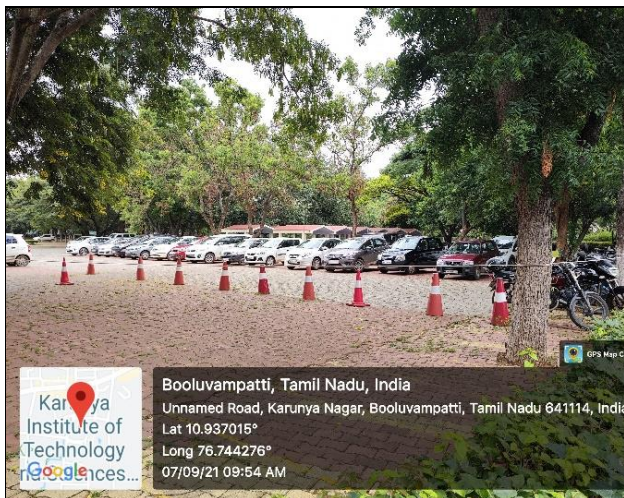
18.	Copper pod tree/ <i>Peltophorum ferruginium</i>	38		7	1	7			9	62
19.	<i>Dalbergia sissoo</i>		4	3		2	4			13
20.	<i>Delonix regia</i>								3	3
21.	Devils tree – <i>Alstonia scholaris</i>				1					1
22.	Embelica			1						1
23.	False Ashoka <i>Polyalthia pendula</i>				49					49
24.	Fern Tree <i>Filicium decipiens</i>				15					15
25.	<i>Ficus benjamina</i>					2				2
26.	Fig				1					1
27.	Fish tail palm				1					1
28.	<i>Gmelia arborea</i>		5							5
29.	Golden Juniper				1					1
30.	Guava	1		2						3
31.	Jamun	2	9	6	4					21
32.	Jewel box tree/ <i>Sterculia foetida</i>			1		1				2
33.	Mahogany			5		3				8
34.	Mango	1			5	2	1		3	12
35.	Manoranjitham				1					1
36.	<i>Melia doobia</i>		1							1
37.	<i>Michelia champaka</i>				2					2
38.	<i>Mimusops elengi</i>				1					1
39.	Moringa								1	1
40.	Nagalinga puspam				2					2
41.	Neem tree	15	2	8		34				59



42.	Oil palm				4					4
43.	Oliva europa				6					6
44.	<i>Polyalthia longifolia</i>	100	1			34	10		1	146
45.	Pomegranate				1					1
46.	<i>Pongamia pinnata</i>		2	1	4	54				61
47.	<i>Phoenix sp.</i>			1						1
48.	Rain tree	7		2	3	35				47
49.	Red gulmohar	2	2	8		2				14
50.	Royal palm			17	4		9			30
51.	Sandalwood			1	2				3	6
52.	Sapota				1					1
53.	Senna					8		6	1	15
54.	Singapore cherry			1						1
55.	<i>Spathodea campanulata</i>				7		3		2	12
56.	Tamarind			1					1	2
57.	Teak	1								1
58.	<i>Thespesia populnea</i>	1							8	9
59.	Unknown					8				8
60.	<i>Vitex negundo</i>			1						1
61.	X-1								1	1
62.	X-2								1	1
63.	X-3								1	1
64.	X-4								1	1
65.	X-5								1	1
66.	X-6								2	2
67.	Ylang ylang				1					1

8. **Efficient Irrigation:** In agricultural farm, KITS has implemented IoT-sensor based drip irrigation for effective water scheduling based on soil moisture data.
9. **Rainwater Harvesting:** KITS has constructed 33 soak pits to conserve water by recharging the groundwater (**Indicator: 6.2.1**)
10. **Permeable Surfaces:**

Apart from plantation area, KITS has 14 % area as permeable pavement & surfaces to infiltrate the ground rather than running off. This helps recharge groundwater and reduces the need for irrigation.

**Car Parking****Agri Block Corridor****Girls Hostel Yard****Agri Block Atrium**

11. **Maintenance:** KITS has an effective mechanism to regularly maintain landscape by pruning and weeding which help plants stay healthy and use water more effectively.

12. **Educational Initiatives:**

The faculty and staff use the different landscapes as educational tool to teach students and the community about water-efficient landscaping practices and the importance of sustainability.

6.4.2 Reuse and Measurement

For effective recycling and reuse of greywater from sinks, showers, washing of utensils in the kitchen and washing machines, five Sewage Treatment Plants (STP) have been constructed in the Student Hostels. In addition to that, to treat the black water from all the student hostels, four Biogas Plants have been installed to treat black water and for production of biogas to replace two to three commercial cylinders for cooking every day. The treated or recycled wastewater is reused for gardening (from 113 STP treated water outlets). The details on the capacity of each STP and the inflow rate with the quantity of treated effluent are given in the table below.

Average Treated water Output from STP's in KITS Campuses			
Sl.No	Location	Capacity of STP	Average Wastewater Inflow Flow Rate in STP
1	JMR STP	1000 m ³ /day	650 -700 m ³ /day
2	FDR STP	400 m ³ /day	250 -300 m ³ /day
3	Ladies Hostel STP	450 m ³ /day	300 – 350 m ³ /day
4	PR GARG STP	600 m ³ /day	350 -400 m ³ /day
5	Bethesda STP	8 m ³ /day	4 m ³ /day

1. Outlet Points of Treated Wastewater for Irrigation and Gardening

S.NO	Location
1	JMR - Adjacent to STP
2	JMR – Adjacent to Mess
3	JMR - Lawn
4	JMR - Adjacent to Hostel office
5	JVR – Opposite Hostel
6	JMR Hostel Gate
7	JMR Adjacent to Security cabin
8	Bobraj Backyard
9	Bobraj - Adjacent to Cycle stand
10	BRR - Adjacent to House Keeping
11	BRR - Gate
12	JMR – Adjacent to compound wall



13	JVR Adjacent to compound wall
14	JVR -Gate
15	CPM Adjacent to office
16	DGS Playground
17	DGS - North
18	DGS
19	DGS - Adjacent to Rest Room
20	DGS - Gate
21	Guest house Entrance
22	Post office
23	GH - Adjacent to Restaurant front
24	BPC - Adjacent to Dormitory
25	BPC - Adjacent to Hall
26	BPC – Rear side
27	FDR - Adjacent to Mess
28	FDR - Adjacent to Wash Areas
29	FDR - Lawn
30	FDR – Behind Mess
31	FDR - Adjacent to Sump
32	Care Home Entrance
33	Bethesda Front Gate
34	FDR – Front Gate
35	FDR - Lawn
36	FDR - Adjacent to Luke wing
37	FDR - Adjacent to Mark wing
38	FDR – Opposite to Mark wing
39	AR inside Lawn
40	Adjacent to AR office
41	Adjacent to AR Front
42	Adjacent to AR Basket ball Ground
43	Adjacent to AR xerox centre
44	Adjacent to AR - Hot Kitchen
45	Opposite to HR Parking area
46	Adjacent to HR - North
47	Adjacent to HR - south
48	Adjacent to HR - west
49	Adjacent to HR - North
50	Adjacent to HR - entrance
51	Adjacent to Ladies hostel STP
52	Adjacent to LH oprah cycle parking



53	Adjacent to LH STP south
54	Adjacent to LH Dump yard
55	Adjacent to LH mess
56	Back of Oprah block
57	Adjacent to LH Supermarket- North
58	Back of LH EVR sump
59	Adjacent to LH EVR sump -west
60	Adjacent to LH EVR sump- North
61	Adjacent to EVR hostel North
62	EVR hostel front
63	Adjacent to EVR hostel
64	Adjacent to EVR hostel dining hall
65	EVR hostel entrance
66	Back of DMR dining hall
67	Adjacent to SVR block
68	Adjacent to DMR dining hall
69	Adjacent to DMR cycle parking -north
70	Adjacent to DMR cycle parking- south
71	Adjacent to Shopping complex-1
72	Adjacent to Shopping complex -2
73	Adjacent to LH basket ball
74	Adjacent to LH shuttle court
75	Adjacent to Power house
76	Adjacent to SSH front side
77	Adjacent to EL- shaddai north
78	Adjacent to EL- Shaddai south
79	Adjacent to SRH sump -North
80	Opposite to ECE Department
81	Adjacent to ECE front side
82	Opposite Photo copier Shop
83	Adjacent to College photocopier Shop
84	Adjacent to ECE front-south
85	Adjacent to EEE front side north
86	Adjacent to EEE front side south
87	Adjacent to EEE front west
88	Adjacent to Placement and training centre (North)
89	Adjacent to Placement and training centre (South)



90	Adjacent to Placement and training centre (Front)
91	Adjacent to Central library (south)
92	Opposite to Library
93	Adjacent to Library
94	Opposite to Admin building
95	Adjacent to Admin building
96	Admin building lawin
97	Adjacent to Admin building (South)
98	Adjacent to Admin building (South)
99	Adjacent to Admin block parking
100	Adjacent to Admin block north
101	Adjacent to Robotics Department block
102	Adjacent to Mech department
103	Adjacent to Aerospace department (opp)
104	Adjacent to Aerospace department (Front)
105	Adjacent to Aerospace dep (North)
106	Adjacent to Mech dept (West)
107	Adjacent to Mech dept (South)
108	Adjacent to CTC
109	Adjacent to CTC (North)
110	Adjacent to Canteen (South)
111	Adjacent to Canteen (Back side)
112	Adjacent to Canteen (South)
113	Adjacent to Canteen (North)

Reuse of Greywater for irrigation and gardening (Outlet Points)

Location	No. of Outlet Points
Student Hostel	88
Campus	25

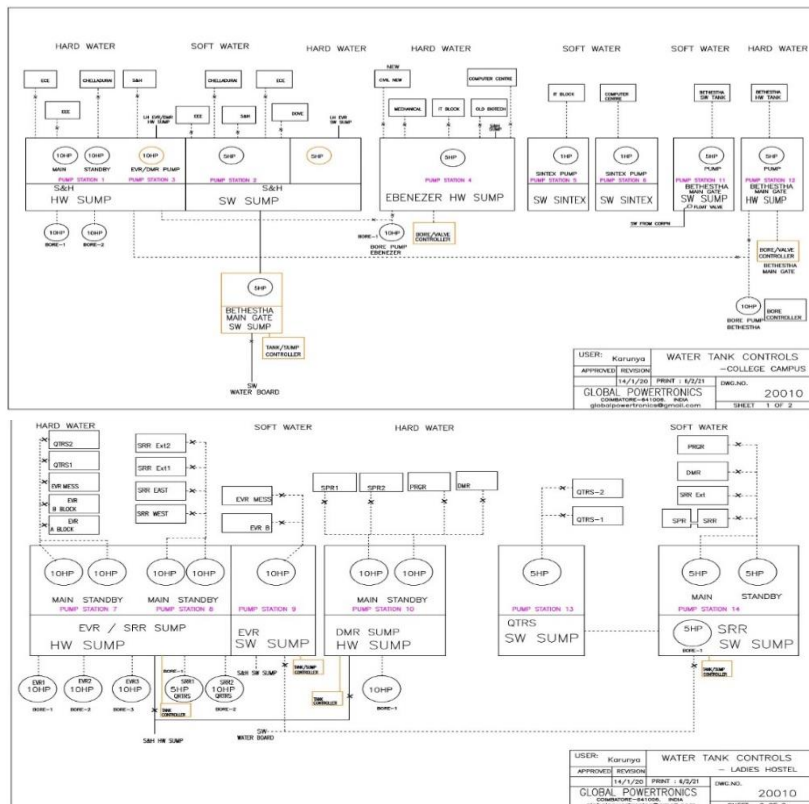


es (Other

Flow Meters at the Filter Unit of Treatment Plant to measure the Treated Water

Than Roof-Top RTWH)

The wastage of water due to overflow in storage tanks and sumps is prevented by using sensor-based pump operating system. The sumps in the campus and student hostels are connected to ensure water supply at all times in case of any reduction in groundwater level or mechanical failure of pumps. Three IoT based automated water controllers have been installed in the overhead tanks and sumps by which 10% of water and energy is conserved.



Layout of IoT based Centralized Water Level Control System

6.5.1 Water Management Educational Opportunities

Karunya Institute of Technology and Sciences (KITS) identified four thrust areas of societal importance in 2008, namely water, food, healthcare, and sustainable energy to work towards Sustainable Goals. KITS provides various educational opportunities related to water management at different levels of study, from UG to PhD programs. These programs cover a wide range of topics related to water resources, conservation and sustainable management.



The Water Institute (WI) established at KITS in 2008 is a flagship program to pursue interdisciplinary research aiming at scientific water management and ensure water security, especially in the semi-arid zones. WI was initiated keeping in view the MDGs, the focus of which shifted to SDGs in 2016. The Dublin Conference-1992, Rio Conference-1992 and Johannesburg Conference-2012, and the initiatives of GoI, namely the National

Drinking Water Mission and WAR for Water, prompted by the Supreme Court of India, motivated KITS to focus on water. The WI gained significance with more areas coming under water stress or water scarcity in India. The water initiative of KITS succeeded in bringing together the faculty and students of different departments - arts, science, agriculture, engineering, and management and the alumni on a single platform to focus on research of social relevance in the water sector.

In the background of the Dublin Conference and the importance assigned to sustainability, WI introduced a **M.Tech. program in Integrated Water Resources Management (IWRM) in 2009; this programme was revamped in 2017** by including the overall environmental perspective, as **M. Tech in Environmental and Water Resources Engineering**.

In framing the curriculum and syllabi for M.Tech in IWRM, the guidelines of UNESCO-IHE and SaeiWATERs were extensively made use of. WI also offers a Ph.D. Programme, and more than 20 doctoral theses related to water are either completed or in the process of completion. These works cover a large spectrum of topics in hydrology and water management: impact of LCLUC on hydrology, isotope application for groundwater recharge studies, evolving reservoir operation policy, contribution of hydroelectric projects to environmental flows, application of nano-membranes, electrocoagulation, electro-dialysis, CDI and bioremediation for water treatment.

Mission:

1. Participation in Policy Formulation

2. Academic Intervention
3. Research and Consultancy
4. Collaborations – National and International
5. Capacity Building Activities
6. Extension and Outreach



Major strategies
 Mission of
 Water Sector

Education Opportunities:

As part of Mission, KITS offers 46 courses related to SDG 6 for different UG and PG programs.

S.No.	Course code	Course name
1	14CE2005	Applied Hydraulics and Hydraulic Machinery
2	14CE2008	Water and Waste water Engineering
3	14CE2011	Water Resources Engineering
4	15CE2001	Irrigation Engineering
5	14CE3036	Hydrology practicals
6	14CE3040	Water and Wastewater treatment
7	16CE3004	Elements of hydrology
8	16CE3005	Design of hydraulic and conveyance structures
9	16CE3006	Water resources planning and systems engineering
10	16CE3014	Nanotechnology for water and wastewater treatment
11	17CE2005	Applied Hydraulics and Hydraulic Machinery
12	17CE2008	Water Supply and Wastewater Engineering



13	17CE2028	Design and Drawing (Irrigation and Environmental)
14	17CE3054	Water and Wastewater treatment
15	17CE3058	Elements of hydrology
16	17CE3059	Design of hydraulic and conveyance structures
17	17CE3060	Water resources planning and systems engineering
18	17CE3061	Principles of integrated water resources management
19	17CE3062	Hydrology laboratory
20	17CE3077	Forest, Urban and Agricultural Watershed management
21	17AG1005	Irrigation Water Management
22	18CE2019	Hydraulic Engineering
23	18CE2025	Hydrology and Water Resources Engineering
24	18ME2082	Introduction to Water Technologies
25	18AT2001	Fluid Mechanics and Open Channel Hydraulics
26	18AT2009	Soil and Water Conservation Engineering
27	18AT2015	Ground water, Wells and Pumps
28	18AT2016	Water Harvesting and Soil Conservation Structures
29	18AT2018	Irrigation and Drainage Water Engineering
30	18AT2019	Micro Irrigation
31	18AT2044	Water Quality and Management Measures
32	18CE3036	Surface flow hydrology
33	18CE3038	Water resources planning and systems engineering
34	18CE3039	Water and Wastewater treatment technology
35	18CE3040	Hydrology laboratory
36	18CE3054	Principles of integrated water resources management
37	18CE3059	Impact of climate change on water resources
38	18ME2028	Hydraulics and Pneumatics
39	18ME2029	Hydraulics and Pneumatics Laboratory
40	18AG1007	Irrigation Water management
41	18AG2027	Rainfed Agriculture and Watershed Management
42	18HO1006	Irrigation and Weed Management in Horticultural Crops
43	20CE2039	Irrigation Engineering and Hydraulic Structures
44	19BT2010	Fluid Mechanics
45	19BT2011	Fluid Mechanics and Heat Transfer Lab
46	19BT2030	Environmental Pollution Control Engineering

**Courses Aligned with Sustainable Development Goal 6: Water (July-December Semester
(2021-22))**



S. No	Course Code	Course Title (Odd Semester 2021-22)	Mapping with SDG 6: Clean Water and Sanitation in %
1	17NT2002	Synthesis of Nanomaterials	5
2	17PH3017	Renewable Energy Sources	5
3	17PH3021	Material Characterization	20
4	18AG2015	Environmental Studies and Disaster Management	40
5	18AG2019	Crop Improvement I (Kharif crops)	70
6	18AG2020	Manures, Fertilizers and Soil Fertility Management	25
7	18AG2024	Precision Farming	50
8	18AG2029	Principles of Organic Farming	50
9	18AT2009	Soil and Water Conservation Engineering	50
10	18AT2018	Irrigation and Drainage Water Engineering	50
11	18CE2025	Hydrology and Water Resources Engineering	50
12	18CE3035	Atmospheric Environmental Pollution And Control	20
13	18CE3036	Surface Flow Hydrology	50
14	18CE3037	Environmental Chemistry and Microbiology	30
15	18CE3052	Groundwater Hydrology	30
16	18CE3057	Forest, Urban and Agricultural Watershed Management	40
17	18CE3058	Wetland Hydrology	30
18	18CE3061	Remote Sensing and Geographical Information System	10
19	18CH2001	Environmental Studies	30
20	18ME2028	Hydraulics and Pneumatics	30
21	18ME2047	Power Plant Engineering	10
22	18RO2010	Programmable Logic Controllers	10
23	18RO2011	Automation System Design	20
24	19CH3002	Waste to Energy	20
25	19ME2025	Thermodynamics	30
26	20AG2001	Rural Agricultural Work Experience (RAWE)	25
27	20AG2008	Fundamentals of Plant Breeding	50
28	20BT3031	Advanced Environmental Biotechnology	75
29	20FP3021	Green Technology in Food Processing	20
30	20ME1007	3D Printing Technology	10
31	20ME1009	Engineering Drawing and Graphics-2021 B.Tech BME A	20
32	20ME2016	Fluid Mechanics and Fluid Machines	20
33	20NT3018	Commercialization of Nanotechnology Products	10



34	20NT3020	Nanomaterial-Based Energy Devices	80
35	20RO2007	Smart Sensors for IoT Applications	10
36	20RO3017	Image Processing and Machine Vision	10
37	21AG1301	Fundamentals of Soil Science-2021 B.Sc Agri A	50
38	21AG3001	Modern Concepts in Crop Production	30
39	21AG3005	Agro-Meteorology and Crop Weather Forecasting	45
40	21AG3006	Cropping Systems and Sustainable Agriculture	50
41	21AG3027	Principles of Plant Breeding	50
42	21AG3216	Soil Fertility and Fertilizer Use	25
43	21HO3127	Growth and Development of Horticultural Crops	50
44	21HO3131	Subtropical and Temperate Fruit Production	45
45	21MS3061	Spatial Data Analytics	10

(Jan to May Semester 2021 – 22)

S. No	Course Code	Course Title (Even Semester of 2021 – 22)	Mapping with SDG 6: Clean Water and Sanitation in %
1	17CH1004	Environmental Studies-2021 BBA	30
2	17EI2028	SCADA Systems Design	25
3	18AG2012	Problematic Soils and their Management	25
4	18AG2027	Rainfed Agriculture and Watershed Management	100
5	18AG2028	Practical Crop Production (Rabi crops)	30
6	18AG2032	Crop Improvement - II (Rabi crops)	70
7	18AG2034	Farm Management, Production and Resource Economics	100
8	18AG2035	Principles of Food Sciences and Nutrition	100
9	18AT2015	Groundwater, wells and Pumps	50
10	18AT2016	Water Harvesting and Soil Conservation Structures	50
11	18AT2019	Micro Irrigation	100
12	18BT2051	Role of Biotechnology in Environment	75
13	18CE3038	Water Resources Planning and Systems Engineering	40
14	18CE3039	Water and Wastewater Treatment Technology	40
15	18CH2001	Environmental Studies	30
16	18EI2005	Measurement and Instrumentation	30

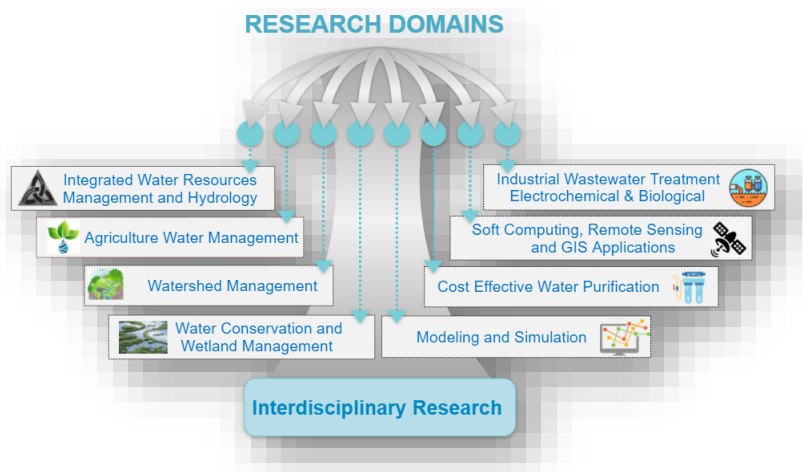
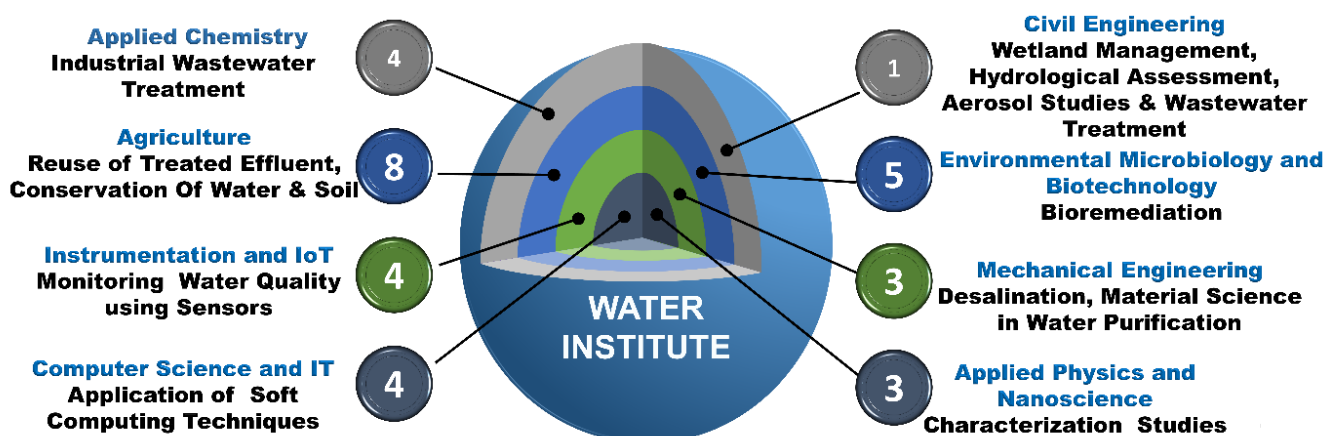


17	18FP2020	Bakery, Beverages and Confectionery Technology	20
18	18HO2003	Precision Farming and Protected Cultivation	50
19	18HO2013	Principles of Ornamental Horticulture and Landscape Architecture	20
20	18ME2027	Fundamentals of Thermal Sciences and Fluid Mechanics	10
21	18ME2055	Computer Aided Design	10
22	18ME2058	Mechatronics systems	10
23	18RO2011	Automation System Design	20
24	19MA3030	Mathematical Modeling	10
25	19ME2020	Drone Technology-(Combined Class)	5
26	19RO1002	Engineering Practices	10
27	20AG1002	Introductory Agro-Meteorology & Climate Change	40
28	20AG2013	Principles of Seed Technology	60
29	20BC2019	Disaster Management	20
30	20BT3066	Algae Biotechnology	25
31	20CE2014	Water Resources Systems	20
32	20CH3040	Water Treatment Technologies	10
33	20RO2003	Sensors and Protocols for Instrumentation	30
34	20RO2007	Smart Sensors for IoT Applications	10
35	20RO3017	Image Processing and Machine Vision	10
36	21AG1201	Fundamentals of Genetics-2021 B.Sc Agri A	20
37	21AG1302	Introductory Agro-meteorology & Climate Change-2021 B.Sc Agri A	40
38	21AG1303	Agricultural Microbiology-2021 B.Sc Agri A	20
39	21AG1451	Introductory Soil and Water Conservation Engineering-2021 B.Sc Agri A	50
40	21AG1503	Fundamentals of Crop Physiology-2021 B.Sc Agri A	15
41	21AG3004	Principles and Practices of Water Management	100
42	21AG3007	Dryland Farming and Watershed Management	50
43	21AG3010	Agronomy of Fodder and Forage Crops	20
44	21AG3218	Remote Sensing and GIS Techniques for Soil, Water and Crop Studies	75

45	21AG3226	Agricultural Research, Research Ethics and Rural Development Programs	25
46	21ME3004	Manufacturing System and Simulation	10

Interdisciplinary Research on Water

An interdisciplinary group of 75 faculty and other staff members and a large cross-section of students are involved in water research and extension activities at KITS. More than 100 papers on the theme of water have been published in Scopus/WoS indexed journals. Around 12 patents have been filed; one of them is filed in collaboration with Ben-Gurion University and another with Cape Breton University. There are around 100 *alumni* collaborating with their *alma mater* in activities pertaining to water. The teams meet frequently and organise interdisciplinary water related activities.



R Dharshini	Fabrication of microbial fuel cell for electricity generation using dairy wastewater
S Dharshini	Synthesis Of Acid Precipitated Lignin for Removal Of Chromium From Wastewater
Irene Francy	Effect of root nodules of Casuarina equisetifolia and its impact on industrial waste pollutants removal



Jithin Jose	Preparation Of Activated Carbon From Agave Leaf For The Removal Of Lead From Aqueous Solution
Sherin Roshan	Rapid Annotation Using Subsystem Technology (Rast) Analysis Of Lead Resistant Bacteria Enterobacter Cloacae : A Thriving Inhabitant Of Textile Dye Industrial Wastewater
Vinisha A	Removal Of Chromium (VI) From Tannery Effluent Using carbonized Chrysopogon zizanioides
Thirumalaiivasan P	Removal Of Chromium Using Fungi Isolated From Tannery Industrial Effluent.
Syed Arafath	Recovery Of Struvite From Domestic Waste Water And Its Effect On Plant As Fertilizer

- Fabrication of microbial fuel cell for electricity generation using dairy wastewater
- Synthesis Of Acid Precipitated Lignin For Removal Of Chromium From Wastewater
- Effect of root nodules of Casuarina equisetifolia and its impact on industrial waste pollutants removal
- Preparation Of Activated Carbon From Agave Leaf For The Removal Of Lead From Aqueous Solution
- Rapid Annotation Using Subsystem Technology (Rast) Analysis Of Lead Resistant Bacteria Enterobacter Cloacae : A Thriving Inhabitant Of Textile Dye Industrial Wastewater
- Removal Of Chromium(VI) From Tannery Effluent Using carbonized Chrysopogon zizanioides
- Removal Of Chromium Using Fungi Isolated From Tannery Industrial Effluent.
- Recovery Of Struvite From Domestic Waste Water And Its Effect On Plant As Fertilizer
- A Review on Effluent Treatment of Wastewater from Milk Industry
- A Review on Effluent Treatment of Wastewater from Milk Industry
- Treatment Of Textile Dyeing Waste Water Using Stainless Steel Electrode By Electrocoagulation Process”
- Treatment Of the Textile Dyeing Effluent Using Aluminium Electrode In Electrocoagulations Process
- Removal Of Dye From Textile Dyeing Effluent Using Cu-Cu Electrode In Electrocoagulation Process
- Treatment of Blue 3I dye water using Cu, Al as electrodes in EC process
- Potential Removal of Yellow 10GW dye water using Cu, Al as electrodes in EC process
- Removal of Red BFI dye water using Cu, Al as electrodes in EC process
- Decolorization of Textile Dyeing Wastewater using TiO₂/Zn by thermal decomposition of TiCl₃ by EC process
- Comparative Study of Treatment of Acid dye using TiO₂/SS by EC process
- EC process using TiO₂/Zn for the treatment of Disperse dye
- Decolorisation of Textile Dyeing Wastewater using TiO₂/Zn by thermal decomposition of TTIP by EC Process
- Treatment of Textile dyeing wastewater laded with disperse dye using TiO₂/Al by EC process
- Performance of Ti/Cu Electrodes in the Abatement of Synthetic dye from Aqueous Solution in Electrocoagulation Process



- Microclimatic impact on groundwater of Coimbatore district
- Optimization of Disinfection in Water Distribution System
- Climate Change Scenario Assessment for Paddy in Palakkad District and Evolving Possible Adaptation Strategies
- Sensitivity Assessment of Radiative forcing to Aerosol optical properties in diverse locations of India
- A long-term analysis for sustainable water availability in the Kuttiadi river basin of Kerala using the WEAP model
- Identification of Microplastic and Quantification of floating plastics using UAV images in Ukkadam Tank, Coimbatore, Tamil Nadu
- Impact of Climate Change on Groundwater Potential Zones in the Gomti River Basin
- Runoff Modeling of the Catchment using Swat Model and catchment using Swat Model and Geospatial Techniques
- Modelling the Impact of Climate Change on Hydrology and Sedimentation Process of Chaliyar River Basin, Kerala
- Impact on aerosols on precipitation trends and flooding in the state of Kerala
- Impact of climate change on water resources by using DWAT model
- Characterization of segregated greywater from rural Indian Households: An instrumental case study.

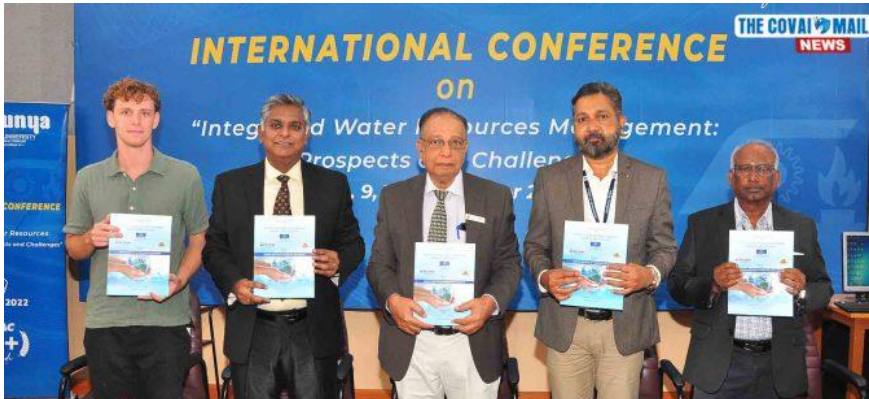
6.5.2 Promoting conscious water usage

Promoting conscious water usage in KITS is not only environmentally responsible act but also helps reduce operational costs. The strategies adopted to promote conscious water usage in KITS are:

- Educational activities (Conferences/ Workshops/Seminars/Consultation): International Conference on ‘Integrated Water Resources Management: Prospects and Challenges’, water summit,
- Awareness creation (Conservation of water bodies by NSS, World Water Day Celebration, commemoration of the International Day of Action for Rivers, webinar on Enhanced Water Productivity in Irrigation Systems, World Environment Day Celebration)
- Infrastructure improvements like water efficient appliances and water harvesting structures.
- Collaboration and partnerships
- Water audits

1. Educational Activities (Conferences/ Workshops/Seminars/Consultation)

1.1 International Conference on ‘Integrated Water Resources Management: Prospects and Challenges’



Karunya Institute of Technology and Sciences, Coimbatore organized an International Conference on “Integrated Water Resources Management: Prospects and Challenges” from 8 to 9th December 2022 sponsored by the Ministry of Jal Sakthi, Govt. of India. The conference deliberated upon the

themes of hydrology, geospatial techniques, application of IoT and AI in water resources management, agriculture, water quality, water treatment technologies, wetland ecology, decision support system, water conservation and groundwater recharge, the impact of climate change on water resources, water economics, governance, policies and capacity building. A total of 4 keynote lectures and 6 theme papers were presented. Around 120 papers were presented in 12 technical sessions.

1.2 Water Summit

KITS organized Water Summit India 2022 on 18th September 2022. Twenty renowned experts from across the country representing diverse academic and research organizations, industry, Government and NGO outfits shared their expertise and 100 participants attended Water Summit. and prepared the Water Vision document for Coimbatore. The Vision Document was prepared considering the following issues in the sector:

- Overexploitation of freshwater sources, especially groundwater
- Quality deterioration of ground and surface water
- Impact of climate variation and change and subsequent trends in hydrologic extremes, sea-level-rise and snow-melt
- Degradation of ecosystem

- Limitations associated with water governance and stakeholder participation



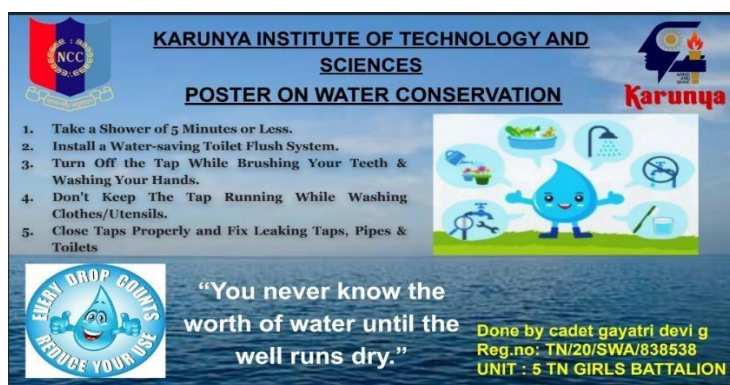
2. Awareness Creation:

KITS regularly organises awareness creating webinars, club and outreach activities on importance of water conservation among students, faculty, and staff. Use posters, flyers, and digital communication channels to share information about the university's water usage and the need for conservation.

2.1 Conservation of Water Bodies

Water bodies play a crucial role in sustaining life and ecosystems. To raise awareness about the importance of conserving these invaluable natural resources, 135 NCC Cadets of Karunya Institute of Technology and Sciences organized an online event on January 02, 2022. This event aimed to educate, engage, and inspire individuals to take active steps towards the preservation of water bodies. One of the standout features of this event was the creation and presentation of vlogs and poem recitation by NCC cadets, providing unique insights into water conservation.

2.2 World Water Day Celebration



World Water Day, a significant global event, was observed to promote awareness of the critical importance of freshwater and advocate for the sustainable management of this invaluable resource. On July 25th, 2021, a distinctive online celebration of World Water Day was hosted by 138 NCC Cadets from the Karunya Institute of Technology and

Sciences. In response to the ongoing COVID-19 pandemic, the event was conducted virtually,

allowing cadets to express their creativity through the presentation of engaging posters and insightful vlogs.



The Tech Unit of Rotaract Club organized an awareness program in commemoration of the **International Day of Action for Rivers** on March 22, 2022, with active participation from 200 students. Additionally, the SSAMM unit of the Rotaract Club conducted a competition on July 12, 2021, in celebration of World Paper

Bag Day, featuring the enthusiastic participation of 51 students.

DEPARTMENT OF CIVIL ENGINEERING

ORGANIZES A WEBINAR ON
WATER PRODUCTIVITY INDEX - IRRIGATION SYSTEM

📅 03/06/2021 ⌚ 09:30 AM (IST)

DR. T. J. DEEPAK
Manipal International University
No 1, MIU Boulevard, Putra Nilai,
71800,
Negeri Sembilan, Malaysia

Contact persons:
Dr. J. Brema, Professor, Civil Engineering
Dr. Sneha Gautam, Asst. Professor, Civil Engineering

Registration Link: <https://forms.gle/5JE3nuKQb6ZiXgHo8>

A **Webinar** Emphasizing Enhanced Water Productivity in Irrigation Systems for the Advancement of Water Conservation in Agriculture. The event drew 78 participants from KITS and various other esteemed institutions.

Commemorating World Environment Day, a webinar titled 'Advancing Collective Solutions for Effective Environmental Governance' centered around the theme of 'Generation Restoration,' particularly focusing on the revitalization of water bodies. The session drew active participation from 112 attendees, comprising members from KITS and various other institutions

WORLD ENVIRONMENT DAY ; THEME - "ECOSYSTEM RESTORATION"

WETLAND CONSERVATION MISSION & DEPARTMENT OF CIVIL ENGINEERING

JOINTLY ORGANIZES A WEBINAR ON
ADVANCING COLLECTIVE SOLUTIONS FOR EFFECTIVE ENVIRONMENTAL GOVERNANCE

CAN #GENERATION RESTORATION BE THE GUIDING VISION?

📅 05/06/2021 ⌚ 06:30 PM (IST)

DR. NIDHI NAGABHATLA
Research Fellow,
Institute on Comparative Regional Integration Studies,
United Nations University, Belgium

REGISTRATION LINK: <https://forms.gle/pCKCA6xQQYwYJNFPA>

FOR CLARIFICATIONS CONTACT: DR. (MRS.) J. BREMA, FIE., MIWRS Professor, Department of Civil Engineering



3. Infrastructure Improvements like water efficient appliances (*Push tap in wash basin, Hand shower, Push tap in water purifier, Flush tap*) and water harvesting structures:

- KITS initiated a program to promote water efficiency by installing self-closing taps in various areas, including the hostel and college campuses. These taps are designed to minimize water wastage by automatically shutting off after use. The total number of self-closing taps installed at KITS is 3,376. To assess the effectiveness of this initiative, we calculate the percentage of water-efficient appliances installed compared to the total potential. KITS has achieved full installation of these water-efficient appliances. This depicts a thorough commitment to water conservation and sustainability.
- Karunya Institute of Technology and Sciences has successfully implemented water-efficient self-closing taps across its campuses, achieving more than installation rate.
- Total number of taps = 6026 No.
- The total number of self-closing taps (Push tap in wash basin, Hand shower, Push tap in water purifier, Flush valve) = 3376

Percentage of usage of Water Efficient Appliances: 56%



Water Efficiency Appliances (Push tap in wash basin, Hand shower, Push tap in water purifier, Flush tap) in Student Residences /Hostel and Campus



Sl.No	Description of item	Location	Qty
1	Self-closing Taps (Taps (<i>Push tap in wash basin, Hand shower, Push tap in water purifier, Flush valve</i>))	Hostel Campus	2676 Nos
2	Manual Operated Taps	Hostel Campus	2150 No
3	Self-closing Tap (Taps (<i>Push tap in wash basin, Hand shower, Push tap in water purifier, Flush valve</i>))	College Campus	700 Nos
4	Manual Operated Taps	College Campus	500 Nos
	Total		6026 No

6.5.3 Off-campus water conservation support

KITS provides off-campus water conservation support in various ways to engage with communities at local, regional, national and international level and promote sustainable practices. KITS contributes to water conservation efforts beyond their campus borders in the following ways:

1. Collaborative Research
2. Educational outreach
3. Demonstration, extra mural and consultancy projects
4. Consultancy services
5. Community based projects
6. Partnership
7. Monitoring water quality and reporting

Integrated and Sustainable Village Development

Pachinampathi, Coimbatore District



Community Outreach Activity

Community Outreach Programme is at the heart of the educational process at Karunya Institute of Technology and Sciences (KITS). These opportunities help the faculty and students to build a sense of responsibility and sensitivity towards the society. More importantly, faculty and students can deepen their understanding of systemic change and social responsibility in the society. The institution offers various opportunities to become active and positive contributors to the farming community.



Transfer of Technology

As a lab to land programme students conducted various demonstrations to solve the field problems at different farmer's field in various villages during the village stay programme. The major problems faced by the farmers are identified and proper technologies and management practices were demonstrated. Critical skill-demonstrations under these thematic areas included:

- Use of Yellow sticky Trap
- Root feeding in Coconut
- Neem leaf extraction
- Azola preparation
- Banana paring and pralinage
- Preparation of Jeevaamirtham & Panchakavya
- Stem injection in banana
- Bucket trap
- Tree banding in coconut
- Bee keeping

Village Adoption: Pachinampathy Village

Integrated and sustainable village development Model is an emerging concept still in the process of being developed. Through this Concept, KITS has created a model village of environmentally sustainable development in active collaboration with village people that reflect their concern and respect for the environment. Environmentally sustainable and ecologically oriented integrated villages shall be focused towards the model village.

Adopted village is developed with an aim to ensure sustainable development in an organized and integrated manner. The programme endeavours to sustain prosperity in villages that is built around sustainable use of the key natural resources of a village, through the adoption of low-impact practices that result in water security, food security and livelihood security for the village communities.

Activities in Pachinampathy Village

- ✓ Drip irrigation for Kitchen Garden
- ✓ Vermicompost unit
- ✓ Innovative Cages for Backyard poultry
- ✓ Solid waste management gadgets and system
- ✓ Solar Lamps for community meetings
- ✓ Nutritional Garden for rural community
- ✓ Grow bags for household vegetable production
- ✓ Livelihood support by planting coconut, moringa and other useful plants
- ✓ Rural water supply – Demonstration of cost effective ferrocement storage tank
- ✓ Providing advice on farming techniques, Animal Husbandry and demo unit

- ✓ Biogas plant to demonstration of solid waste treatment and cooking gas generation
- ✓ Awareness creation and capacity building

Vermicompost Unit

Vermicompost production unit has been developed in Mr.Rasu, field at Pachinampathy Village. The species of earth worm (Eisenia fetida) was inoculated for preparation of vermicompost. The size of vermicompost tank unit is 2.5mX1.5 mX1m which is used for nutritional kitchen garden.

Kitchen garden

One Nutritional Organic Kitchen Garden has been established in an area of 5 cents. Different vegetables are sown in different beds according to the season. The organic manures produced in the Vermicompost unit are used for health purposes to make it purely an Organic Kitchen Garden.



Tree planting at Pachinampathy Village

Technology Transfer



Panjakavya Preparation



Demonstration on NSKE: Uses, application



Yellow sticky trap: Application





Health Awareness Campaign



Household Biogas plant



Ferrocement Tank for Drinking Water –
Rural Water Supply

Technology Transfer:

Construction of Sanitation Block with Bamboo Reinforced Geo-Polymer Precast Units - A Technology Transfer.

**Flyash Toilet**

6.5.4 Cooperation on Water Security

KITS has cooperation between universities and governments at different levels (local, regional, national, and global) on water security and in supporting policy level in addressing the challenges related to water availability, quality, and management. Such collaborations can lead to research advancements, policy development, and practical solutions for sustainable water resource management. KITS has MoU with following national and international level academic and industry partners. Here are ways in KITS cooperates with governments and universities on water security:

a. **Research Partnerships with SUEZ, India:**

- **KITS is an *academic partner for SUEZ*** in India for implementation of 24 x7 water supply scheme. Research studies on chlorine decay studies have been carried out. Students have undergone B. Tech and M. Tech internship at SUEZ. Training programs on Smart Water Meter System, Water GEM and Computational Optimization of water distribution system have been organized for students.



- b. **A patent has been filed as a joint venture with Cape Breton University** in the development of cost effective water purifier

c. **KITS is in collaboration with**


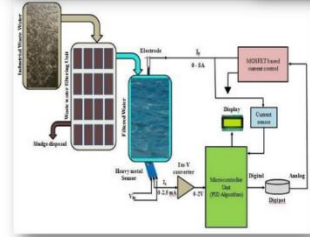
- **National Institute of Hydrology, Roorkee (MoWR)**
- **TamilNadu Agriculture University**
- **Centre for Water Resources Development and Management**
- **National Environmental Engineering Research Institute** , for joint research projects, publications, students internship, capacity building activities

d. **Demonstration projects in the industries (Recovery of Water from electroplating effluent):**

KITS in industrial partnership with ATM Chem Equipment Pvt Ltd, Hosur and Aruldas Electroplating Works, Coimbatore:

KITS has research partnership with academic institution SSN, Chennai in executing DST project under Technology Stream for the Demonstration to lab-scale project entitled “High Performance Integrated Two-Stage Electrochemical Technology for Recovery of Water from Electroplating

High Performance Integrated Two-stage Electro chemical Technology for Recovery of Water from Electroplating effluent with Real Time Monitoring and Control system (Project Period - 2020-2023)

Principal Investigator
Dr. P. Jegathambal

Co-Principal Investigator
Dr. Sabitha Janet

KITS, Coimbatore

Principal Investigator
Dr. S. Radha

Co-Principal Investigator
Dr. Sreeja
Dr. Muthumeenakshi

SSN, Chennai

Industry Collaborators

**ATS CHEM Equipment's PVT LTD Nammakkal
 ARULDAS Electroplating Works, Coimbatore**

effluent with Real Time Monitoring & Control System”. ATM Chem Equipment Pvt Ltd and Aruldas Electroplating work are the industrial collaborators in the DST project under Technology Stream for the Demonstration to lab-scale project entitled “High Performance

Integrated Two-Stage Electrochemical Technology for Recovery of Water from Electroplating effluent with Real Time Monitoring & Control System”. The ATM Chem Equipment is involved in the fabrication of the Model and the performance evaluation of the model in treating electroplating effluent. Karunya has linked up with them in joint investigations.



e. Collaborative research is in progress with **Devi Threads PVT Ltd** to evaluate the performance of multichannel baffle type electrocoagulation *using TiO₂ /Al electrodes in treatment of textile dyeing effluent*. A prototype model has been installed in the industry and the performance of the reactor in removing dye has been evaluated for the effluent directly coming out of the process unit.



• The CEO of **Ray**

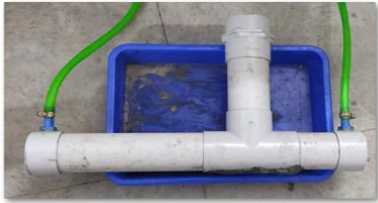
Construction Company is one of the inventors of the patent on ‘A Novel Foam Block for Treating Textile Effluent’ which is one of the outcomes of the ongoing funded project of the

Ministry of Environment, Forest & Climate Change. To transfer the technology to product form, Fellowships for two scholars are provided at KITS.


CARBON-NANO-BIO FOAM BLOCK FOR DYE REMOVAL


Funded by Ministry of Environment, Forests & Climate Change (MoEF & CC), GoI


Performance of Activated Carbon, Biochar, Azolla Humus Based Foam Block In Treatment Of Textile Dyeing Effluent




Foam Generator








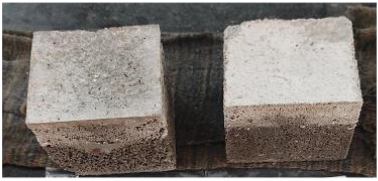
Biochar



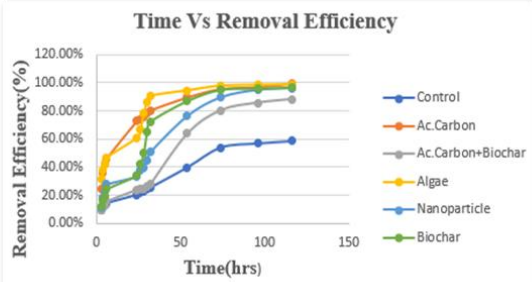
Azolla



Activated Carbon + Nanoclay + Biochar based Foam Block



Activated Carbon + NPs + Azolla based Foam Block



Time (hrs)	Control (%)	Ac. Carbon (%)	Ac. Carbon+Biochar (%)	Algae (%)	Nanoparticle (%)	Biochar (%)
0	0.00	0.00	0.00	0.00	0.00	0.00
25	15.00	45.00	35.00	65.00	25.00	55.00
50	35.00	75.00	65.00	90.00	45.00	85.00
75	45.00	85.00	80.00	95.00	55.00	90.00
100	55.00	90.00	85.00	95.00	60.00	95.00
125	58.42	95.00	90.00	98.00	65.00	98.00

HIGHLIGHTS


Dye Removal Efficiency

- **Azolla - 98.60%**
- **Biochar - 96.36%**
- **Nanoparticles - 96.21%**
- **biochar+ Carbon - 88.20%**
- **Control block -58.42%**

PATENT FILED

Controller General of Patents, Designs & Trade Marks

Docket No 33615



G.A.R.6
 (See Rule 221)
 RECEIPT

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Date/Time 2021/04/19 13:26:15

d. International Collaboration

Israel Universities
Establishment of Electrochemical Lab



Germany, 2008
RWTH, Aachen
Groundwater Flow & Contaminant Transport



Joint International Research, Publications,
Workshops, Conferences and IPR

Australia
Enviro Group
Stormwater &
Groundwater Management



USA
UniRem Tech
Bioremediation



Canada
Cape Breton University
Water Purification and Biochar Preparation



Dr. Stephanie



Dr. Allen Britten



Dr. Edwin MacLellan



Dr. Martin

e. KITS Involvement in Policy Formulation

- NASA-Land Cover Land Use Change (LCLUC) Initiatives (Regional Meeting and Training Workshop in KITS and Installation of AERONET in the Campus - Global Network of NASA),
- Evaluated the project on opportunity cost regarding the wetlands funded by GIZ of German Government
- KITS carried out a consultancy project dealing with ‘Eco-Hydrology’ of Point Calimere Wetland -a Ramsar site with funding from GIZ of German Government.
- The Water Institute helped in formulating a Water Policy for Kerala (Co-chairperson) and in preparing guidelines for establishing River Basin Authorities for the Planning Board of Kerala (Chairperson).
- KITS served as the Advisor for preparing Guidelines for Time and Motion Studies to come out with a Schedule of Rates for MNERAGA (for NIRD and Ministry of Rural Development and Panchayati Raj, GoI). The Time and Motion study for arriving at the schedule of rates for MNERAGA initiative of Tamil Nadu was carried out by KITS team; most of these works pertained to soil and water conservation and agriculture.
- In collaboration with the LSG of Alandurai Town Panchayat in Coimbatore District, KITS implemented sanitation projects adopting innovative technologies. The institution implemented

water management practices in one of the rural villages located near the campus. Scientific support is provided to the local panchayat and communities on water management, precision farming and animal husbandry.

f. Project Title: Evaluation of Ecosystem services with reference to climate change in Kole wetlands, India, Ramsar Regional Convention - East Asia

The objectives of the project are to analyse the status as well as trends in the Kole wetland use over the years; identify the major ecosystem services provided by the Kole wetland; assess the ecosystem services in the wetland; assess the impact of climate change on livelihood activities through physical changes in the wetland system



Conclusion:

In conclusion, achieving SDG 6 has not been a mere target for KITS, but has been its commitment to promote the wellbeing of humanity and the health of the planet. Karunya will continue to pave the way for healthier societies, enhance economic opportunities and strive for a self-sustainable future, through its avowed mission on water conservation, treatment, and management.

“Clean water is not an expense; but an investment for human dignity and well-being.” - Richard J. Codey

SO LET US INVEST !!



SDG 7 - Affordable and Clean Energy

Sustainable Development Goal (SDG) 7 is one of the 17 SDG's established by the United Nations General Assembly in 2015. It is focused on ensuring access to affordable, reliable and sustainable energy for all. Energy is vital for the humanity and economic development of a nation. SDG 7 has targets such as access to energy for all, increase in renewable energy, improvement in energy efficiency and investment on green buildings to be met by the year 2030.

Preamble

Karunya Institute of Technology and Sciences (KITS) being a deemed University offers a wide range of multidisciplinary programs in sciences, engineering, agriculture, management, arts and media. KITS has a commitment to provide quality education integrated with social research, extension & outreach and consultancy projects in alignment with Sustainable Development Goals. The 720 acre campus of Karunya, with more than 300 acres of farm land serve as experimental and demonstration laboratories and field stations to provide eco-friendly solutions to the problems in the areas of global importance and the thrust areas of the institution such as Water, Food, Healthcare and Sustainable energy. Most of the Technology missions of KITS also focus on research and demonstration projects in the areas related to environment, natural resources & ecosystems and biodiversity of the campus.

7.1 Research on Clean Energy

The Publications of the faculty in Scopus and WoS indexed Journals in SDG 7 is given below:

S.No	Title	Authors	Year	Journal	Volume	Issue
1	Conceptual Implementation of Artificial Intelligent based E-Mobility Controller in smart city Environment	Jayakumar, J. Nagaraj, B. Chacko, S. Ajay, P.	2021	Wireless Communications and Mobile Computing	2021	-

2	A review on global perspectives of sustainable development in bioenergy generation	Duarah, P. Haldar, D. Patel, A.K. Dong, C.-D. Singhanian, R.R. Purkait, M.K.	2022	Bioresource Technology	348	-
3	Innovative potential of additive friction stir deposition among current laser-based metal additive manufacturing processes: A review	Gopan, V. Leo Dev Wins, K. Surendran, A.	2021	CIRP Journal of Manufacturing Science and Technology	32	-
4	Consolidated bioprocessing of lignocellulosic biomass: Technological advances and challenges	Singhanian, R.R. Patel, A.K. Singh, A. Haldar, D. Soam, S. Chen, C.-W. Tsai, M.-L. Dong, C.-D.	2022	Bioresource Technology	354	-
5	Effect of Titanium dioxide nanoparticle as an additive on the working characteristics of biodiesel-water emulsion fuel blends	Vellaiyan, S. Subbiah, A. Chockalingam, P.	2021	Energy Sources, Part A: Recovery, Utilization and Environmental Effects	43	9
6	Production of bioethanol from food waste: Status and perspectives	Singh, A. Singhanian, R.R. Soam, S. Chen, C.-W. Haldar, D. Varjani, S. Chang, J.-S. Dong, C.-D. Patel, A.K.	2022	Bioresource Technology	360	-
7	Advanced technologies on the sustainable approaches for conversion of organic waste to valuable bioproducts: Emerging circular bioeconomy perspective	Ashokkumar, V. Flora, G. Venkatkarthick, R. SenthilKannan, K. Kuppam, C. Mary Stephy, G. Kamyab, H. Chen, W.-H. Thomas, J. Ngamcharussrivichai, C.	2022	Fuel	324	-
8	Exemplification of sustainable sodium silicate waste sediments as coarse aggregates in the performance evaluation of geopolymer concrete	Kanagaraj, B. Anand, N. Johnson Alengaram, U. Samuvel Raj, R. Kiran, T.	2022	Construction and Building Materials	330	-

9	A KNN based random subspace ensemble classifier for detection and discrimination of high impedance fault in PV integrated power network	Swarna, K.S.V. Vinayagam, A. Belsam Jeba Ananth, M. Venkatesh Kumar, P. Veerasamy, V. Radhakrishnan, P.	2022	Measurement: Journal of the International Measurement Confederation	187	-
10	The bond strength of self-compacting concrete exposed to elevated temperature	Mathews, M.E. Anand, N. Kodur, V.K.R. Arulraj, P.	2021	Proceedings of the Institution of Civil Engineers: Structures and Buildings	174	9
11	Weather Forecasting for Renewable Energy System: A Review	Meenal, R. Binu, D. Ramya, K.C. Michael, P.A. Vinoth Kumar, K. Rajasekaran, E. Sangeetha, B.	2022	Archives of Computational Methods in Engineering	29	5
12	Comprehensive case study on heat transfer enhancement using micro pore metal foams: From solar collectors to thermo electric generator applications	Bose, J.R. Manova, S. Asirvatham, L.G. Wongwises, S.	2021	Case Studies in Thermal Engineering	27	-
13	Performance evaluation of sodium silicate waste as a replacement for conventional sand in geopolymer concrete	Kanagaraj, B. Anand, N. Raj R, S. Lubloy, E.	2022	Journal of Cleaner Production	375	-
14	Comprehensive Assessment of Electric Vehicle Development, Deployment, and Policy Initiatives to Reduce GHG Emissions: Opportunities and Challenges	Paul Sathiyam, S. Benin Pratap, C. Stonier, A.A. Peter, G. Sherine, A. Praghsh, K. Ganji, V.	2022	IEEE Access	10	-
15	Performance and Emission Characteristics of Pyrolysis Oil Obtained from Neem de Oiled Cake and Waste Polystyrene in a Compression Ignition Engine	Raguraman, D. Kumar, A. Prasanna Raj Yadav, S. Patil, P.Y. Samson Isaac, J. Sowmya Dhanalakshmi, C. Madhu, P. Isaac Joshuaramesh Lalvani, J.	2021	Advances in Materials Science and Engineering	2021	-

16	Performance evaluation and emission characteristics of variable compression ratio diesel engine using Argemone Mexicana biodiesel	Suresh, M. Jawahar, C.P. Renish, R. Malmquist, A.	2021	Energy Sources, Part A: Recovery, Utilization and Environmental Effects	43	12
17	Performance evaluation on engineering properties and sustainability analysis of high strength geopolymers concrete	Kanagaraj, B. N, A. Alengaram, U.J. Raj R, S. B, P. Tattukolla, K.	2022	Journal of Building Engineering	60	-
18	Potato peels biochar composite with copper phthalocyanine for energy storage application	Wesley, R.J. Durairaj, A. Ramanathan, S. Obadiah, A. Justinabraham, R. Lv, X. Vasanthkumar, S.	2021	Diamond and Related Materials	115	-
19	Investigation on engineering properties and micro-structure characteristics of low strength and high strength geopolymers composites subjected to standard temperature exposure	Kanagaraj, B. Anand, N. Andrushia, A.D. Lubloy, E.	2022	Case Studies in Construction Materials	17	-
20	A LoRaWAN IoT-Enabled Trash Bin Level Monitoring System	Ramson, S.R.J. Vishnu, S. Kirubaraj, A.A. Anagnostopoulos, T. Abu-Mahfouz, A.M.	2022	IEEE Transactions on Industrial Informatics	18	2
21	A comprehensive review of dye-sensitized solar cell optimal fabrication conditions, natural dye selection, and application-based future perspectives	Baby, R. Nixon, P.D. Kumar, N.M. Subathra, M.S.P. Ananthi, N.	2022	Environmental Science and Pollution Research	29	1
22	Understanding the management of household food waste and its engineering for sustainable valorization- A state-of-the-art review	Haldar, D. Shabbirahmed, A.M. Singhania, R.R. Chen, C.-W. Dong, C.-D. Ponnusamy, V.K. Patel, A.K.	2022	Bioresource Technology	358	-

23	Weather prediction using random forest machine learning model	Meenal, R. Michael, P.A. Pamela, D. Rajasekaran, E.	2021	Indonesian Journal of Electrical Engineering and Computer Science	22	2
24	An improved enzymatic pre-hydrolysis strategy for efficient bioconversion of industrial pulp and paper sludge waste to bioethanol using a semi-simultaneous saccharification and fermentation process	Dey, P. Rangarajan, V. Nayak, J. Das, D.B. Wood, S.B.	2021	Fuel	294	-
25	Sugarcane bagasse into value-added products: a review	Shabbirahmed, A.M. Haldar, D. Dey, P. Patel, A.K. Singhania, R.R. Dong, C.-D. Purkait, M.K.	2022	Environmental Science and Pollution Research	-	-
26	Assessing suitability of commercial fibre reinforced plastic solar still for sustainable potable water production in rural India through detailed energy-exergy-economic analyses and environmental impacts	Sharon, H. Prabha, C. Vijay, R. Niyas, A.M. Gorjian, S.	2021	Journal of Environmental Management	295	-
27	Biodiesel production by transesterification of a mixture of pongamia and neem oils	Vinayaka, A.S. Mahanty, B. Rene, E.R. Behera, S.K.	2021	Biofuels	12	2
28	Investigation on improving the residual mechanical properties of reinforcement steel and bond strength of concrete exposed to elevated temperature	Kiran, T. Anand, N. Mathews, M.E. Kanagaraj, B. Andrushia, A.D. Lubloy, E. G, J.	2022	Case Studies in Construction Materials	16	-
29	Modeling and control of a hybrid electric vehicle to optimize system performance for fuel efficiency	Saju, C. Michael, P.A. Jarin, T.	2022	Sustainable Energy Technologies and Assessments	52	-

30	Optimal model parameter estimation of solar and fuel cells using improved estimation of distribution algorithm	Pratap Chandran, B. Immanuel Selvakumar, A. Shine Let, G. Paul Sathiyam, S.	2021	Ain Shams Engineering Journal	12	2
31	Performance evaluation on engineering properties of sodium silicate binder as a precursor material for the development of cement-free concrete	Kanagaraj, B. Anand, N. Samuvel Raj, R. Lubloy, E.	2022	Developments in the Built Environment	12	-
32	Thermal modeling, characterization, and enviro-economic investigations on inclined felt sheet solar distiller for seawater desalination	Hilarydoss, S. Delhiraja, K. Reddy, K.S. Philip, L. Chand, D. Benny, B.	2021	Environmental Science and Pollution Research	28	45
33	Experimental Setup of Smart E-Vehicle Charging Station using IOT Technology	Sujitha, S. Vinoth Kumar, K. Vinodha, K. Josh, T.F. Venkatesh, B.	2021	2021 IEEE International Conference on Mobile Networks and Wireless Communications ICMNWC 2021	-	-
34	A comprehensive review on Crossflow turbine for hydropower applications	Anand, R.S. Jawahar, C.P. Bellos, E. Malmquist, A.	2021	Ocean Engineering	240	-
35	Influence of mineral admixtures on the residual mechanical properties and durability characteristics of self-compacting concrete subjected to high temperature	Kiran, T. Mathews, M.E. N, A. Alengaram, U.J. Andrushia, A.D.	2022	Australian Journal of Civil Engineering	20	2
36	Bioelectricity production using microbial fuel cell—a review	Kasipandian, K. Saigeetha, S. Samrot, A.V. Abirami, S. Emilin Renitta, R. Dhiva, S.	2021	Biointerface Research in Applied Chemistry	11	2

37	Component fabrication techniques for solid oxide fuel cell (SOFC)–A comprehensive review and future prospects	Deepi, A.S. Dharani Priya, S. Samson Nesaraj, A. Selvakumar, A.I.	2022	International Journal of Green Energy	19	14
38	Palm stearin biodiesel: preparation, characterization using spectrometric techniques and the assessment of fuel properties	John, C.B. Raja, S.A. Deepanraj, B. Ong, H.C.	2022	Biomass Conversion and Biorefinery	12	5
39	Microgrid optimization and integration of renewable energy resources: Innovation, challenges and prospects	Blesslin, S.T. Wessley, G.J.J. Kanagaraj, V. Kamatchi, S. Radhika, A. Janeera, D.A.	2021	Integration of Renewable Energy Sources with Smart Grid	-	-
40	Mn-doped nickeltitanate ($Ni_{1-x}Mn_xTiO_3$) as a promising support material for PdSn electrocatalysts for methanol oxidation in alkaline media	Saraswathy, R. Suman, R. Malin Bruntha, P. Khanna, D. Chellasamy, V.	2021	RSC Advances	11	46
41	A Review on the Feasibility of Deployment of Renewable Energy Sources for Electric Vehicles under Smart Grid Environment	Femy, P.H. Jayakumar, J.	2021	International Journal of Electrical and Electronics Research	9	3
42	Towards a Smarter Surveillance Solution: The Convergence of Smart City and Energy Efficient Unmanned Aerial Vehicle Technologies	Jain, R. Nagrath, P. Thakur, N. Saini, D. Sharma, N. Hemanth, D.J.	2021	Studies in Systems, Decision and Control	332	-
43	Effect of protective coating on axial resistance and residual capacity of self-compacting concrete columns exposed to standard fire	Ealiyas Mathews, M. Kiran, T. Anand, N. Lubloy, E. Naser, M.Z. Prince Arulraj, G.	2022	Engineering Structures	264	-

44	Impact analysis of time-varying voltage-dependent load models on hybrid DG planning in a radial distribution system using analytical approach	Merlin Sajini, M.L. Suja, S. Merlin Gilbert Raj, S.	2021	IET Renewable Power Generation	15	1
45	Strength and microstructure behaviour of high calcium fly ash based sustainable geo polymer concrete	Vijaya Prasad, B. Paul Daniel, A.P. Anand, N. Yadav, S.K.	2022	Journal of Engineering, Design and Technology	20	2
46	Effect of elevated temperature on interfacial shear transfer capacity of self-compacting concrete	Mathews, M.E. Anand, N. Lublóy, É. Kiran, T.	2021	Case Studies in Construction Materials	15	-
47	Production of silicon nanoparticles from selected agricultural wastes	Adebisi, J.A. Agunsoye, J.O. Ahmed, I.I. Bello, S.A. Haris, M. Ramakokovhu, M.M. Hassan, S.B.	2021	Materials Today: Proceedings	38	-
48	Implementation of Smart Electric Vehicle Charging Station Driven Using Experimental Investigation	Vinoth Kumar, K. Radhakrishnan, P. Kalaivani, R. Devadoss, V. Vijay Anand, L.D. Vinodha, K.	2021	2021 2nd Global Conference for Advancement in Technology, GCAT 2021	-	-
49	Derivation of synthetic fuel from waste plastic: investigation of engine operating characteristics on DI diesel engine	Rajamohan, S. Marshal, J.J. Suresh, S.	2021	Environmental Science and Pollution Research	28	10
50	Cooling of high heat flux miniaturized electronic devices using thermal ground plane: An overview	Rakshith, B.L. Asirvatham, L.G. Angeline, A.A. Manova, S. Bose, J.R. Selvin Raj, J.P. Mahian, O. Wongwises, S.	2022	Renewable and Sustainable Energy Reviews	170	-
51	Metal nanoparticles supported on crystalline Al(OH) ₃ Nano sheets for efficient catalytic hydrogen production from hydrous	Prabu, S. Vinu, M. Chiang, K.-Y.	2021	International Journal of Energy Research	45	13

	hydrazine in aqueous solution					
52	Aerodynamic simulation of optimized vortex generators and rear spoiler for performance vehicles	Palanivendhan, M. Chandradass, J. Bannaravuri, P.K. Philip, J. Shubham, K.	2021	Materials Today: Proceedings	45	-
53	NBA: novel bio-inspired algorithm for energy optimization in WSN for IoT applications	Devassy, D. Immanuel Johnraja, J. Paulraj, G.J.L.	2022	Journal of Supercomputing	78	14
54	Ultrafine Ru nanoparticles in shape control hollow octahedron MOF derived cobalt oxide@carbon as high-efficiency catalysts for hydrolysis of ammonia borane	Prabu, S. Vinu, M. Chiang, K.-Y.	2022	Journal of the Taiwan Institute of Chemical Engineers	139	-
55	Machine Learning-Based Predictive Techno-Economic Analysis of Power System	Queen, H.J. J., J. J., D.T. Moses Babu, K.V.S. Thota, S.P.	2021	IEEE Access	9	-
56	Improving the Efficiency of Photovoltaic Panels Using Machine Learning Approach	Khilar, R. Suba, G.M. Kumar, T.S. Samson Isaac, J. Shinde, S.K. Ramya, S. Prabhu, V. Erko, K.G.	2022	International Journal of Photoenergy	2022	-
57	Internet of things-based energy-efficient optimized heuristic framework to monitor sportsperson s health	Cui, M. Poovendran, P. Stewart Kirubakaran, S.	2021	Technology and Health Care	29	6
58	Fabrication of microbial fuel cells with nanoelectrodes for enhanced bioenergy production	Krishnan, S.K. Kandasamy, S. Subbiah, K.	2021	Nanomaterials: Application in Biofuels and Bioenergy Production Systems	-	-
59	Cluster Head Selection and Energy Efficient Multicast Routing Protocol-Based Optimal Route Selection for Mobile Ad Hoc Networks	Suresh Kumar, R. Manimegalai, P. Vasanth Raj, P.T. Dhanagopal, R. Johnson Santhosh, A.	2022	Wireless Communications and Mobile Computing	2022	-

60	Polarization Insensitive Circular Ring Resonator Based Perfect Metamaterial Absorber Design and Simulation on a Silicon Substrate	Du John, H.V. Jose, T. Jone, A.A.A. Sagayam, K.M. Pandey, B.K. Pandey, D.	2022	Silicon	14	14
61	Analysis of the Different Types of Electric Motors Used in Electric Vehicles	Ramya, K.C. Ramani, J.G. Sridevi, A. Rai, R.S. Shirley, D.R.A.	2022	EAI/Springer Innovations in Communication and Computing	-	-
62	Effect of methane enrichment on the performance of a dual fuel CI engine	Vijin Prabhu, A. Manimaran, R. Jeba, P. Babu, R.	2021	International Journal of Ambient Energy	42	3
63	Investigation of concentrated solar collector with discretized flat mirrors in parabolic arrangement	Ramasamy, A.K. Ganesh, M. Rajamani, K. Loganathan, A.K. Rangaswamy, R.	2021	Energy for Sustainable Development	64	-
64	Post-fire behaviour and improving the performance of hot rolled open sections subjected to standard fire exposure	Kiran, T. Anand, N. Mathews, M.E. Andrushia, A.D. Walls, R. Kanagaraj, B. lubloy, E.	2022	Case Studies in Construction Materials	16	-
65	Facile wet-chemical synthesis and evaluation of physico-chemical characteristics of novel nanocrystalline NdCoO ₃ -based perovskite oxide as cathode for LT-SOFC applications	Priya, S.D. Nesaraj, A.S. Selvakumar, A.I.	2021	Bulletin of Materials Science	44	2
66	Feasibility of halide (F ⁻ , Cl ⁻ and Br ⁻) encapsulated Be ₁₂ O ₁₂ nanocages as potential anode for metal-ion batteries – A DFT-D3 approach	Duraisamy, P.D. Prince Makarios Paul, S. Gopalan, P. Angamuthu, A.	2022	Materials Science in Semiconductor Processing	147	-
67	Design and simulation of inorganic perovskite solar cell	Jebakumar, J.P.A. Moni, D.J. Gracia, D. Shallet, M.D.	2022	Applied Nanoscience (Switzerland)	12	5
68	A novel lightweight phase-changing cooling roof tile	Arunraj, E. Hemalatha, G. Noroozinejad Farsangi, E.	2021	International Journal of Engineering Transactions C: Aspects	34	6

69	Artificial Intelligence-Based Energy Management and Real-Time Optimization in Electric and Hybrid Electric Vehicles	Pritima, D. Rani, S.S. Rajalakshmy, P. Kumar, K.V. Krishnamoorthy, S.	2022	EAI/Springer Innovations in Communication and Computing	-	-
70	Detection of Attackers in Cognitive Radio Network Using Optimized Neural Networks	Ajay, V.P. Nesasudha, M.	2022	Intelligent Automation and Soft Computing	34	1
71	SEPIC Converter for Low Power LED Applications	Javeed, P. Yadav, L.K. Venkatesh Kumar, P. Kumar, R. Swaroop, S.	2021	Journal of Physics: Conference Series	1818	1
72	Dairy Waste Management: A Narrative Review on Current Knowledge	Anand, T.S. Vahab, H. Chandran, D. Shanavas, A. Kumar, M. Nainu, F. Bagath, M. Mohankumar, P. Mohapatra, R.K. Chakraborty, S. Alagawany, M. Dhama, K.	2022	Indian Veterinary Journal	99	8
73	Metaheuristic optimization techniques to design solar-fuel cell-battery energy system for locomotives	Ajayan, S. Immanuel Selvakumar, A.	2022	International Journal of Hydrogen Energy	47	3
74	Performance Evaluation and Energy Efficient VM Placement for Fog-Assisted IoT Environment	Patra, S.S. Mittal, M. Jude Hemantha, D. Ahmad, M.A.L. Barik, R.K.	2022	Lecture Notes on Data Engineering and Communications Technologies	74	-
75	Day-ahead wind power forecasting using machine learning algorithms	Akash, R. Rangaraj, A.G. Meenal, R. Lydia, M.	2021	Advances in Intelligent Systems and Computing	1227	-
76	Investigation on Crack Control and Crack Pattern Analysis of Self-compacting Concrete Exposed to Standard Fire Exposure	Mathews, M.E. Anand, N. Andrushia, A.D. Kiran, T.	2021	RILEM Bookseries	31	-
77	OCSO-CA: opposition based competitive swarm optimizer in energy efficient IoT clustering	Biswas, A. Majumdar, A. Das, S. Baishnab, K.L.	2022	Frontiers of Computer Science	16	1

78	Prediction of Rooftop Photovoltaic Solar Potential Using Machine Learning	Mukilan, K. Thaiyalnayaki, K. Dwivedi, Y.D. Samson Isaac, J. Poonia, A. Sharma, A. Al- Ammar, E.A. Wabaidur, S.M. Subramanian, B.B. Kassa, A.	2022	International Journal of Photoenergy	2022	-
79	Structural response of self-compacting concrete beams under elevated temperature	Mathews, M.E. Andrushia, A.D. Kiran, T. Yadav, B.S.K. Kanagaraj, B. Anand, N.	2021	Materials Today: Proceedings	49	-
80	An experimental investigation on the heat transfer characteristics of minichannel thermosyphon with multiports for cooling the modern miniaturized electronic devices	Manova, S. Godson Asirvatham, L. Appadurai, A.A. Ribatski, G. Kumar, P. Wongwises, S.	2022	Energy Conversion and Management	268	-
81	Evaluation of the anti-rheumatic properties of thymol using carbon dots as nanocarriers on FCA induced arthritic rats	Murugesan, S. Srinivasan, V. Lakshmanan, D.K. Venkateswaran, M.R. Jayabal, S. Muthukumar Nadar, M.S.A. Kathiravan, A. Asha Jhonsi, M. Thilagar, S. Periyasamy, S.	2021	Food and Function	12	11
82	Flexural behavior of fire damaged self-compacting concrete beams strengthened with fiber reinforced polymer (FRP) wrapping	Mathews, M.E. N, A. A, D.A. Kiran, T. Al-Jabri, K.	2021	Journal of Structural Fire Engineering	12	4
83	Enhanced hydrogen evolution by rGO decorated copper nickel tin sulphide (CNTS-rGO) in acidic medium by water splitting	Sheebha, I. Maheskumar, V. Sebastian, A. Vidhya, B. Sakunthala, A.	2022	International Journal of Hydrogen Energy	47	61

84	Enhancement of optoelectrical properties in Co doped CdS–TiO ₂ nanocomposite thin film as photoanode for Semiconductor Sensitized Solar Cells (SSSCs)	Jostar, S.T. Devadason, S. Arputhavalli, G.J. Jebasingh, S. Suthagar, J.	2022	Physica E: Low-Dimensional Systems and Nanostructures	142	-
85	A comparative study on the electrocatalytic and photocatalytic activity of reduced graphene oxide (rGO) and doped rGO based Cu ₅ FeS ₄ composite	Sebastian, A. Deepthi, V. Sheebha, I. Vidhya, B. Maheskumar, V. Sakunthala, A.	2022	International Journal of Hydrogen Energy	47	64
86	Electrochemistry and Electrocatalytic Activity of Cobaloxime Complexes	Sowmya, S. Vijaikanth, V.	2022	ChemistrySelect	7	10
87	Energy Efficient MAC with Variable Duty Cycle for Wireless Sensor Networks	Subramanyam, R. Bala, G.J. Perattur, N. Kanaga, E.G.M.	2022	International Journal of Electronics	109	3
88	Facile soft chemical synthesis and physico-chemical characterisation of ceria based novel ceramic nanocomposite electrolyte for LTSOFC application	Priya, S.D. Nesaraj, A.S. Selvakumar, A.I.	2021	Materials Research Innovations	25	3
89	Achieving Longevity in Wireless Body Area Network by Efficient Transmission Power Control for IoMT Applications	Rajesh, G. Raajini, X.M. Kritika, N. Kavinkumar, A. Sagayam, K.M. Som, M.M. Wahab, M.H.A.	2022	International Journal of Integrated Engineering	14	3
90	Nanotechnology's contribution to next-generation bioenergy production	Kandasamy, S. Manickam, N.K. Subbiah, K. Muthukumar, K. Kumaraguruparaswami, M. Venkata Ratnam, M.	2021	Nanomaterials: Application in Biofuels and Bioenergy Production Systems	-	-
91	Machine learning analysis on the impacts of COVID-19 on India's renewable energy transitions and air quality	Stephan, T. Al-Turjman, F. Ravishankar, M. Stephan, P.	2022	Environmental Science and Pollution Research	29	52

92	Comparative techno-economic analysis of power system with and without renewable energy sources	Queen, H.J. Jayakumar, J. Deepika, T.J.	2021	Indonesian Journal of Electrical Engineering and Computer Science	24	3
93	Design of directional two L shaped microstrip patch antenna for WSN applications using Sea Lion optimization algorithm	George, R. Mary, T.A.J.	2021	Proceedings of the 2021 1st International Conference on Advances in Electrical, Computing, Communications and Sustainable Technologies, ICAECT 2021	-	-
94	A compact tilted split ring multiband metamaterial absorber for energy harvesting applications	Evangeline Persis, G.P. John Paul, J. Bella Mary, T. Catherine Joy, R.	2022	Materials Today: Proceedings	56	-
95	Integration of sensors for dam water quality analysis – A prototype	Rose, L. Mary, X.A. Karthik, C.	2021	Water Science and Technology	84	10-11
96	A Cognitive Knowledge Efficient Path Selection Using Centroid and Ant-Colony Optimized Hybrid Protocol for WSN-Assisted IoT	Raj Kumar, N.P. Bala, G.J.	2022	Wireless Personal Communications	124	3
97	Experimental Investigation on Productivity Enhancement of a Solar Still Modified with the Evacuated Tube Heat Pipe using Paraffin Wax	R, V. Govindasamy, K. P, V. Lazarus, G.A.	2022	Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science	236	21
98	Biogas production by pilot-scale anaerobic co-digestion and life cycle assessment using a real scale scenario: Independent parameters and co-substrates influence	Mosquera, J. Rangel, C. Thomas, J. Santis, A. Acevedo, P. Cabeza, I.	2021	Processes	9	11
99	Phyto-pharmacological investigation of marine red algae Kappaphycus	Sharan, L.V. Vennila, J.J.	2021	International Journal on Algae	23	2

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100	Semiconductor Materials for Solar PV Technology and Challenges towards Electrical Engineering	Siva Ramkumar, M. Felshiya Rajakumari, R. Kannan, N. Premkumar, R. Mohanasundaram, S. Purushotham, S. Ramya, D. Rajan, K.	2022	Advances in Materials Science and Engineering	2022	-
101	Finite State Machine-Based Load Scheduling Algorithm for Smart Home Energy Management	Merlin Sajini, M.L. Suja, S. Merlin Gilbert Raj, S. Kowsalyadevi, S. Maria, C.	2021	IETE Journal of Research	-	-
102	Environmental Impact of Electric Vehicles	Jose, P.S. Jose, P.S.H. Wessley, G.J.J. Rajalakshmy, P.	2022	EAI/Springer Innovations in Communication and Computing	-	-
103	Wet-chemical synthesis and physico / electro-chemical performance characteristics of novel perovskite cathode materials for low-temperature solid oxide fuel cells	Reni, M.L. Samson Nesaraj, A.	2021	Iranian Journal of Chemistry and Chemical Engineering	40	2
104	RFID Based Wireless Charging System for Electric Car	Chaganti, R.K.R. Amruth, P.M. Devarinti, V.R. Chandra, B.V.J. Victor Du John, H.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-
105	A DFT Study of Halogen (F ⁻ , Cl ⁻ , and Br ⁻) Encapsulated Ga ₁₂ X ₁₂ (X = N, P, and As) Nanocages for Sodium-Ion Batteries	Duraisamy, P.D. Paul, S.P.M. Gopalan, P. Paranthaman, S. Angamuthu, A.	2022	Journal of Inorganic and Organometallic Polymers and Materials	32	11
106	Challenges And Impacts of V2g Integration -A Review	Kuruville, V. Kumar, P.V. Selvakumar, A.I.	2022	8th International Conference on Advanced Computing and Communication Systems, ICACCS 2022	-	-

107	Comparative techno-economic analysis of power system with and without renewable energy sources and statcom	Queen, H.J. Jayakumar, J. Deepika, T.J.	2021	Journal of Green Engineering	11	2
108	Regression Based Predictive Machine Learning Model for Pervasive Data Analysis in Power Systems	Sasikala, K. Jayakumar, J. Senthil Kumar, A. Chacko, S. Queen, H.J.	2022	International Journal of Electrical and Electronics Research	10	3
109	Impact of electric vehicles in smart grids and micro-grids	Thomas, T. Michael, P.A. Joy, A.	2022	Smart Grids and Microgrids: Technology Evolution	-	-
110	Optimization of Performance and Emission Characteristics of Biodiesel from Non-Edible Raphanus sativus Oil with Nano-Additive	Chokkalingam, S. Chandrasekaran, K. Pandian, S. Asir, O.	2022	Theoretical Foundations of Chemical Engineering	56	6
111	Multi-omics intervention in Setaria to dissect climate-resilient traits: Progress and prospects	Aggarwal, P.R. Pramitha, L. Choudhary, P. Singh, R.K. Shukla, P. Prasad, M. Muthamilarasan	2022	Frontiers in Plant Science	13	-
112	Valorization of Agro-industrial Discards in Fermentation for the Production of Cellulase Enzyme	Dinil, A. Jacob, A.	2022	Journal of Pure and Applied Microbiology	16	1
113	Future of electric vehicles with reference to national electric mobility mission plan at Tamil Nadu	Shrilatha, S. Aruna, K. Bhagavathy, S. Chellaiah, G. Gupta, A.	2021	AIP Conference Proceedings	2396	-
114	A Novel Optimization Algorithm for Modifying the Parameter Unit of Solar PV Cell	Nayagam, V.S. Kumar, S.S. Thiyagarajan, V. Kamal, N. Nisha, N. Isaac, J.S. Kassa, A.	2022	International Journal of Photoenergy	2022	-
115	A test bench on quality checking for electric vehicle chargers	Jency Joseph, J. Josh, F.T. Leander Gilbert, S. Leander Gilbert, S.	2021	Materials Today: Proceedings	45	-
116	Energy-Efficient Network Routing	Devassy, D. Jebadurai, I.J.	2022	EAI/Springer Innovations in	-	-

	Protocols for IoT Applications	Paulraj, G.J.L. Silas, S. Jebadurai		Communication and Computing		
117	Low temperature assisted phase transitions in thermally evaporated Cu ₂ Se/Ga ₃ Se ₂ /In ₃ Se ₂ multilayer thin film structure: Raman signatures of a pristine chalcopyrite CuIn _x Ga _{1-x} Se ₂ structure	Issac Nelson, P. Mohan, A. Rathes Kannan, R. Gopala Krishnan, M. Sathya Moorthy, K. Vidhya, B. Rajesh, S. El Sayed Massoud, E. Vasudeva Reddy Minnam Reddy, R.	2022	Surfaces and Interfaces	29	-
118	Paradigm shift from conventional processes to advanced membrane adsorption-mediated inactivation processes towards holistic management of virus - A critical review	Dey, P. Halder, D. Rangarajan, V. Suggala, V.S. Saji, G. Dilip, K.J.	2022	Journal of Environmental Chemical Engineering	10	6
119	Combustion synthesis and characterization of Ni doped LiMn ₂ O ₄ cathode nanoparticles for lithium-ion battery applications	Deepi, A.S. Sriresh, G. Nesaraj, A.S.	2021	Revista Materia	26	1
120	Design of Si Based Nano Strip Resonator with Polarization-Insensitive Metamaterial (MTM) Absorber on a Glass Substrate	Du John, H.V. Moni, D.J. Ponraj, D.N. Sagayam, K.M. Pandey, D. Pandey, B.K.	2022	Silicon	14	10
121	Review of FPGA-Based Accelerators of Deep Convolutional Neural Networks	Philip, N.M. Sivamangai, N.M.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-
122	Global Solar Radiation Prediction using Empirical based Models	Sivakumar, M. Priya, S.J. Subathra, M.S.P.	2022	Proceedings - International Conference on Applied Artificial Intelligence and Computing, ICAAIC 2022	-	-

123	A Study on Massive MIMO 5G Challenges	Kanchana Devi, A. Bhuvaneshwari, B.	2022	Advances in Parallel Computing	37	-
124	Design of Low Power Dynamic Comparator for SAR ADC	Herinsha, A.J. Shylu Sam, D.S. Atchaya, A.J. Vignesh T, M.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-
125	DC-DC Converters based Integration of Grid Stability Estimation for PV Systems	Ma, S. Vellimedu, A.S. Purushotham, S. Suresh, M. Pe, J. Prasad, K.L. Venkatesh, R. Sivaramkrishnan, M.	2022	International Conference on Sustainable Computing and Data Communication Systems, ICSCDS 2022 - Proceedings	-	-
126	An Extensive Critique on Electric Vehicle Components and Charging Systems	Iqubal, M. Sathiyam, P. Stonier, A.A. Peter, G. Vanaja, D.S. Ganji, V.	2022	International Transactions on Electrical Energy Systems	2022	-
127	Design of solar cells for dual charging capability using seebeck effect	Benhur Ruhneb, J. Samuel Varghese, J. Du John, V.H. Jackuline Moni, D.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-
128	Wide band metamaterial absorber for gallium arsenide GaAs solar cells	John, V.D.H. Antony, B. Teja, N.N. Gandikota, V.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-
129	A topology review and comparative analysis on transformerless grid-connected photovoltaic inverters and leakage current reduction techniques	Ponrekha A., S. Subathra, M.S.P. Bharatiraja, C. Manoj Kumar, N. Haes Alhelou, H.	2022	IET Renewable Power Generation	-	-
130	Optimal Sizing of Various Types of Microgrids - A Review	Irence, L.B.S. Selvakumar, A.I.	2021	Journal of Engineering Science and Technology Review	14	6

131	The Diagnosis for the Lack of Remote Village Electrification Using Sustainable Energy in Labranzagrande	John, A.A. Kumar, P.V.	2021	Lecture Notes in Civil Engineering	78	-
132	Molecular Insights on the Dihydrogen Bond Properties of Metal Borohydride Complexes upon Ammoniation	Arumugam, S. Angamuthu, A. Gopalan, P.	2021	ECS Journal of Solid State Science and Technology	10	9
133	Mitigation measures for power quality issues in renewable energy integration and impact of IoT in grid control	Hepsiba, D. Anand, L.D.V. Granty, R.E.J. Shajilin, J.B. Shirley, D.R.A.	2021	Integration of Renewable Energy Sources with Smart Grid	-	-
134	IoT Enabled Sustainable Automated Greenhouse Architecture with Machine Learning Module	Lanitha, B. Poornima, E. Sudha, R. David, D.B. Kannan, K. Jegan, R. Peroumal, V. Kirubagharan, R. Tesfaye, M.	2022	Journal of Nanomaterials	2022	-
135	Dye sensitized solar cell action of Sn(IV)tetrakis(4-pyridyl) porphyrins as a function of axial ligation and pyridine protonation	Jayachandran, P. Angamuthu, A. Gopalan, P.	2021	Journal of the Iranian Chemical Society	18	7
136	Execution of smart electric vehicle charging station driven by RE technology	Vinoth Kumar, K. Josh, F.T. Vinodha, K. Ramya, K.C. Chacko, S. Gunapriya, B.	2021	2021 IEEE Mysore Sub Section International Conference, MysuruCon 2021	-	-
137	A New High Gain AC-Decoupled Transformerless Inverter for Photovoltaic Applications	Ponrekha, S.A. Subathra, M.S.P. Bharatiraja, C.	2022	Journal of Applied Science and Engineering (Taiwan)	25	6
138	Analysis of the blade profile of the Savonius wind turbine using computational fluid dynamics	Venkatesan, S.P. Venkatesh, S. Sunil Kumar, M. Senthamizh Selvan, S. Sai, Y.	2022	International Journal of Ambient Energy	43	1

139	Al ₂ O ₃ -coated Fe ₃ O ₄ /graphene/TiO ₂ hybrid nanocomposite mixture as anode material for lithium-ion batteries	Saravanakumar, K. Samson Isaac, J. Rajesh, R.	2022	Current Science	123	2
140	Fuel vehicle improvement using high voltage gain in DC-DC boost converter	Jarin, T. Akkara, S. Sreeja Mole, S.S. Manivannan, A. Immanuel Selvakumar, A.	2022	Renewable Energy Focus	43	-
141	Improved enzymatic hydrolysis of lignocellulosic waste biomass: most essential stage to develop cost-effective second-generation biofuel production	Dey, P. Gupta, G. Nayak, J. Dilip, K.J.	2022	Biofuels and Bioenergy: A Techno-Economic Approach	-	-
142	Smart Charging in Electric Vehicles and Its Impact on the Evolution of Travelling	Shirley, D.R.A. Sankari, B.S. Rai, R.S. Janeera, D.A. Raj, P.A.C.	2022	EAI/Springer Innovations in Communication and Computing	-	-
143	Remote sensing-based water quality analysis of Vembanad lake	Mohandas, K.A. Brema, J.	2021	Journal of Green Engineering	11	1
144	SRF Theory-Based PI Controller Applied to Micro Grid Interfaced with hybrid sources for Power Quality Improvement	Sreejyothi, K.R. Kumar, P.V. Jayakumar, J.	2022	8th International Conference on Advanced Computing and Communication Systems, ICACCS 2022	-	-
145	Operating Cost Analysis of Microgrid Including Renewable Energy Sources and a Battery Under Dynamic Pricing	Queen, H.J. Jayakumar, J. Deepika, T.J.	2022	Lecture Notes in Electrical Engineering	795	-
146	Iot based prognostics using mems sensor with single board computers for rotary machines	Vasanth, A. Paul, P.S. Shylu, D.S. Paul, P.M.	2021	Przegląd Elektrotechniczny	97	11
147	Investigations on diesel engine characteristics using waste biomass pyrolysis oil: A study on the effect of compression ratio	Marshal, S.J.J. Rajamohan, S. Gnanasundari, K. Kumar, G. Sharon, M.G.	2022	Journal of Applied Research and Technology	20	3

148	Mathematical modeling of real time wind power density using the transformation technique	Divya, P.S. Manoj, G. John, C.G. Lydia, M.	2022	Przegląd Elektrotechniczny	-	4
149	EMSNDP: Energy Minimized Optimal Zone Selection of Sensor Network to Build the Data Path for IoTN	Nalluri, P.R.K. Gnanadhas, J.B.	2021	Wireless Personal Communications	119	1
150	Enhancement of energy efficient distribution generation integrated with solid state transformer using improved rider optimization algorithm	Saju, N. Jegathesan, V.	2022	Australian Journal of Electrical and Electronics Engineering	19	4
151	Green telecare: An iot and cloud-based identification of common thoracic diseases using deep learning approach	Daniel, E. Durga, S. Vijayalakshmi, J. Janani, R. Susila, N.	2021	Journal of Green Engineering	11	2
152	Facile chemical synthesis and electrochemical studies of CNO-CGO nanocomposite electrolytes for LTSOFC application	Priya, S.D. Nesaraj, A.S. Selvakumar, A.I. Selvasekarapandian	2022	Journal of the Australian Ceramic Society	58	4
153	Recovery of Bioactive Components from Food Processing Waste	Ravichandran, C. Mutharasu, R.M. Upadhyay, A.	2021	Sustainable Food Waste Management: Concepts and Innovations	-	-
154	A Machine Learning-Based Novel Energy Optimization Algorithm in a Photovoltaic Solar Power System	Prasad, K. Samson Isaac, J. Ponsudha, P. Nithya, N. Shinde, S.K. Gopal, S.R. Sarojwal, A. Karthikumar, K. Hadish, K.M.	2022	International Journal of Photoenergy	2022	-
155	Mini Scale Horizontal Axis Wind Turbine Blade with Different Mixed Airfoil and their Performance in QBLADE	Gayathri, R. Ponmary Pushpa Latha, D. Thanga Helina, S. Mondal, R.K. Jeeva, N.G.	2022	International Journal of Mechanical Engineering	7	1

156	Decoration of WO ₃ nanospheres with graphene nanotubes for enhancement of solar energy conversion applications	Hariharan, G. Dharani, P. Aruna, K. Ramya, J. Sridarane, R.	2022	Journal of Materials Science: Materials in Electronics	33	18
157	Experimental Analysis on a Designed and Fabricated Cost-Effective Solar Pond Model	Lakshya, A.K. David, A. Sahu, M. Sinha, R.K.	2022	Lecture Notes in Mechanical Engineering	1	-
158	Flyback PPC Converter with Artificial Neural Network for Distributed MPPT Application	Sebin Davis, K. Jegathesan, V.	2022	8th International Conference on Advanced Computing and Communication Systems, ICACCS 2022	-	-
159	Light absorption of a polymer based single/multi junction solar cell model	Varghese, J.S. Ruhneb, B. Jackuline Moni, D. Victor Du John, H.	2021	Przegląd Elektrotechnicz ny	1	1
160	Simple soft chemical synthesis and characterization of phase pure co-doped LiMn ₂ O ₄ nanoparticles as cathode materials for Li-ion battery applications	Deepi, A.S. Srikesh, G. Nesaraj, A.S.	2021	Asia-Pacific Journal of Science and Technology	26	2
161	Energy-Efficient Chicken Swarm Optimization Algorithm Using Multiple Cluster Head Selection in Wireless Sensor Networks	Devassy, D. Johnraja, J.I. Paulraj, G.J.L.	2022	ICISTSD 2022 - 3rd International Conference on Innovations in Science and Technology for Sustainable Development	-	-
162	Electric Vehicle Charging Technology: Recent Developments	Paul Sathiyam, S. Jensen, S. Abirami, J.	2022	Lecture Notes in Networks and Systems	355	-
163	Phytochemicals from artocarpus heterophyllus and its potential applications: A review	ANU, J.	2021	Plant Cell Biotechnology and Molecular Biology	22	29- 30

164	Efficiency gains, alternative sources and environmental tracking systems for telecommunications networks	Bhardwaj, I. Chinnaiah, B. Ebenezer, V. Mani Joseph, P. Kavitha, A. Sreekanth, D.	2021	Journal of Nuclear Energy Science and Power Generation Technology	10	9
165	Optimal location and sizing of various DG units in real distribution substation using heuristic approach	Sajini M.L, M. Suja, S. Gilbert Raj S, M.	2022	Circuit World	-	-
166	Analysis of Foot-Ground Interaction for Assessment of Gait Using Lab View	Isaac, S.J. Dhiviyalakshmi, L. Raj, A.C.P. Sreepadmini, R. Sakthi, S.A.	2022	Journal of New Materials for Electrochemical Systems	25	1
167	Machine Learning-Based Management of Hybrid Energy Storage Systems in e-Vehicles	Blessie, E.C. Jagnannathan, S.K. Krishna, B.V. David, D.B. Maheswari, R. Pavithra, M. Raj, P.A. Paramasivam, S. Prasad, V.R.R.	2022	Journal of Nanomaterials	2022	-
168	Performance evaluation of vegetable fueled domestic cooking stove	Mohanrajhu, N. Balamurugan, S. Suresh, M. Jadhav, M.M. Leno, I.J.	2022	AIP Conference Proceedings	2527	-
169	Minimization of the Wind Turbine Cost of Energy Through Probability Distribution Functions	Divya, P.S. Lydia, M. Manoj, G. Devaraj Arumainayagam, S.	2021	EAI/Springer Innovations in Communication and Computing	-	-
170	Wind Turbine Energy Cost Optimisation Using Various Power Models	Divya, P.S. Moses, V. Manoj, G. Lydia, M.	2022	WSEAS Transactions on Power Systems	17	-
171	Performance Analysis in Cognitive Radio using Multirate Asynchronous Sub-Nyquist Sampling System	Muneera Begum, H. Hepsiba, D. Vijay Anand, L.D. Janeera, D.A. Ruth Anita Shirley, D. Benedict Tephila, M.	2021	Proceedings of the 5th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), I-SMAC 2021	-	-
172	Stability issues and mitigating techniques employed in AC grid	Michael, P.A. Palanisamy, N.	2022	Materials Today: Proceedings	69	-

173	Diesel engine performance and emissions with fuels derived from waste tyres	Joseph John Marshal, S. Samuel, S.Y. Sundari, K.G. Rajamohan, S.	2021	Advanced Technology for the Conversion of Waste into Fuels and Chemicals: Volume 2: Chemical Processes	-	-
174	Smart Recharge of Electric Vehicles Using Wind Energy	Samuel, S.M. Sam Isaac, S.P. Rajasekaran, M.	2021	2021 International Conference on Intelligent Technologies, CONIT 2021	-	-
175	Application of lithium nonafluoro-1-butane sulfonate (nonaflate) based non-aqueous liquid electrolytes (NALE) in lithium-ion batteries	Gurusamy, H. Ayyasamy, S. Bella, D.	2022	Revista Materia	27	1
176	Natural Dyes from Ornamental Plants as Sensitizers for Dye-Sensitized Solar Cells (DSSCs): A Review on the Structure-Activity Relationships (SARs) between Power Conversion Efficiencies and Chemical Constituents	Nixon, P.D. Baby, R. Kumar, N.M. Ananthi, N.	2021	Russian Journal of Applied Chemistry	94	12
177	A Scalar Decoupled PWM Technique for a Three-Level Symmetrical Dual Inverter Fed OEWM Drive for Electric Vehicle	Venugopalan, K. Jegathesan, V. Reddy, M.H.V.	2021	International Journal of Renewable Energy Research	11	3
178	Social Group Optimization Based Cluster Head Identification in Underwater Acoustic Sensor Networks	Bhattacharya, T. Patel, P. Jasmine Jena, J. Acharya, B. Sagayam, K.M. Abd Wahab, M.H. Ambar, R.	2021	ACM International Conference Proceeding Series	-	-
179	Facile Chemical Synthesis And Characterization Of Nanostructured Nickel Oxide - Ceria Composite Anode Materials For Solid Oxide Fuel Cells	Reni, M.L. Nesaraj, A.S.	2021	Journal of Chemical Technology and Metallurgy	56	4

	Working At Low Temperature					
180	Deep Neural Network based Forecasting of Short-Term Solar Photovoltaic Power output	Jogunuri, S. Josh, F.T.	2022	2022 2nd International Conference on Intelligent Technologies, CONIT 2022	-	-
181	A Research Study on Various Control for Speed Control of BLDC Motor	Salim, N. Joseph, J.J.	2022	13th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2022	8	-
182	Organosolvent extraction coupled with steam explosion pretreatment of wild sugarcane and optimization of cellulase activity using response surface methodology	Aruna, S. Gobikrishnan, S.	2021	Journal of Pure and Applied Microbiology	15	1
183	An Intelligent Energy Management System with an Efficient IoT based Deep Learning Framework	Bazil Wilfred, C. George, S.M. Sivaranjani, S. Selvan, S. Feros Khan, J.M. Beulah David, D.	2022	International Conference on Sustainable Computing and Data Communication Systems, ICSCDS 2022 - Proceedings	-	-
184	Temporal Assessment of Sedimentation in Siruvani Reservoir Using Remote Sensing and GIS	Brema, J. Tamilarasan, A.	2022	Geospatial Modeling for Environmental Management: Case Studies from South Asia	-	-
185	Data Analytics in Wind Turbine Generators for Improving Efficiency	Sankineni, P.V. Grace, A.H.M. Juliet, S. Lincy Esther, U. Joanna, J.	2022	International Conference on Sustainable Computing and Data Communication Systems, ICSCDS 2022 - Proceedings	-	-

186	Hybrid electric car comparison to increase the reliability for fuel efficiency	Saju, C. Angel Michael, P. Jarin, T.	2022	Renewable Energy Focus	43	-
187	Execution of smart electric vehicle charging station driven by RE technology using soft computing approach	Kumar, K.V. Sujitha, S. Stalin, B. Buvana, D. Josh, F.T. Vinodha, K. Ramya, K.C. Saravanakumar, R. Logeswaran, D.	2021	3rd IEEE International Virtual Conference on Innovations in Power and Advanced Computing Technologies, i-PACT 2021	-	-
188	Changing Patterns in the Spread of Human Monkeypox: A Dangerous New Development in Disease Epidemiology	Chandran, D. et.al	2022	Journal of Pure and Applied Microbiology	16	1 S
189	System Reduced DC Voltage and Restart Sequence Analysis for Repeated Line Faults on VSC HVDC Transmission System	Karunakar, T. Josh, F.T. Diwakar, V.	2022	2022 International Conference on Futuristic Technologies, INCOFT 2022	-	-
190	A novel study and research on multilayer alas/gaas quantum dot inner layer for solar cell applications	Du John, H.V. Moni, D.J. Rubesh, G.P.	2021	International Journal of Computer Aided Engineering and Technology	15	2-3
191	Tailored TiO ₂ nanorod arrays for dye sensitized solar cell applications	Beula, J. Devadason, S. Angamuthu, A. Bhojan, V.	2021	EPJ Applied Physics	96	3
192	Energy Saving in a Two Stage Compressor by Reducing the Losses in Motor	Karthikeyan, V. Victor, S. Michael, P.A.	2021	Proceedings of the 6th International Conference on Communication and Electronics Systems, ICCES 2021	-	-

7.2 University measures towards affordable and clean energy

KITS in alignment with SDG 7 has taken measures towards providing affordable and clean energy. In this process, solar water heater systems were provided in the students residences replacing the geysers, sodium street lamps were replaced with LED lamps, sensor controlled water pumping systems and motion sensors were provided for corridors. The following are the evidences and records of the measures taken:

Karunya Institute of Technology and Sciences (KITS) has a well-defined policy for renovation of existing buildings with energy efficient systems and construct new infrastructure incorporating all energy efficient techniques. Energy conservation results in carbon reduction and emission reduction as energy required to be produced decreases due to the adoption of energy efficient devices. Institution also has a clear plan of implementing reduced energy consumption and also involve in research to find solutions for the same. Electrical Inspections and Energy audits are being conducted to identify the areas where energy is wasted and suitable measures are taken to solve the issues.

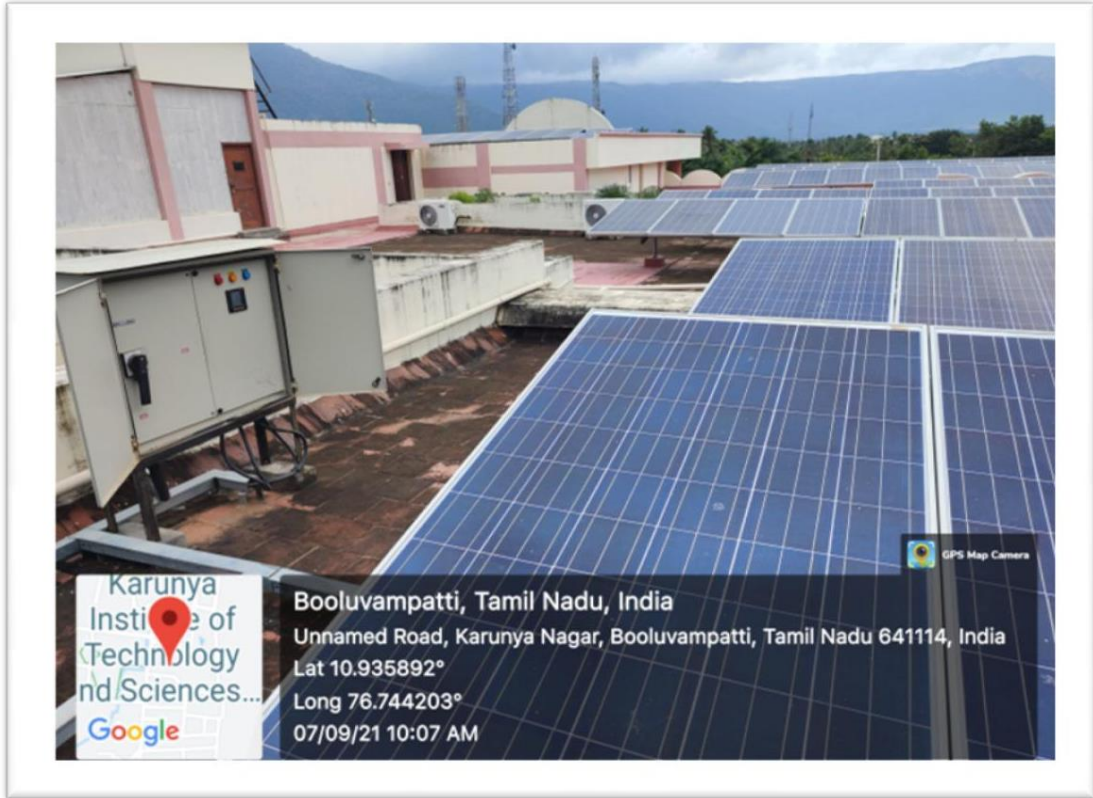
7.2.1 Energy-efficient renovation and building

Renewable Energy Sources (Solar)

Solar Water Heating System in KITS Residences and Solar Power Plant in Admin Block



Solar Water Heating system in Student Residence



Solar Power Plant in Admin Block



Solar Power Plant in Admin Block



Solar based Street Light



Sensor based LED Lights

Hostel Specifications	Angelina Residence	Hephzibah Residence	Father Duraisamy Residence	Edward George Residence	New JVR Residence	New JMR Residence	New BRR Residence	New Bethany Residence
System Model	TWINWALL model Solar system							
Type of Collector	Flat Plate Collector							
System Capacity	3500 Lts per day	2500 Lts per day	3500 Lts per day	2500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	3 Units	1 Unit	2 Units	2 Units	2 Units	2 Units	2 Units
System Temperature	60@c	60@c	60@c	60@c	60@c	60@c	60@c	60@c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m ² for 3500 LPD System and 45 m ² for 2500 LPD System							
Application	Hot Water							
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 kW with thermostat							
Tank Capacity	3500 Lts with air vent provision	2500 Lts with air vent provision	3500 Lts with air vent provision	2500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision
Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger							
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts							

Hostel Specifications	Sevugapandian Residence	Sundararaj Residence	P R Garg Residence	Dakshinamoorthy Residence	Oprah Residence	Evangeline Residence
System Model	VESAT Solar Products					
Type of Collector	Flat Plate Collector					
System Capacity	3500 Lts per day	3500 Lts per day	500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	2 Units	1 Unit	1 Unit	1 Unit	2 Units
System Temperature	60@c	60@c	60@c	60@c	60@c	60@c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m ² for 3500 LPD System					
Application	Hot Water					
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 kW with thermostat					
Tank Capacity	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision
Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger					
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts					

95 kW GRID TIED SOLAR POWER PLANT IN MAIN BUILDING

The 95 kW Grid – Tied Solar Power Plant was installed on July 1st 2016 in admin Block of the Karunya Institute of Technology and Sciences. The type of Solar panel is Poly crystalline and around 312 panels are connected through four inverters to the Distribution Board from where the Power is drawn to the load. In addition, the Power generation is monitored through online monitoring unit from the inverters.

Salient Features of Solar Power Plant.

- Grid – Tied 95kW Photo Voltaic Poly Crystalline Solar Power Plant
- 25 kW Capacity of Inverter of 4 Nos – Make – SMA
- No of Inverters – 4 Nos
- No of Strings in each Inverter – 4 Nos
- No of Solar panels connected in each inverter – 84 Panels (Except 4th inverter - 60 Nos)
- Total No of Modules (Panels) – 312 Nos (Each – 310 Watts) – Make – EMMVEE

20 kW GRID TIED SOLAR POWER PLANT IN EVR BLOCK BUILDING

- Salient Features of Solar Power Plant.
- Grid – Tied 20kW Photo Voltaic Poly Crystalline Solar Power Plant
- 25 kW Capacity of Inverter of 1 No – Make – SMA
- No of Inverters – 1 Nos
- No of Strings in each Inverter – 4 Nos
- No of Solar panels connected in each inverter – 66 Panels
- Total No of Modules (Panels) – 16 Nos (Each – 310 Watts) – Make – EMMVEE

Energy efficiency plan in place to reduce overall energy consumption

S.No.	Existing Item	Modification
1	Sodium or Halogen Lights	Sensor based LED Lights
2	Manual operated Overhead Tank	Automatic Sensor based Water Level Controller
3	Old model Lifts	V3f drive based energy efficient Lifts
4	Electrical water heater in hostels	Solar based Water heaters in hostels
5	Sodium or Halogen Street Lights in hostels	Solar powered Street Lights in hostels
6	CFL or Fluorescent Lights in corridors	Sensor based LED lights in Corridors
7	Classrooms with Fluorescent Lights	Classrooms with LED Tube Lights

Street Light Installed Place	Panel Used	No. of Lights	Present Condition
Guest House	Crystalline Type	4	Working
Opposite to S&H Auditorium	Crystalline Type	2	Working
Mechanical Building Yard	Crystalline Type	1	Working

Specifications for Solar Street Lights

Electrical Parameters

Panel Type	: Crystalline Type
Cell Type	: High efficiency Solar Cells
Nominal Capacity	: 1*120 W
Peak Power Voltage	: 16.2 Volts
Peak Current	: 8.3 Amps
Tolerance	: $\pm 5\%$

Mechanical Parameters

Front cover glass	: Toughened Glass
Encapsulate	: Ethylene Vinyl Acetate (EVA)
Mounting frames	: Anodized aluminium channel
Rear panel	: Polyvinyl Fluoride (PVF)
Junction box	: ABS moulded box
Weight	: 5.4 Kgs

Battery

Electrical Parameters

Normal capacity	: 100 Ampere Hours
Rated current Discharge	: C/10
Normal voltage	: 12V
Self-discharge	: About 0.5% per week
Expected life	: About 1500 cycles

General parameters

Types	: low maintenance lead acid
Construction	: 12V block
Container material	: polypropylene

Solar light controller:

Charge Controller Type And Rating : Series Pulsed Two Step 15A max.

Cable Assembly:

Module to Light Controller : 4.0 m²- cable with
ring terminal
Luminary to Lighting Controller : 1.5 m² dual sheathed cable
Battery to Lightning : 4.0 m² with ring and fork terminal

The Institution has facilities for alternate sources of energy and energyconservation measures

S. No	Description	Page No.
1	Solar energy	2
2	Biogas plant	4
3	Sensor-based energy conservation	5
4	Use of LED bulbs/ power efficient equipment	5



V3f drive based energy efficient Lifts



V3f drive based energy efficient Lifts

7.2.3 Carbon emission reductions

Carbon emission reductions are followed in line with the United Nations Framework Convention on Climate Change by KITS. Carbon emission status was measured in the year 2015-16 and again in 2021-22 and electricity consumption for the campus and residences are presented below:

Base line Year: 2015

Total Power Consumption: 7417799 kWh

CO2 Emission- 4989.8 tonnes

Previous reporting year (2021-2022)

Total Electricity Consumption for the campus and residences: 3862181 kWh

CO2 Emissions – 2598 tonnes

7.2.4 Future Plans for reducing Energy

KITS has a plan for reducing Energy consumption as given below:

1. Additional Solar Power Plant in Gents Hostel Campus before 2025-26
2. Additional Solar Power Plant in all the buildings in Campus before 2025-26
3. Motion Sensors for corridor lights in University Campus before 2024-25
4. Replacing all Conventional lights with LED lights
5. Procuring new air conditioners only with 5 Star Rating

7.2.5 Energy Wastage Identification

Annual Energy Inspection for measures relating to safety and electrical supply is being conducted by Chief Electrical Inspectorate, Govt of Tamil Nadu. The defects identified by the team will be notified to the Institution for rectification on priority. Apart from this inspection, Energy Audit by Professional External Agency is being conducted periodically to arrive at strategy for minimizing the waste of energy. Based on such audits the areas where energy may be conserved are i) providing LED tube lights, LED Street lights, Motors and pumps installed with capacitor bank, resetting temperature level in air conditioners, Water level controller in sumps and tanks, energy meters in each building, Single point control for corridor lights, motion sensor lights, HVLS fans in auditorium and to check and set right the Phase current imbalance in the Circuits

7.4.1 Local community outreach for energy efficiency Provide programmes for local community to learn about importance of energy efficiency and clean energy

KITS has non- academic credits for students to involve in extension and outreach activities. The Institution implements three non-academic days in a semester and motivate the students to involve in outreach activities. The outreach extension activities of KITS are conducted in many villages in and around the campus. The details of outreach activities that took place at Pachinampathy

village, Alandurai town panchayat is presented below:

Sl.No	Thematic Area	Subcomponent	Description	Budget (Rs. lakhs)
1	Water	1.1. Water supply for domestic use	Construction of Overhead Tank 5000 lit capacity with Ferro cement to supply water to 82 households	0.7
		1.2. Irrigation supply to Community garden	Installation of Submersible Pump set (1 HP) in the second tube well and micro irrigation system	0.3
		1.3. Sewage water and rainwater	Recycling of sewage water system (Rs. 0.2 lakhs) & rainwater collection. 4 toilets (2 with mold and 2 with flyash) (0.72 lakhs) to be constructed.	0.9
		1.4. Solid waste Management system	Bins to be installed to collect Bio-degradable and Non bio-degradable materials separately (for further disposal). Black water and Grey water treatment arrangements	0.2
2	Food	2.1 Agriculture/ Farming/ Livestock	2.1.1. Vegetable cultivation (0.5 acre) Demonstration 2.2.2. Millets (0.5 acre) 2.2.3. Kitchen Gardens on ST women group basis. Preferably using precision farming/irrigation methods. Training on Scientific, sustainable/ Good agriculture practices. 2.2.4. Scientific Poultry and Goat rearing (indigenous cages)	0.8
		2.2. Nutrition	Awareness & Training on Nutrition & Food Processing. Eradication of Malnutrition in villages	0.25
		2.3. Training & Awareness	Training for skilled farm practices and preparation of nutritious food for commercial sale by villagers Awareness about the nutritious food for children and women	0.2
3	Renewable Energy	3.1. Solar Lighting/ LED lighting	Lighting for the purpose of enabling villagers for socializing. 3 Numbers (1 already existing & its battery to be replaced)	0.5
4	Health Care	4.1. Health monitoring of villagers	Survey to identify health problems and Fortnightly Health camps with help of Sheesha	0.2
5	Education	5.1. Enhancing literacy level of all	Survey to assess literacy level Eradicating Illiteracy among the villagers	0.1

6	Skill Development	6.1. Developing skill of all youth with > 10 th STD education	Training on Food Processing, weaving, wiring, welding, plumbing, etc for employability	0.2
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Solar light installed in Pachinambathi Village

7.4.2 Public Pledge Toward 100% Renewable Energy

Photographs of pledge taken outside the university





7.4.3 Energy efficiency services for industry Provide direct services to local industry aimed at improving energy efficiency and clean energy

Green Initiatives

Karunya in collaboration with SALZER, one of the largest ESCO (Energy Savings Company) has installed one energy saving kit for one of the street lights on the campus, thereby reducing the power consumption by 30%. This project provides hands-on training to the students in energy conservation. Measures have also been taken to conserve Energy and Water using energy efficient devices including sensors in the halls of residence, quarters and administrative blocks in the campus. All the student residences are provided with solar water heaters, an initiative that prevents the emission of 129.94 tons of CO₂ per year. As a major institutional project in conservation of Energy, roof top solar panels with a capacity of 95kW are installed in the administrative building, saving 520 units of EB power every day.

Information on visits to the industry with the student team accompanied by faculty of EEE and EIE



Photographs of the visits on the equipment's inside the industry with the student team accompanied by faculty of EEE and EIE



Live demonstration of the equipment at Salzer – Coimbatore



View of the Salzer Lab Space in KITS Campus of EEE building first floor



7.4.4 Policy on clean energy technology

1. Introduction

The atmosphere, ocean, cryosphere and biosphere have undergone rapid changes due to human-caused climate change. It is affecting hydrological extremes in every region across the globe and lead to adverse impacts and losses and damages to nature and people. To offset the climatic conditions and to have sustainable environment, KITS is committed to carry out all its operations by considering climate and the environment in line with the national and international policies.

India in its Nationally Determined Contributions (NDC) has pledged to reduce the emission intensity of its Gross Domestic Product (GDP) by 45% by 2030. This is a measure of the amount of greenhouse gas emitted per unit of economic activity.

KITS shall carry out a number of activities as mentioned in this policy document to reduce its carbon footprints and thus contributing to global climate mitigation and support to the Nation's commitment. Carbon offset measures shall be taken to mitigate part of its carbon footprint. The efforts will continue until it becomes effectively carbon neutral.

2. Green Energy

- i. KITS shall use solar heating systems by making solar water heaters mandatory in buildings
- ii. KITS shall use solar as an off-grid solution to provide electricity and reduce the consumption from fossil-fuel based power plants
- iii. Use of energy efficient equipment, appliances including lighting
- iv. Utilizing natural lighting in all the buildings
- v. Using renewable energy sources to meet the energy requirement

- vi. Transforming its buildings into more green and smart ones
- vii. Awareness campaign on energy conservation shall be conducted for all the stakeholders of the institution
- viii. Usage of IC engine vehicles inside the campus shall be minimal
- ix. Avoiding fossil fuel-based vehicles and introduction of EVs and HEVs.
- x. Solar PV charging infrastructure to be installed.
- xi. Flow battery-based energy storage units to be adopted as the backup energy source
- xii. Annual energy auditing to be conducted

3. Sustainable Habitat

- i. Adopting holistic approach to solid and liquid waste management to ensure their full potential for energy generation, and recycling and reuse.
- ii. Planning and laying out eco-friendly and energy free campus with green pedestrian path ways and bicycle trails
- iii. Envisions a net-zero waste and emission campus by 2060
- iv. Sustaining and enhancing the floral and faunal biodiversity of the campus
- v. Utilizing technologies for producing energy from waste

4. Water Conservation

- i. Automatic control system to be installed in all the water distribution networks to avoid overflow and dry run
- ii. Regular maintenance to be carried out to avoid water leakage which will reduce the need for pumping of water
- iii. Waste water treatment methods to be adopted
- iv. Installation of rain water harvesting systems
- v. Promote water purification and desalination techniques
- vi. Provide guidelines for different water users on efficient water usage
- vii. Awareness campaign on water conservation shall be conducted for all the stakeholders of the institution

5. Recycling of Plastic and Paper

- i. Plastic usage inside the institution shall be restricted.
- ii. Plastic and solid wastes in the campus to be converted to energy, utilizing the existing “Rotary Kiln Gasification Plant”
- iii. Paperless administration is envisaged and the paper waste, if any, has to be recycled using eco-friendly paper recycling unit in the campus.

6. E-Waste Management

- i. The Institution’s stores officer has to collect all the E-Wastes at the end of every month from various academic divisions, research laboratories, workshops, hostel buildings etc. and shall transport to the authorized dismantler or recycler.
- ii. The Institution will ensure that no damage is caused to the environment on account of transporting such items.
- iii. A detailed inventory to be maintained on E-Waste Disposal
- iv. Following components/equipment/Appliances are considered as E-Waste after their life period
 - a. All forms of Computers (Desktops, Laptops, Notebook Computers, Notepad Computers)
 - b. Computer Peripherals (Keyboards, Mouse, Display Units, Printers, Copiers and Scanners)
 - c. Telephones, Cordless telephones, Cellular telephones
 - d. Television sets [including sets based on Liquid Crystal Display (LCD) and Light Emitting Diode (LED) technology]
 - e. Refrigerators, Washing Machines, Air-conditioners (excluding centralized air conditioning plants)
 - f. Fluorescent lamps, lamps which contain mercury, and other Consumer electrical and electronic items.

7. Sustainable Agriculture

The School of Agricultural Sciences of KITS will be involved in the following activities with the support of other Schools.

- i. Development of strategies to evolve low input agriculture by creating crops with enhanced water and nitrogen use efficiency.
- ii. Use of micro irrigation systems
- iii. Promotion of agricultural techniques like precision farming, organic farming and rainwater conservation
- iv. Production of large scale bio-fertilizer in the campus to substitute chemical fertilizers

8. Strategic knowledge for climate change

- i. Curriculum on low carbon operational practices
- ii. More research shall be initiated related to sustainable environment and climate change to create technologies that mitigate climate change
- iii. PG and UG students shall be encouraged to design and device methods to reduce carbon emissions.
- iv. More research on water neutral and water positive technologies

9. Conclusion

KITS has installed solar PV systems, solar water heaters and waste to energy conversion plants. Energy efficiency criteria have been followed for lighting and other appliances. Green audit is carried out regularly. With the support of this policy, efforts will be taken to reduce greenhouse gas emission and support the environment to improve the climate. The Institution is committed to zero emission from the Campus to be achieved by 2060.

7.4.5 - University as a body provide assistance for start-ups that foster and support a low-carbon economy/technology

KITS motivates its faculty and students to involve in product development, patent generation and commercialization. In this regard there were eight patents filed and published in energy sector to support low carbon economy/technology. KITS also motivates the students to start their companies and facilitates them to enter into a Start-up venture. The following are the patents published by the faculty members during the academic year 2021-22.

Sl. No	Title of Invention	Applicati on Number	Date of Filing	Date of Publishing	Applic ant Name	Inventors
1	A Fabric Based Electro-Adhesive Clutch Operated Exosuit	20214104 0925	09.09.2021	24.09.2021	KITS	Dr. S. Rajesh, Dr. A. Sakunthala, Dr. R. Nandhakumar, Dr. B. Vidhya
2	A Process of Preparing FeO-GO-hBN Composite And Product Thereof	20214104 6596	12.10.2021	29.10.2021	KITS	Dr. S. Rajesh, Dr. A. Sakunthala, Dr. R. Nandhakumar, Dr. B. Vidhya, Dr. J. Prabhu
3	Process of Preparation of Magnesium Ion Conducting Electrolyte Membrane and Product Thereof	20214104 6597	12.10.2021	29.10.2021	KITS	Dr. S. Rajesh, Dr. A. Sakunthala, Dr. R. Nandhakumar, Dr. B. Vidhya
4	Tool for optimality in Automatic Washer Punching	20224100 9223	21.02.2022	04.03.2022	KITS	Dr. R. Sabitha, Dr. J. Immanuel Johnraja, Dr. Esther Daniel, Mr.S. Aravind Raj
5	Improved Backing Plates With Cooling For Friction STIR Processing	20224100 9227	21.02.2022	11.03.2022	KITS	Dr. R. Raja, Dr. S.J. Vijay, Dr. Tapas Debnath, Dr. Sabitha Jannet, Dr. L. Godson Asirvatham
6	AI System For Post Crash Care on Road Traffic Injuries	20224101 3076	10.03.2022	18.03.2022	KITS	Dr. R. Elijah Blessing, Dr. S. Salaja, Mrs. P. Joyce Beryl Princess
7	A Broadband Optically Transparent Metamaterial Absorber Self-Energy Harvester	20224101 5804	22.03.2022	25.03.2022	KITS	Dr. Victor Du John, Dr. Jackuline Moni, Dr. D. Narain Ponraj
8	Hybrid Power Source System for Elevators	20224102 2817	18.04.2022	13.05.2022	KITS	Dr. Prawin Angel Michael, Dr. S. J. Vijay, Dr. Victor Du John

Karunya Technology Business Incubation Park (K-TBIP) Incubates List

List of Student Incubates

Sl.No	Name	Division	Theme/Product	Company Name
1	Mr. J. Midhun (URK20AI1047)	CSE	An easy platform for booking the charging slots or the customers who uses the EV cars	Eco charge
	Mr. R. Manohar (URK20AI1057)			
	Mr. B. Praveen (URK20AI1060)			
2	Mr. S. Kishor Kumar (PRK21MS1084)	MBA	Smart Transportation using E-vehicle transporting people in a closed campus 24/7 without any human power	-
3	Mr. J. Kevin (URK22CO3003)	CSE	Autonomous electric vehicle for Karunya University to assist visitors	
	Dr. A.M. AnushaBamini			
	Mr. Jeffrey Chrish			
4	Mr. S. Parthiban (URK20RA100)	Robotics Engineering	Kreatln	
	Ms. Rashmi Kiran			
	Mr. Bobby Vishal			
	Mr. Dhanush AM			
5	Mr. J. Joshua		Energy	

Karunya Centre for Conservation and Management of NaturalResource (KCCMN)

In translating SDGs into action, Karunya Centre for Conservation and Management of Natural Resource (KCCMN) has taken several initiatives to follow the principle of “Reduce, Reuse and Recycle” (3Rs) for a clean and green campus.

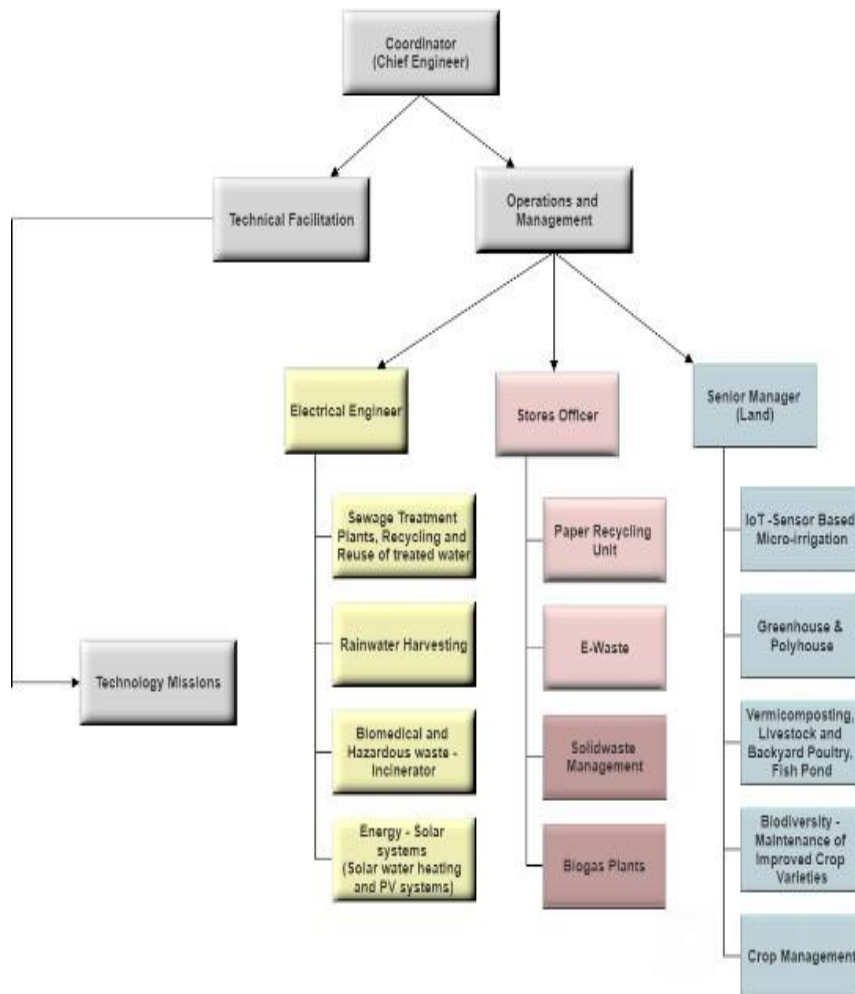
The objectives of KCCMN include:

- Overall maintenance of the infrastructure including the buildings and garden, stadiums and playgrounds.
- Maintenance and repair of generators and other electrical fixtures, recalibration and

refilling of fire extinguishers, provision of fire safety measures, facilitating mobility of physically challenged by a team of competent engineers and technical staff of Construction and Maintenance Department (CMD).

- Energy audits to monitor the progression of energy efficiency of the conventional and renewable energy sources for the reduction of CO₂ emission.

The organizational structure of KCCMN :



Link: <https://karunva.edu/universitypolicies> - Infrastructure and Maintenance Policy

KARUNYA UNIVERSITY
(Karunya Institute of Technology and Sciences)
(Declared as Deemed-to-be-University under section-3 of the UGC Act, 1956)
KARUNYA NAGAR, COIMBATORE – 641 114

Dr. E. J. James
Officiating Vice-Chancellor

KU/VC/OO/ 53 /2013
June 24, 2013

OFFICE ORDER

Sub: Establishment of Centre for Conservation and Management of Natural Resources

Considering the importance of natural resource management, especially the conservation of water, energy and food, and also treatment of solid and liquid waste in the campus, a Centre for Conservation and Management of Natural Resources is established with immediate effect.

The main purpose of the Centre is to develop and sustain an eco-friendly green campus and to conserve the flora and fauna as well as other natural resources in the most effective manner in the campus, thereby contributing to sustainable development of natural resources envisaged in MDG of the UN. This initiative is also important in the context of global warming and of climate change.

The major functions of the Centre are:

1. Conservation of water resources within the campus
2. Practicing renewable energy within the campus
3. Conducting water and energy audits
4. Waste water treatment leading to recycling and reuse
5. Planting indigenous trees of the Western Ghats in the campus
6. Advising the Construction and Management Department on environment friendly practices
7. Introducing precision farming practice

The Centre will be functioning under the guidance of Science and Engineering Departments which will nominate one faculty member each to serve in the Centre. The implementation of the plans will be carried out by the Construction and Maintenance Department.

Necessary funds will be made available by the Finance Section depending upon the requirements from time to time.



E. J. JAMES
13/06/24

To

1. Registrar
2. Directors of Schools
3. Finance Officer
4. Chief Engineer



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved

NAAC A++ Accredited

SDG 8 - Decent Work and Economic Growth

Karunya Institute of Technology and Sciences (KITS) serves as a dynamic engine of knowledge creation, making significant contributions to SDG 8 through inclusive, and sustainable economic growth, full and productive employment, and decent work for all. This report presents the contribution of KITS to SDG 8 through its research and publications, employment practice, employee policies and so on. It delves into the multifaceted ways in which academic institutions drive economic growth, foster decent work opportunities, and support a skilled workforce through their research activities and scholarly publications generating insights, providing policy guidance, and nurturing a workforce capable of driving economic growth.

8.1 Research on Economic Growth and Employment

KITS conducts in-depth research on engineering, science and management which are published in reputable Scopus and Web of Science Indexed journals, influencing policymakers' decisions, and driving the development of effective economic growth strategies.

As a hotbed of innovation, KITS has conducted ground-breaking research in emerging technologies, leading to industry-specific advancements thereby generating employment and contributing in scaling up economic growth of the nation. These findings can revolutionize existing industries, stimulate the creation of new sectors, and, in turn, generate job opportunities.

Faculty members have published 32 research papers relevant to SDG 16 in Scopus Indexed Journals during 2021 to 2022. Details furnished below:

S. No.	Title	Authors	Year	Journal	Volume	Issue
1	Worksafe: towards healthy workplaces during covid-19 with an intelligent phealth app for industrial settings	Shamim Kaiser, M. Mahmud, M. Noor, M.B.T. Zenia, N.Z. Mamun, S.A. Abir Mahmud, K.M. Azad, S. Manjunath Aradhya, V.N. Stephan, P. Stephan, T. Kannan, R. Hanif, M. Sharmeen, T. Chen, T. Hussain, A.	2021	Ieee access	9	-

2	A review on global perspectives of sustainable development in bioenergy generation	Duarah, P. Halder, D. Patel, A.K. Dong, C.-D. Singhania, R.R. Purkait, M.K.	2022	Bioresource technology	348	-
3	Strong link between coronavirus count and bad air: a case study of india	Gautam, S. Samuel, C. Gautam, A.S. Kumar, S.	2021	Environment, development, and sustainability	23	11
4	Qualitative and quantitative analyses of impact of covid-19 on sustainable development goals (sdgs) in indian subcontinent with a focus on air quality	Bherwani, H. Gautam, S. Gupta, A.	2021	International journal of environmental science and technology	18	4
5	Exemplification of sustainable sodium silicate waste sediments as coarse aggregates in the performance evaluation of geopolymer concrete	Kanagaraj, B. Anand, N. Johnson Alengaram, U. Samuvel Raj, R. Kiran, T.	2022	Construction and building materials	330	-
6	Analysis of the health, economic and environmental impacts of covid-19: the bangladesh perspective	Gautam, S. Setu, S. Khan, M.G.Q. Khan, M.B.	2022	Geosystems and geo- environment	1	1
7	Assessment and valuation of health impacts of fine particulate matter during covid-19 lockdown: a comprehensive study of tropical and sub tropical countries	Bherwani, H. Kumar, S. Musugu, K. Nair, M. Gautam, S. Gupta, A. Ho, C.- H. Anshul, A. Kumar, R.	2021	Environmental science and pollution research	28	32

8	Sugarcane bagasse into value-added products: a review	Shabbirahmed, A.M. Halder, D. Dey, P. Patel, A.K. Singhania, R.R. Dong, C.-D. Purkait, M.K.	2022	Environmental science and pollution research	-	-
9	Assessing suitability of commercial fibre reinforced plastic solar still for sustainable potable water production in rural india through detailed energy-exergy-economic analyses and environmental impacts	Sharon, H. Prabha, C. Vijay, R. Niyas, A.M. Gorjian, S.	2021	Journal of environmental management	295	-
10	Thermal modeling, characterization, and enviro-economic investigations on inclined felt sheet solar distiller for seawater desalination	Hilarydoss, S. Delhiraja, K. Reddy, K.S. Philip, L. Chand, D. Benny, B.	2021	Environmental science and pollution research	28	45
11	Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and sdg2	Shams Esfandabadi, H. Ghamary Asl, M. Shams Esfandabadi, Z. Gautam, S. Ranjbari, M.	2022	British food journal	124	12
12	Addressing the relevance of covid-19 pandemic in nature and human socio-economic fate	Thapliyal, J. Bhattacharyya, M. Prakash, S. Patni, B. Gautam, S. Gautam, A.S.	2022	Stochastic environmental research and risk assessment	36	10

13	Environmental remediation by tea waste and its derivative products: a review on present status and technological advancements	Debnath, B. Halder, D. Purkait, M.K.	2022	Chemosphere	300	-
14	Smart agriculture monitoring system for outdoor and hydroponic environments	Edwin, B. Veemaraj, E. Parthiban, P. Devarajan, J.P. Mariadhas, V. Arumuganainar, A. Reddy, M.	2022	Indonesian journal of electrical engineering and computer science	25	3
15	Experimental studies on thermosyphon using low global warming potential refrigerant hfe7000 and nanorefrigerant hfe7000/al ₂ o ₃	Anand, R.S. Jawahar, C.P. Brusly Solomon, A. Benson, V. Alan, A. Vignesh Nair, K.P. Alan, V.A.	2021	Proceedings of the institution of mechanical engineers, part e: journal of process mechanical engineering	235	3
16	Machine learning analysis on the impacts of covid-19 on India's renewable energy transitions and air quality	Stephan, T. Al-Turjman, F. Ravishankar, M. Stephan, P.	2022	Environmental science and pollution research	29	52
17	Environmental impact of electric vehicles	Jose, P.S. Jose, P.S.H. Wessley, G.J.J. Rajalakshmy, P.	2022	Eai/springer innovations in communication and computing	-	-
18	A novel approach for effective crop production using machine learning	Chowdary, V.T. Robinson Joel, M. Ebenezer, V. Edwin, B. Thanka, R. Jeyaraj, A.	2022	Proceedings of the international conference on electronics and renewable systems, icears 2022	-	-
19	Biofertilizers: a sustainable approach towards enhancing the agricultural productivity	Mohanty, S.S.	2021	Biomolecular engineering solutions for renewable specialty chemicals: microorganisms, products, and processes	-	-

20	Germination prediction system for rice seed using cnn pre-trained models	Durai, S. Mahesh, C. Sujithra, T. Shyamalakumari, C.	2022	Proceedings - ieee international conference on advances in computing, communication and applied informatics, accai 2022	-	-
21	Comparative analysis of deep learning models for cotton leaf disease detection	Mary, X.A. Raimond, K. Raj, A.P.W. Johnson, I. Popov, V. Vijay, S.J.	2022	Lecture notes in electrical engineering	905	-
22	Dryland livestock rearing relies heavily on tree fodders: a narrative review	Manuvanthra, A. Chandran, D. Emran, T.B. Aslam, M.M.K. Savanth, V.V. Kumar, M. Sharma, R. Da Silva, L.E. Pran, M. Lishma, N.P. Sureshkumar, R.	2022	Indian veterinary journal	99	10
23	Development of banana peel powder as organic carrier based bioformulation and determination of its plant growth promoting efficacy in rice cr100g	David Paul Raj, R.S. Agnes Preethy, H. Gilbert Ross Rex, K.	2021	Journal of pure and applied microbiology	15	3
24	Global implications of biodiversity loss on pandemic disease: covid-19	Brema, J. Gautam, S. Singh, D.	2022	Covid-19 and the sustainable development goals	-	-
25	Analysis and classification of rhizome rot disease for turmeric plant using artificial intelligence	Janani, V. Mangai, N.M.S.	2022	International conference on sustainable computing and data communication systems, icscds 2022 - proceedings	-	-
26	An analysis of total factor productivity of cotton in tamil nadu	Kavitha, V. Usha Nandhini, S. David Chella Baskar, V.	2021	Ecology, environment and conservation	27	1

27	Economic feasible assesment of green power generation for an isolated area	Debie Shajie, A. Immanuel Paulraj, J.P.	2020	Indian journal of environmental protection	40	1
28	Algae: co2 sequestration and biorefinery	Thomas, J. Sureshkumar, P.	2020	Applied algal biotechnology	-	-
29	Impact of plant health on global food security: a holistic view	Srinivasan, T.S. Thankappan, S. Balasubramaniam, M. Bhaskar, V.	2022	Agriculture, environment and sustainable development: experiences and case studies	-	-
30	Analyzing the financial soundness and resilience of select small finance banks with rbi's big data	Augustus Immanuel Pauldurai, T. Anitha, J. Vijila, M.	2022	Lecture notes in electrical engineering	905	-
31	An analysis on farmers awareness and perception towards pradhan mantri fasal bima yojana scheme in coimbatore district of tamil nadu	Kavitha, V. Nandhini, S.U.	2022	International journal of agricultural and statistical sciences	18	2
32	Bioconversion of waste to wealth as circular bioeconomy approach	Peter, D. Rathinam, J. Vasudevan, R.T.	2021	Biotechnology for zero waste: emerging waste management techniques	-	-

8.2.1 Employment practice living wage: The principle of "employment practice living wage" of KITS is in line with SDG 8, striving for continuous, inclusive, comprehensive employment and satisfactory work for everyone.

KITS has a policy of paying salary and wages which is much higher than the normal livelihood as per the norms of the Institution adhering to the guidelines of government pay commission.

Fig.1 – HR Personal Policy on the scale of pay for faculty positions as per the norms of the Institution.

The scale of pay for faculty positions will be as per the norms of the Institution which is in accordance with the UGC pay commission and other allowances as per the university norms as approved by the Board of Management.

1. 7th Central Pay Commission applicable for School of Engineering and Technology / School of Agricultural Sciences / School of Management:

S.No.	Designation	Rationalized Entry Pay
1.	Assistant Professor (Grade I)	₹57,700
2.	Assistant Professor (Grade II)	₹68,900
3.	Assistant Professor (Selection Grade)	₹79,800
4.	Associate Professor	₹1,05,100
5.	Professor	₹1,44,200

HRA and D.A as per norms.

Fig.2 – HR Personal Policy on the performance margin for faculty members in terms of API Score as per the norms of the Institution.

Performance Margin:

The performance margin for faculty members in terms of API score & maximum permissible Basic Pay limit in 7th pay shall be as follows:

Designation	Criteria	Maximum permissible limit of Basic Pay in 7th Pay
Assistant Professor (All Grades)	API scores less than 350 from Research & Academic Development	₹1,01,000 (Basic Pay)
Associate Professor	API scores less than 600 from Research & Academic Development	₹1,80,000 (Basic Pay)

Fig.3 – HR PDA Policy for publications in Scopus Indexed Journals

A. PDA Policy for Publications in Scopus Indexed Journals based on Impact Factors:

S.No.	Schools / Departments	Papers published in Scopus indexed journals (Non-Paid Journals) with impact factors	Incentive (one time/paper)	Remarks
1	Engineering	Between 1 and 2	2,000	Max. 5 in a calendar year
2	Engineering	Between 2 and 5	5,000	Max. 2 in a calendar year
3	Non-Engineering	Between 2 and 3	2,000	Max. 5 in a calendar year
4	Non-Engineering	Between 3 and 5	5,000	Max. 2 in a calendar year
5	Engineering and Non-Engineering	Between 5 and 10	10,000	No Restriction in no. of papers
6	Engineering and Non-Engineering	10 and above	20,000	No Restriction in no. of papers

Note: The first / Corresponding Author will only be eligible to receive the Incentive.

Fig.4 – HR PDA Policy for Funded Projects

B. PDA Policy for Funded Projects:

1. For Faculty Members who obtain Funded projects, an equivalent amount of 50% of the overhead expenses only allotted by the funding agency for the project period, will be averaged and be credited into the PDA every month, till the project period is over.
2. In case of Funded Projects the Principal Investigator is only eligible to receive the equivalent amount of 50% of the overhead expenses allotted by the funding agency to be credited into the PDA.
3. In case of multiple investigators involved in the project, an equivalent amount of 50% of the overhead expenses allotted by the funding agency shall be apportioned between / among the investigators and be credited into the PDA.
4. This should be spelt out at the time of submitting the proposals to the Registrar / Vice Chancellor (i.e., while obtaining the signature of the Registrar / Vice Chancellor) as a disclosure form.

Fig.5 – HR PDA Policy for Consultancy

C. PDA Policy for Consultancy:

Faculty members are encouraged to undertake consultancy work in the areas of their interest, with the explicit approval of the Head of the School and the Registrar. The proceeds from the consultancy project will be shared as follows.

Projects where Institutional facilities (infrastructure) are utilized.

To the Consultancy Coordinator	- 35%
To the Institution	- 35%
To the Department Budget (for academic oriented development)	- 20%
To the Lab Asst	- 10%

This distribution is from the surplus amount remaining after deducting the consumables and other expenditure incurred by the Institution.

Projects where Institutional facilities (infrastructure) are not utilized

To the Consultancy Team	- 55%
To the Institution	- 30%
To the Department	- 15%

Fig.6 – HR Policy for Non-Teaching Staff – Construction Staff

A. CONSTRUCTION STAFF

Qualification	Recommended Scale of pay	Construction
B.E / B.Tech in Civil / Electrical / Mechanical Engineering	Rs. 15600-39100 + Rs. 5400 E	Asst. Engineer
Minimum 8 years of Experience as Asst. Engineer	Rs. 15600-39100 + Rs. 6600	Asst. Executive Engineer
Minimum 8 years of Experience as Asst. Executive Engineer	Rs. 15600-39100 + Rs. 7600	Executive Engineer

Fig.7 – HR Policy for Non-Teaching Staff – Maintenance Staff

B. MAINTENANCE STAFF

Qualification	Recommended Scale of pay	Maintenance/ Transport	Campus Communication
<i>HMV/ ITI / Diploma*/B.Sc*/ relevant equivalent degree*</i>	Rs.5200-20200 + Rs. 2200 3625-85-4900 *3 increments A	Plumber / Electrician/ Pump Operator Gr. II	Telephone Operator Grade II
Minimum 6 years of Experience in Karunya in Gr.II	Rs. 5200-20200 + Rs. 2800) B	Plumber / Electrician/ Pump Operator Gr.I	Telephone Operator Grade I
Minimum 8 years of Experience in Karunya in Gr.I	Rs. 9300-34800 + Rs. 4400 C	Plumber / Electrician/ Pump Operator (Selection Grade)	Telephone Operator (Selection Grade)

The regular vacations will not hold good for the essential staff

Fig.8 – HR Policy for Non-Teaching Staff – Technical Staff

C. TECHNICAL STAFF

Qualification	Recommended Scale of pay	Category / Laboratories	Workshops	Computer Center
<i>ITI / Diploma*/B.Sc*/ relevant equivalent degree*</i>	Rs.5200-20200 + Rs. 2200 *3 increments A	Lab Technician Gr. II	Mechanic** Gr II ** - Appropriate trade	Computer technician Grade II
<i>B.E / M.Sc / relevant equivalent degree</i> Or Minimum 6 years of Experience as Lab Technician Gr. II	Rs. 5200-20200 + Rs. 2800) B	Lab Technician Gr. I	Mechanic** Gr I	Computer technician Gr I
Minimum 8 years of Experience as Lab Technician Gr. I	Rs. 9300-34800 + Rs. 4400 C	Senior Lab Technician	Senior Mechanic**	Senior Computer technician
Minimum 6 years of Experience as Lab Technician Selection Grade	Rs. 9300-34800 + Rs. 4700 D	Lab Technician Selection Grade	Mechanic** Selection Grade	Computer Technician Selection Grade
Minimum 8 years of Experience as Senior Lab Technician	Rs. 9300-34800 + Rs. 5400 E	Demonstrator	Foreman	Computer Instructor

HR Policy for Non-Teaching Staff – Administrative Staff

D. ADMINISTRATIVE STAFF

Qualification	Recommended Scale of pay	Designation
B.A. / B.Sc / B.Com/ relevant equivalent degree / M.A.**/ M.Sc** with essential computer knowledge	Rs.5200-20200 + Rs. 2200 ** 2 increments at entry only A	Assistant / Accountant Gr. II
M.Com / PG Diploma / Shorthand higher with a degree & 3 years relevant exp. Or Minimum 6 years of Experience as Assistant / Accountant Gr. II	Rs. 5200-20200 + Rs. 2800) B	Assistant / Accountant Gr. I
M.B.A / M.C.A or Minimum 8 years of Experience as Assistant / Accountant Gr. I	Rs. 9300-34800 + Rs. 4400 C	Assistant Section Officer / Assistant Purchase Officer / Assistant Stores Officer / Assistant PRO / Assistant Accounts officer / Assistant Superintendent / Assistant Manager
Minimum 6 years of Experience as Asst.Section Officer/Asst. Purchase Officer/ Asst Stores Officer / APRO / Asst Accounts officer	Rs. 9300-34800 + Rs. 4700 D	Section Officer / Purchase Officer / Stores Officer / PRO / Accounts officer / Superintendent / Manager
Minimum 8 years of Experience as Superintendent	Rs. 9300-34800 + Rs. 5400 E	Asst. Registrar
Minimum 6 years of Experience as Asst. Registrar	Rs. 15600-39100 + Rs. 6600	Dy. Registrar

Note:

- * Candidates with qualifications from Distance Education may be appointed based on the performance in the skilled test and interview. However, Open University scheme candidates need not be considered.
- * All the new appointments shall be on contract basis for a period of two years. After two years the contract appointment shall be regularized/extended based on the performance of the staff member.

8.2.2 Employment Practice Unions

KITS has got a platform for all the faculty to post their grievances through the email tellus@karunya.edu. This is the forum to express their issues. Appropriate reply will be given within 24 hours sorting out the issues raised or if it is a trivial issue the inconvenience in sorting out the issue will be given to the faculty concerned.

8.2.3 Employment policy on discrimination

KITS has got a platform for all the faculty to post their grievances through the email tellus@karunya.edu. This is the forum to express their issues. Appropriate reply will be given within 24 hours sorting out the issues raised or if it is a trivial issue the inconvenience in sorting out the issue will be given to the faculty concerned.

. It encompasses various forms of discrimination, including but not limited to race, gender, age, disability, sexual orientation, religion, and ethnicity. This policy applies to all aspects of employment, including recruitment, hiring, promotion, training, compensation, and termination.

Equal Employment Opportunity Policy

(a) Equal Employment Opportunity Policy

Karunya Institute of Technology and Sciences is a self-financing Christian Minority Institution. No employee or applicant will be subjected to discrimination because of race, colour, age, sex, religion, marital status, disability, military status or any other characteristic protected by law. This policy is applicable to all terms and conditions of employment, including recruitment, hiring, promotion, training assignment, evaluations, compensation and termination.

Policy against Harassment

(b) Policy Against Harassment

In General

Karunya Institute of Technology and Sciences is committed to provide all employees with an environment that is free of discrimination and harassment. We will not tolerate conduct that constitutes or could lead or contribute to harassment based on sex, race, colour, religion or any characteristic or status protected by law. Examples of such prohibited conduct include, but are not limited to

- Ethnic slurs
- Use of computer (including the internet and email) to view or distribute racially offensive communications
- Threatening, intimidating or hostile acts directed at a particular sex or religious group

Harassment does not require intent to offend. Thus, inappropriate conduct meant as a joke or even a compliment can constitute prohibited harassment.

Sexual harassment

Sexual harassment is a specific type of discriminatory harassment. It includes unwelcome sexual advances, requires for sexual favors and other verbal or physical conduct of a sexual nature when:

- Submission to the action is either an explicit or implicit condition of employment
- Submission to or rejection of the action is used as a basis for employment decisions or
- Such conduct has the purpose or effect of interfering with the employee's work performance or creating an intimidating, hostile or offensive environment

Prohibited conduct includes, but is not limited to:

- Unwelcome sexual flirtations, advances or propositions
- Inappropriate touching
- Graphic verbal comments about an individual's body or appearance
- The use of sexually degrading words
- The use of computers (including the internet and email) to display or distribute sexually explicit images, messages or cartoons

In addition to the foregoing, no one with a supervisory role may at any time:

- Threaten or imply that an individual's submission to or rejection of a sexual advance will in any way influence any decision regarding that individual's employment, performance evaluation, advancement, compensation, assignments, discipline, discharge or any other term or condition of employment
- Make any employment decision concerning an individual on such a basis

(c) Procedures

If you believe that you or anyone else has been subjected to prohibited conduct, you are required to report the relevant facts as promptly as possible. At your option, the report can be made to your higher authority Head of the Department (HoD) / Director / Dean / Registrar / Pro-Vice Chancellor / Vice Chancellor. You should report the conduct regardless of

- The offender's position at Karunya Institute of Technology and Sciences
- The fact the offender is not employed in Karunya Institute of Technology and Sciences eg. Vendor, visitor, temporary employee. Your time report is critical in order for the Karunya Institute of Technology and Sciences to take action to stop the conduct before it is repeated. All reports will be addressed promptly, with further investigation where needed to confirm facts or resolve dispute facts. In conducting its investigation, Karunya Institute of Technology and Sciences will strive to keep the identity of individuals making reports as confidential as possible.

Appropriate disciplinary action including unpaid suspensions and terminations will be taken against the personnel found to have violated these policies. Individuals who violate these policies may also be vulnerable to additional, personal exposure under applicable law.

(d) No Retaliation

Threats or acts of retaliation against individuals who report inappropriate conduct or participate in an investigation will not be tolerated. If you think you have been subjected to retaliation, you are obligated to use the above procedure to report the pertinent facts. The Institution will investigate and take appropriate action in the manner described above.

8.2.4 Employment policy modern slavery

The employment policy of KITS on combating modern slavery sets the standard for the Institute's commitment to eliminate any form of forced labour, human trafficking, or exploitation within its operations and supply chains. It extends to all employees emphasising a zero-tolerance approach to modern slavery.

Policy on modern slavery for commencement of service

6.15 Commencement of Service

Except as otherwise provided by or under these Rules, service of an employee shall be deemed to commence from the working day on which the employee reports for duty in an appointment covered, by these Rules at the place intimated to him by the Competent Authority provided he / she reports before noon, otherwise his service shall commence from the following working day.

"Service" includes the period during which an employee is on duty as well as on leave duly sanctioned, but does not include any period during which an employee is absent from duty without permission or overstays leave, unless specifically permitted.

Policy on modern slavery for employees on probation

6.16 Employees on Probation

All persons appointed in the Institution either by direct recruitment or re-appointment to another cadre shall be on probation.

a) Period of Probation

The period of probation in case of employees shall be one year. The Competent Authority may extend the period of probation of an employee, by another year only if his / her performance is not found satisfactory during the period of probation.

b) Termination of Probation

The probation period may be terminated by the competent authority, in case their attendance, conduct, work progress are not satisfactory as per the assessment made and also on the recommendation of the Dean/Head of the School.

Policy on modern slavery for confirmation of service

6.17 Confirmation of service

On satisfactory completion of the probation an employee shall be Approved Probationer subject to fulfillment of the following criteria. No probationer shall be deemed to have been Approved Probationer unless done in writing by the Competent Authority. The HR Committee shall be the final authority to decide on the satisfactory completion of the probation.

- An employee should have obtained a minimum prescribed score in the performance appraisal report on successful completion of the probation period.
- There are no adverse remarks noted or reported against the concerned employee. In the event of any such observation, the period of probation is likely to be extended for such period as deemed appropriate under the circumstances.

Policy on modern slavery for Induction of new staff

6.18 Induction of New Staff

A brief campus trip to show the different location of the Karunya Campus to the new appointee shall be arranged by the HR Section.

All newly inducted faculty shall undergo faculty induction programme organized by the HR Section.

The Dean shall introduce the new appointee to the HoD and also the HoD (DoVE) for a special briefing on Karunya's vision.

The Department shall assist the new appointee in obtaining campus accommodation and other amenities (such as cooking gas connection, etc). A handout can be given as to whom they should contact for each need. The handout may contain various telephone numbers, copies of requisition forms both for internal assistance and requirements from external agencies.

Policy on modern slavery for Resignation/Termination of Service

6.19 Resignation / Termination of Service:

In case the faculty wants to leave the Institution or the management decides to terminate the services, one month notice or one month wages in lieu of notice is required on either side. However, the faculty member will not be relieved in the middle of the semester. In the case of proved moral turpitude the Management has the right to immediately terminate the services of the faculty both in the case of Approved Probationers and Faculty on Probation.

Policy on modern slavery for system for Relieving Staff

6.20 System for Relieving Staff

The staff member who wishes to leave the institution shall submit the resignation through the head of the department concerned.

The HoD should clearly certify that the staff member can be relieved and his absence shall not affect the routine duties of the department till the end of the semester without any additional burden to other staff members.

The staff in-charge of the establishment section shall forward a note to the Registrar indicating clearly the notice period required and given along with other remarks if any.

When the above documents are clear, the Registrar shall inform the Vice Chancellor and accept the resignation and direct the staff member to obtain "No Due Certificate".

Service certificate will not be issued to staff who do not comply with the above regulations

An exit interview shall be conducted to obtain the feedback from the faculty proposing to leave the Institution.

Policy on modern slavery for termination of service/superannuation & retirement

Termination of Service

Services will be automatically terminated at the close of the period of contract unless otherwise communicated in writing. Any further employment is subject to the discretion of the management and subject to availability of vacancies. In case of further employment, the service during the previous period will not be reckoned with, to compute the continuity of service for any reason.

Nothing in these rules shall affect the right of the Institution to terminate the services of an employee without notice or pay in lieu thereof on his /her being certified by a Medical Officer to be physically unfit (permanently incapacitated) for further continuance in the service of the Institution.

6.21 Superannuation & Retirement

Retirement Age: 58 years on scale. However, after the age of 58 years, if the service of the faculty is required by the Management, the HR Committee shall decide about the reappointment of the faculty by examining the medical fitness, teaching learning skills, administrative skills, research competency and contribution to the department. If reappointed after 58 years, year by year till 70 years of age, can be considered. The decision of the HR Committee shall be binding and final.

8.2.5 Employment practice equivalent rights outsourcing

KITS provide a guaranteeing equivalent right of workers when outsourcing activities to third parties which is existing and reviewed every year as per the HR Personal Policy.

The policy with respect to the Adjunct Faculty/Visiting Faculty as per the HR policy of the KITS is given below. Apart from this, no outsourcing is given about labour and other administrative staff in this Institute.

Policy for outsourcing rights and practices

6.5 Policy with respect to Adjunct Faculty/Visiting Faculty:

1. The Deans of the Schools may identify Eminent Professors / Industrialists in their respective fields / specializations in consultation with the Vice Chancellor to be appointed as Adjunct Faculty for a period of one year. They may be involved in teaching, research and consultancy.
2. Adjunct Professors from a foreign country would be paid a consolidated salary of Rs.1,20,000/- per month or Rs. 30,000/- per week. They will be provided food and accommodation. Their travel (airfare-economy- round trip) through the shortest route will be reimbursed only once.
3. Adjunct Professors from India would be paid a consolidated salary of Rs. 60,000/- per month or Rs. 15,000/- per week. They will be provided food and accommodation. Their travel (airfare-economy – round trip) through the shortest route will be reimbursed only once.
4. If they are employed on an hourly basis, Rs. 3500/- per hour (max. 10 hours in a semester) and Rs. 2,000/- per hour (max. 10 hours in a semester) will be given as remuneration for a Foreign and Indian Professor respectively. However, this arrangement can be implemented once in a semester. This arrangement will not cover the air or train travel.
5. Once a Adjunct faculty is approved by the Vice-Chancellor, subsequent visits can be arranged by the school / department subject to the availability of funds in the school/department budget.

Policy for Outsourcing with respect to Part-time Faculty

6.6 Policy with respect to Part-time Faculty:

- 1) The Deans of the Schools may identify the faculty who have minimum of 10 years Teaching / Research / Industry experience in their respective fields / specializations to be appointed as part-time faculty members with the approval of Vice Chancellor.
- 2) The part-time faculty members resume will be scrutinized and put up to the Vice Chancellor for his review and perusal. However, it will be placed before the HR Committee for the final recommendation for approval.
- 3) The part-time faculty may be involved in giving lectures for UG & PG programmes with maximum of two subjects per semester per faculty.

- 4) Once a part-time faculty is approved by the Vice-Chancellor / HR Committee, the subject allocation and subsequent visits can be arranged by the school / department subject to the availability of funds in the school/department budget.

Policy for outsourcing of Part-time Faculty

6.7 Payment for Part-time faculty

- 1) The part-time faculty may be given the remuneration on an hourly basis as shown in the table below;

Part-time Faculty Category	Programme	No. of Subjects	No. of hours per week	Remuneration per hour (in ₹)	Total Remuneration per week (in ₹)	Total Remuneration per month (in ₹)
Category I: PG with Ph.D. (OR) PG with ≥ 8 years of experience in lieu of Ph.D.	UG	Single subject	3	1,000	3,000	12,000
		Two subjects	6	1,000	6,000	24,000
	PG	Single subject	3	1,250	3,750	15,000
		Two subjects	6	1,250	7,500	30,000
Category II: PG with < 8 years of experience.	UG	Single subject	3	750	2,250	9,000
		Two subjects	6	750	4,500	18,000

- 2) Norms for the internal faculty members taking extra classes for UG programmes:
Internal faculty, after fulfilling the teaching workload policy norms of the Karunya Institute of Technology and Sciences, if willing to handle subjects on part-time basis, may be allotted with one UG subject and shall be paid remuneration at the rate of 50% of the recommended remuneration for part-time faculty members.

Policy for outsourcing of Distinguished Professors/Professor Emeritus

6.8 Distinguished Professors

The Schools and Departments may identify 'Distinguished Professors' or 'Professors of Eminence' in their respective fields, specializations. The names of these Professors will be placed before the Board of Management for approval, once approved they will be appointed to serve as Professor of Eminence for the Institution. They will be used by the Institution for Guidance, consultancy, guest lectures, endorsement of programs and courses etc.

6.9 Payment for Distinguished Professors

Once appointed to the post of Professor of Eminence they will be paid an annual retainer fee of minimum ₹50,000 and will be paid additionally for visits and consultations based on the internationally acceptable market rates for the work done.

6.10 Professor Emeritus

This position shall be made available to the professors of Karunya Institute of Technology and Sciences after they have crossed the age of 70 years and are considered to be useful because they have sponsored projects and continue to guide research scholars. The approval for this post must be accorded by the Board of Management and these Professors shall receive an honorarium of ₹ 15,000 per month in addition to the 5% consultancy payment made on the total value of the funded research project being operated by the professor.

8.2.6 Employment policy pay scale equity.

The employment policy of the KITS on pay scale equity underscores the commitment of this Institute to ensure that all employees receive fair compensation irrespective of gender, race, ethnicity, or any other differentiating factor. It emphasizes the implementation of transparent and non-discriminatory salary structures.

Salary Slip of a Faculty Member - Sample



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Deemed to be University)

Karunya Nagar, Coimbatore 641 114, Tamil Nadu, India.

Payslip for the month Oct 2023

Staff ID : 744
 Department : Division of Mechanical Engineering

Staff Name : Dr.M.WILSON KUMAR
 Designation : ASSISTANT PROFESSOR
 (SELECTION GRADE)

Gross Pay : 119,180.00
 Loss of Pay Days : 0.00
 Date of Joining : 01 Aug 2006
 PF No. : 16982
 PAN No. : AAXPW0602M

Deductions : 24,893.00
 Net Salary : **94,287.00**
 Bank A/c No. : 917010077861849
 Aadhaar No. : 624709643084
 UAN No. : 100414060503

Earnings

Earnings Desc.	Amount
Pay in the Band	101,000.00
Grade Pay	0.00
Dearness Allowance	10,100.00
House Rent Allowance	8,080.00
Total :	119,180.00

Deductions

Deductions Desc.	Amount
EPF	1,800.00
Income Tax	10,900.00
Professional Tax	211.00
Staff Benevolent Fund	120.00
Quarters Service Charges	5,100.00
Quarters Amenity Charges	800.00
Medical	131.00
JC Contribution	500.00
SBF Loan	5,331.00
Total :	24,893.00

* This is a system generated document, and does not require signature

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8.2.7 Tracking Pay Scale for Gender Equity.

KITS fosters a more inclusive and respectful work environment, creating a level playing field where employees are valued and compensated based on their contributions, not their gender.

By upholding this practice, the Institute not only supports gender equality but also contributes to a more motivated, engaged, and loyal workforce, benefiting both the employees and the Institute. The HR policy of the institute is available in the intranet of the Karunya portal.

8.2.8 Employment Practice Appeal Process

Understanding the significance of ensuring fair and transparent employment practices, KITS has established a structured and impartial appeal process for employees who may have concerns or grievances related to their employment. In this process, the Institute has a platform tellus@karunya.edu for employees to raise an appeal which will be sorted out within 24 hours.

8.3.1 Expenditure per Employee

Referring to the year 2021-22, our institution comprises a total of 661 employees. This dedicated workforce plays a crucial role in the daily operations and the fulfilment of academic and administrative objectives.

To sustain this workforce and the institution's operations, the expenditure amounts to Rs. 102.38 crores per year. The financial commitment encompasses salaries, infrastructure maintenance, research initiatives, academic development, and the overall support necessary to maintain an efficient and conducive environment for both staff and students.

8.4.1 Proportion of Students with Work Placements

KITS had 7625 students enrolled in diverse academic programs in 2021-22. The institution is committed to providing a conducive and comprehensive educational environment that caters to the holistic development and academic pursuits of our students.

The Full-Time Equivalent (FTE) program with work placements has proven to be a significant success as a total of 870 students in the final year were placed across all streams. This accomplishment underscores the institute's commitment to providing holistic education and practical exposure, resulting in substantial opportunities for students to transition seamlessly from academia to the professional world.

8.5.1 Proportion of Employees on Secure Contracts.

The Full-Time Equivalent (FTE) count at KITS encompasses a team of 661 dedicated employees. This collective workforce forms the backbone of the institution, contributing significantly to its academic and operational excellence.



SDG 9 – Industry Innovation & Infrastructure

Building Resilient Infrastructure, Promoting Inclusive and Sustainable Industrialization, and Fostering Innovation

Preamble

Sustainable Development Goal 9 (SDG 9) aims towards fostering sustainable industrialization by promoting innovation, and building a resilient infrastructure. The significance of SDG9 lies in its potential to facilitate inclusive economic growth, promote sustainable development and foster global competitiveness. SDG 9 plays a pivotal role in addressing challenges posed by natural disasters, climate change, and rapid urbanization. It emphasizes the development of reliable and modernized infrastructure that not only facilitates economic growth but also ensures the well-being and safety of communities. By promoting inclusive and sustainable industrialization, this goal encourages the transformation of economies through adoption of environment-friendly practices by creation of decent job opportunities, thereby reducing inequalities and promoting social inclusion.

Institutional Measures

The implementation of SDG9 calls for collaboration, knowledge sharing, and technological transfer among different disciplines. Embracing sustainable practices, implementing research and development, and promoting education and skill-sets are crucial steps towards realizing the objectives of SDG 9. KITS has been consistently and diligently carrying out sustainability oriented activities with regard to innovation on several fronts. These include innovative teaching methods to match contemporary requirements, research leading to new processes, products, patents, and incubation leading to spinoffs as well as commercialization.

Innovation Infrastructure

Built on its vision, Karunya aims to provide the required ambience, infrastructure and policies in order to facilitate the students to find solutions to human problems in the thrust areas relating to water, food, healthcare and sustainable energy through scientific, social and technological research.



Technology Missions

The vision of KITS is being accomplished through interdisciplinary research involving 25 Technology Missions in which faculty members and students implement research that solves societal problems. These Missions lay emphasis on modern technologies relevant to industry and development. Of the 25 technology missions identified, six are in the field of Agriculture and Food Processing Engineering, that include such as, Smart Technology for Precision Farming, Technology Mission for Food Security, Indigenous and Herbal Medicine, Millets for Nutrition and Drone Technology for Agriculture. These Missions are driven by the Divisions of Agriculture and Food Processing Engineering of KITS. The Technology Missions that deal with Water Treatment and Desalination, and Wetland Conservation, implemented by the Water Institute of KITS. Four

KITS encourages, facilitates, promotes and safeguards scientific investigations and research carried out through its IPR policy, which provides guidelines for generating patents.

Objectives of IPR Policy

- To promote Intellectual Property awareness among students, faculty members, non-teaching staff and researchers.
- To organize short term training programmes, seminars, workshops and conferences.
- To assist researchers to file patents of products processes and inventions based on the research and development carried out by them.
- To assist inventors in following legal procedures related to commercialization and technology transfer.
- To promote IPR awareness among MSME (Micro, Small and Medium Enterprises) in and around Coimbatore region.

KITS-IPR Policy: <https://karunya.edu/ipr>

University Spinoffs

Incubation serves as a cornerstone for fostering a culture of innovation, entrepreneurship and interdisciplinary collaboration. KITS has developed its policy on Innovation, Incubation and Entrepreneurship, with the major objective of creating an ideal ecosystem for innovation-incubation- entrepreneurship in KITS, emanating from its academic and research programmes, leading to an innovation culture contributing to new products and processes of social, economic and technological value to the society. In order to implement this, KITS has established the Karunya Incubation Foundation (KIF), as a not-for-profit company under section 8 of The Companies Act, 2013. Under the ambit of KIF, the Institute has setup the Karunya Technology Business Incubation Park (K-TBIP), for nurturing pre-incubation, incubation and start-up ecosystem within the campus, which has successfully incubated 51 projects. The success of

university spin-offs in KITS is a testament to the institution's commitment to fostering innovation, entrepreneurship, and knowledge transfer. By providing a supportive environment, mentorship, and access to resources, KTBIP is playing a crucial role in shaping the future of entrepreneurship in the region. It not only enables students and researchers realize their dreams but also contributes to the growth and development of the region and the nation.

KITS Policy on Innovation, Incubation and Entrepreneurship:

<https://www.karunya.edu/ktbip/policy>

Research Publications

Sl. No	Title	Authors	Year	Scopus Source title	Volume	Issue
1	Inconsistencies of e-waste management in developing nations – Facts and plausible solutions	Gollakota, A.R.K. Gautam, S. Shu, C.-M.	2020	Journal of Environmental Management	261	-
2	Lignocellulosic bioethanol production: Prospects of emerging membrane technologies to improve the process - A critical review	Dey, P. Pal, P. Kevin, J.D. Das, D.B.	2020	Reviews in Chemical Engineering	36	3
3	Experimental investigation and optimization of process parameters in EDM of aluminium metal matrix composites	Palanisamy, D. Devaraju, A. Manikandan, N. Balasubramanian, K. Arulkirubakaran, D.	2020	Materials Today: Proceedings	22	-
4	Temporary reduction in air pollution due to anthropogenic activity switch-off during COVID-19 lockdown in northern parts of India	Gautam, A.S. Dilwaliya, N.K. Srivastava, A. Kumar, S. Baudh, K. Siingh, D. Shah, M.A. Singh, K. Gautam, S.	2021	Environment, Development and Sustainability	23	6

5	Innovative potential of additive friction stir deposition among current laser based metal additive manufacturing processes: A review	Gopan, V. Leo Dev Wins, K. Surendran, A.	2021	CIRP Journal of Manufacturing Science and Technology	32	-
6	Progress in the electrochemical reduction of CO ₂ to formic acid: A review on current trends and future prospects	Duarah, P. Haldar, D. Yadav, V.S.K. Purkait, M.K.	2021	Journal of Environmental Chemical Engineering	9	6
7	Post-fire damage assessment and capacity based modeling of concrete exposed to elevated temperature	Thanaraj, D.P. Anand, N. Prince Arulraj, G. Zalok, E.	2020	International Journal of Damage Mechanics	29	5
8	An efficient clustering-based anonymization scheme for privacy-preserving data collection in IoT based healthcare services	Onesimu, J.A. Karthikeyan, J. Sei, Y.	2021	Peer-to-Peer Networking and Applications	14	3
9	Excellent Photocatalytic degradation of Methylene Blue, Rhodamine B and Methyl Orange dyes by Ag-ZnO nanocomposite under natural sunlight irradiation	R., S. Jebasingh, J.A. S., M.V. Stanley, P.K. Ponmani, P. Shekinah, M.E. Vasanthi, J.	2021	Optik	231	-
10	Advanced technologies on the sustainable approaches for conversion of organic waste to valuable bioproducts: Emerging circular bioeconomy perspective	Ashokkumar, V. Flora, G. Venkatkarthick, R. SenthilKannan, K. Kuppam, C. Mary Stephy, G. Kamyab, H. Chen, W.-H. Thomas, J. Ngamcharussrivichai, C.	2022	Fuel	324	-
11	Qualitative and quantitative analyses of impact of COVID-19 on sustainable development	Bherwani, H. Gautam, S. Gupta, A.	2021	International Journal of Environmental Science	18	4

	goals (SDGs) in Indian subcontinent with a focus on air quality			and Technology		
12	Exemplification of sustainable sodium silicate waste sediments as coarse aggregates in the performance evaluation of geopolymer concrete	Kanagaraj, B. Anand, N. Johnson Alengaram, U. Samuvel Raj, R. Kiran, T.	2022	Construction and Building Materials	330	-
13	The bond strength of self-compacting concrete exposed to elevated temperature	Mathews, M.E. Anand, N. Kodur, V.K.R. Arulraj, P.	2021	Proceedings of the Institution of Civil Engineers: Structures and Buildings	174	9
14	Development of neural network models for wire electrical discharge machining of Haste alloy	Palanisamy, D. Manikandan, N. Ramesh, R. Devaraju, A. ArulKirubakaran, D.	2021	Materials Today: Proceedings	39	-
15	Performance evaluation of sodium silicate waste as a replacement for conventional sand in geopolymer concrete	Kanagaraj, B. Anand, N. Raj R, S. Lubloy, E.	2022	Journal of Cleaner Production	375	-
16	Multi objective optimization of wire-electrical discharge machining of stellite using Taguchi – Grey approach	Ujjaini Kumar, S. Manikandan, N. Binoj, J.S. Thejasree, P. Shajahan, S. Arulkirubakaran, D.	2021	Materials Today: Proceedings	39	-
17	Investigation and optimization of parameters for hard turning of OHNS steel	James Dhillip, J.D. Jeevan, J. Arulkirubakaran, D. Ramesh, M.	2020	Materials and Manufacturing Processes	35	10
18	Comprehensive Assessment of Electric Vehicle Development, Deployment, and Policy Initiatives to Reduce GHG Emissions:	Paul Sathiyam, S. Benin Pratap, C. Stonier, A.A. Peter, G. Sherine, A.	2022	IEEE Access	10	-

	Opportunities and Challenges	Praghash, K. Ganji, V.				
19	Investigation on engineering properties and micro-structure characteristics of low strength and high strength geopolymer composites subjected to standard temperature exposure	Kanagaraj, B. Anand, N. Andrushia, A.D. Lubloy, E.	2022	Case Studies in Construction Materials	17	-
20	Understanding the management of household food waste and its engineering for sustainable valorization- A state-of-the-art review	Haldar, D. Shabbirahmed, A.M. Singhanian, R.R. Chen, C.-W. Dong, C.-D. Ponnusamy, V.K. Patel, A.K.	2022	Bioresource Technology	358	-
21	An improved enzymatic pre-hydrolysis strategy for efficient bioconversion of industrial pulp and paper sludge waste to bioethanol using a semi-simultaneous saccharification and fermentation process	Dey, P. Rangarajan, V. Nayak, J. Das, D.B. Wood, S.B.	2021	Fuel	294	-
22	Kinetic modelling and process engineering of phenolics microbial and enzymatic biodegradation: A current outlook and challenges	Priyadarshini, A. Sahoo, M.M. Raut, P.R. Mahanty, B. Sahoo, N.K.	2021	Journal of Water Process Engineering	44	-
23	A Review of Challenges and Opportunities in Additive Manufacturing	Raju, R. Manikandan, N. Palanisamy, D. Arulkirubakaran, D. Binoj, J.S. Thejasree, P. Ahilan, C.	2022	Lecture Notes in Mechanical Engineering	-	-

24	Sugarcane bagasse into value-added products: a review	Shabbirahmed, A.M. Haldar, D. Dey, P. Patel, A.K. Singhania, R.R. Dong, C.-D. Purkait, M.K.	2022	Environmental Science and Pollution Research	-	-
25	Optimization and performance evaluation of PLA polymer material in situ carbon particles on structural properties	Raju, R. Manikandan, N. Binoj, J.S. Palanisamy, D. Arulkirubakaran, D. Thejasree, P. Kalyan, A.P. Reddy, G.S.	2021	Materials Today: Proceedings	39	-
26	Enrichment of material subtraction rate on Eglin steel using electrical discharge machining process through modification of electrical circuits	Sheeba Rani, S. Kamatchi Sundari, V. Subha Hency Jose, P. Sivaranjani, S. Stalin, B. Pritima, D.	2020	Materials Today: Proceedings	33	-
27	Sinaptic acid safeguards cardiac mitochondria from damage in isoproterenol-induced myocardial infarcted rats	Stanely Mainzen Prince, P. Dey, P. Roy, S.J.	2020	Journal of Biochemical and Molecular Toxicology	34	10
28	Estimation of fuel properties and characterization of hemp biodiesel using spectrometric techniques	John, C.B. Solamalai, A.R. Jambulingam, R. Balakrishnan, D.	2020	Energy Sources, Part A: Recovery, Utilization and Environmental Effects	-	-
29	Predictive Models for Wire Spark Erosion Machining of AA 7075 Alloy Using Multiple Regression Analysis	Manikandan, N. Binoj, J.S. Krishnamachary, P.C. Thejasree, P. Arul Kirubakaran, D.	2021	Lecture Notes in Mechanical Engineering	23	-

30	Investigation on improving the residual mechanical properties of reinforcement steel and bond strength of concrete exposed to elevated temperature	Kiran, T. Anand, N. Mathews, M.E. Kanagaraj, B. Andrushia, A.D. Lubloy, E. G, J.	2022	Case Studies in Construction Materials	16	-
31	Prediction of Performance Measures Using Multiple Regression Analysis for Wire Electrical Discharge Machining of Titanium Alloy	Manikandan, N. Varaprasad, K.C. Thejasree, P. Palanisamy, D. Arulkirubakaran, D. Raju, R. Badrinath, K.	2022	Lecture Notes in Mechanical Engineering	-	-
32	Performance evaluation on engineering properties of sodium silicate binder as a precursor material for the development of cement-free concrete	Kanagaraj, B. Anand, N. Samuvel Raj, R. Lubloy, E.	2022	Developments in the Built Environment	12	-
33	Coagulation influencing parameters investigation on textile industry discharge using Strychnos potatorum seed powders	Gautam, S. Arora, A.S. Singh, A.K. Ekka, P. Daniel, H. Gokul, B. Toppo, S. Chockalingam, P. Kumar, H. Lyngdoh, J.F.	2021	Environment, Development and Sustainability	23	4
34	Implementation of academia 4.0 for engineering college education	Rekh, S. Chandy, A.	2020	Procedia Computer Science	172	-
35	Privacy Preserving Attribute-Focused Anonymization Scheme for Healthcare Data Publishing	Onesimu, J.A. Karthikeyan, J. Eunice, J. Pomplun, M. Dang, H.	2022	IEEE Access	10	-
36	Visible light sensitive hexagonal boron nitride (hBN) decorated Fe ₂ O ₃ photocatalyst for the degradation of methylene blue	Shenoy, M.R. Ayyasamy, S. Bhojan, V. Swaminathan, R. Raju, N. Senthil Kumar,	2021	Journal of Materials Science: Materials in Electronics	32	4

		P. Sasikumar, M. Kadarkarai, G. Tamilarasan, S. Thangavelu, S. J, S. Reddy, M.V.				
37	Influence of mineral admixtures on the residual mechanical properties and durability characteristics of self-compacting concrete subjected to high temperature	Kiran, T. Mathews, M.E. N, A. Alengaram, U.J. Andrushia, A.D.	2022	Australian Journal of Civil Engineering	20	2
38	Bioelectricity production using microbial fuel cell—a review	Kasipandian, K. Saigeetha, S. Samrot, A.V. Abirami, S. Emilin Renitta, R. Dhiva, S.	2021	Biointerface Research in Applied Chemistry	11	2
39	Secure IoT Healthcare Architecture with Deep Learning-Based Access Control System	Thilagam, K. Beno, A. Vanitha Lakshmi, M. Wilfred, C.B. George, S.M. Karthikeyan, M. Peroumal, V. Ramesh, C. Karunakaran, P.	2022	Journal of Nanomaterials	2022	-
40	Analysis of hybrid aluminium composite material reinforced with Ti and NbC nanoparticles processed through stir casting	Joslin Vijaya, D. Pradeep Kumar, J. Robinson Smart, D.S.	2021	Materials Today: Proceedings	51	-
41	A Review on the Feasibility of Deployment of Renewable Energy Sources for Electric Vehicles under Smart Grid Environment	Femy, P.H. Jayakumar, J.	2021	International Journal of Electrical and Electronics Research	9	3
42	Digital twin technology for “smart manufacturing”	Evangeline, P. Anandhakumar	2020	Advances in Computers	117	1

43	Effect of protective coating on axial resistance and residual capacity of self-compacting concrete columns exposed to standard fire	Ealiyas Mathews, M. Kiran, T. Anand, N. Lubloy, E. Naser, M.Z. Prince Arulraj, G.	2022	Engineering Structures	264	-
44	The recent trends of EDM applications and its relevance in the machining of aluminium MMCs: A comprehensive review	Bindya Devi, M. Kumar Birru, A. Kumar Bannaravuri, P.	2021	Materials Today: Proceedings	47	-
45	Strength and microstructure behaviour of high calcium fly ash based sustainable geo polymer concrete	Vijaya Prasad, B. Paul Daniel, A.P. Anand, N. Yadav, S.K.	2022	Journal of Engineering, Design and Technology	20	2
46	Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and SDG2	Shams Esfandabadi, H. Ghamary Asl, M. Shams Esfandabadi, Z. Gautam, S. Ranjbari, M.	2022	British Food Journal	124	12
47	UAV-CPSs as a test bed for new technologies and a primer to industry 5.0	Monteiro, A.C.B. Franca, R.P. Estrela, V.V. Fernandes, S.R. Khelassi, A. Jenice Aroma, R. Raimond, K. Iano, Y. Arshaghi, A.	2020	Imaging and Sensing for Unmanned Aircraft Systems: Deployment and Applications	-	-
48	Current perspective on improved fermentative production and purification of fungal cellulases for successful biorefinery applications: a brief review	Dey, P. Rangarajan, V. Singh, J. Nayak, J. Dilip, K.J.	2022	Biomass Conversion and Biorefinery	12	3
49	Effect of elevated temperature on interfacial shear transfer	Mathews, M.E. Anand, N.	2021	Case Studies in	15	-

	capacity of self-compacting concrete	Lublóy, É. Kiran, T.		Construction Materials		
50	Cutting parameter optimization of CNC dry milling process of AISI 410 and 420 grade MSS	George, P. Philip Selvaraj, D.	2020	Materials Today: Proceedings	42	-
51	Performance evaluation of textured inserts with MQL in machining of pH stainless steel	Palanisamy, D. Jayasurya, S. Manikandan, N. ArulKirubakaran, D. Divakar, V.	2021	Materials Today: Proceedings	39	-
52	Study of Numerous Resins Used in Polymer Matrix Composite Materials	Ramakrishnan, T. Mohan Gift, M.D. Chitradevi, S. Jegan, R. Subha Hency Jose, P. Nagaraja, H.N. Sharma, R. Selvakumar, P. Hailegiorgis, S.M.	2022	Advances in Materials Science and Engineering	2022	-
53	Addressing the relevance of COVID–19 pandemic in nature and human socio-economic fate	Thapliyal, J. Bhattacharyya, M. Prakash, S. Patni, B. Gautam, S. Gautam, A.S.	2022	Stochastic Environmental Research and Risk Assessment	36	10
54	Rheological and mechanical characterization of self-compacting concrete with utilization of supplementary sustainable cementitious materials	Ealiyas Mathews, M. Anand, N. Prince Arulraj, G. Kiran, T.	2020	IOP Conference Series: Earth and Environmental Science	491	1
55	Machinability analysis and optimization of wire-EDM textured conventional tungsten carbide inserts in	Palanisamy, D. Manikandan, N. Ramesh, R. Kathirvelan, M. Arulkirubakaran, D.	2021	Materials Today: Proceedings	39	-

	machining of 17–4 PH stainless steel					
56	Influence of fiber on shear behavior of concrete exposed to elevated temperature	Varghese, A. Anand, N. Arulraj, P.G.	2020	International Journal of Engineering, Transactions A: Basics	33	10
57	Optical Grating Techniques for MEMS-Based Spectrometer-A Review	Ravindran, A. Nirmal, D. Prajoon, P. Gracia Nirmala Rani, D.	2021	IEEE Sensors Journal	21	5
58	Development and strength assessment of sustainable high strength fiber reinforced concrete	Jayakumar, G. Mathews, M.E. Kiran, T. Yadav, B.S.K. Kanagaraj, B. Anand, N.	2021	Materials Today: Proceedings	49	-
59	Luminous power improvement in InGaN V-Shaped Quantum Well LED using CSG on SiC Substrate	Manikandan, M. Nirmal, D. Prajoon, P. Dhivyasri, G. Chandran, V.	2020	IOP Conference Series: Materials Science and Engineering	906	1
60	Imaging and sensing for unmanned aircraft systems. volume 1: Control and performance	Estrela, V.V. Hemanth, J. Saotome, O. Nikolakopoulos, G. Sabatini, R.	2020	Imaging and Sensing for Unmanned Aircraft Systems: Control and Performance	-	-
61	Post-fire behaviour and improving the performance of hot rolled open sections subjected to standard fire exposure	Kiran, T. Anand, N. Mathews, M.E. Andrushia, A.D. Walls, R. Kanagaraj, B. lubloy, E.	2022	Case Studies in Construction Materials	16	-
62	Comparison analysis of IoT based industrial automation and improvement of different processes - Review	Sundari, V.K. Nithyashri, J. Kuzhaloli, S. Subburaj, J. Vijayakumar, P. Jose, P.S.H.	2021	Materials Today: Proceedings	45	-
63	Experimental investigation on surface integrity during	Palanisamy, D. Devaraju, A. Arulkirubakaran	2020	Materials Today: Proceedings	22	-

	machining of AISI 420 steel with tungsten carbide insert	, D. Manikandan, N.				
64	Smart tracking and monitoring in supply chain systems using RFID and BLE	Kumar, S.G. Prince, S. Shankar, B.M.	2021	2021 3rd International Conference on Signal Processing and Communication, ICPSC 2021	-	-
65	Study on fresh and mechanical properties for different grades of geopolymer concrete with recycled coarse aggregate	Vinay Kumar, V. Bhikshma, V. Vijaya Prasad, B.	2022	Materials Today: Proceedings	60	-
66	Artificial Intelligence-Based Energy Management and Real-Time Optimization in Electric and Hybrid Electric Vehicles	Pritima, D. Rani, S.S. Rajalakshmy, P. Kumar, K.V. Krishnamoorthy, S.	2022	EAI/Springer Innovations in Communication and Computing	-	-
67	Dairy Waste Management: A Narrative Review on Current Knowledge	Anand, T.S. Vahab, H. Chandran, D. Shanavas, A. Kumar, M. Nainu, F. Bagath, M. Mohankumar, P. Mohapatra, R.K. Chakraborty, S. Alagawany, M. Dhama, K.	2022	Indian Veterinary Journal	99	8
68	Investigation on Crack Control and Crack Pattern Analysis of Self-compacting Concrete Exposed to Standard Fire Exposure	Mathews, M.E. Anand, N. Andrushia, A.D. Kiran, T.	2021	RILEM Bookseries	31	-
69	Structural response of self-compacting	Mathews, M.E. Andrushia, A.D. Kiran, T.	2021	Materials Today: Proceedings	49	-

	concrete beams under elevated temperature	Yadav, B.S.K. Kanagaraj, B. Anand, N.				
70	Switched Reluctance Motor Converter Topologies: A Review	Kumar, V.M. Vinoth Kumar, K. Saravanakumar, R.	2020	Lecture Notes in Electrical Engineering	626	-
71	Flexural behavior of fire damaged self-compacting concrete beams strengthened with fiber reinforced polymer (FRP) wrapping	Mathews, M.E. N, A. A, D.A. Kiran, T. Al-Jabri, K.	2021	Journal of Structural Fire Engineering	12	4
72	An investigation on applications of additive manufacturing of electrical machines	Kareem, F.A. Michael, P.A.	2022	Materials Today: Proceedings	58	-
73	Application of Multiple Regression Analysis for Wire Electrical Discharge Machining of Stainless Steel 304	Thejasree, P. Manikandan, N. Binoj, J.S. Krishnamachary, P.C. Arulkirubakaran, D. Reddy, J.J. Reddy, V.I.K. Saikiran, K. Vardhan, C.V.	2022	Lecture Notes in Mechanical Engineering	-	-
74	Ensuring Sustainability via Application of Root Zone Technology in a Rubber Product Industry: A Circular Economy Approach	C, G. Jacob, L. Gautam, S. Singh, N.K. Kumar, R.P.	2022	Sustainability (Switzerland)	14	19
75	Machining of microholes in Ti-6Al-4V by hybrid micro electrical discharge machining to improve process parameters and flushing properties	Mugilan, T. Aezhisai Vallavi, M.S. Santhosh, S. Sugumar, D. Christopher Ezhil Singh, S.	2020	Bulletin of the Polish Academy of Sciences: Technical Sciences	68	3
76	EELC: Energy-efficient lightweight cryptography for IoT networks	Rajesh, G. Raajini, X.M. Sagayam, K.M. Sivasangari, A. Henesey, L.	2020	Security and Privacy Issues in IoT Devices and Sensor Networks	-	-

77	Imaging and sensing for unmanned aircraft systems: Volume 2: Deployment and applications	Estrela, V.V. Hemanth, J. Saotome, O. Nikolakopoulos, G. Sabatini, R.	2020	Imaging and Sensing for Unmanned Aircraft Systems: Deployment and Applications	-	-
78	A novel request state aware resource provisioning and intelligent resource capacity prediction in hybrid mobile cloud	Durga, S. Daniel, E. Leelipushpam, P.G.J.	2022	Journal of Ambient Intelligence and Humanized Computing	13	5
79	Identification of Civil Infrastructure Damage Using Ensemble Transfer Learning Model	Shamila Ebenezer, A. Deepa Kanmani, S. Sheela, V. Ramalakshmi, K. Chandran, V. Sumithra, M.G. Elakkiya, B. Murugesan, B.	2021	Advances in Civil Engineering	2021	-
80	A review of high frequency emission in 2-150 kHz range	Thomas, T. Michael, P.A.	2020	International Journal of Advances in Applied Sciences	9	2
81	Biogas production by pilot-scale anaerobic co-digestion and life cycle assessment using a real scale scenario: Independent parameters and co-substrates influence	Mosquera, J. Rangel, C. Thomas, J. Santis, A. Acevedo, P. Cabeza, I.	2021	Processes	9	11
82	Environmental Impact of Electric Vehicles	Jose, P.S. Jose, P.S.H. Wessley, G.J.J. Rajalakshmy, P.	2022	EAI/Springer Innovations in Communication and Computing	-	-
83	Development of grey-ANFIS model for wire electrical discharge	Palanisamy, D. Manikandan, N. Ramesh, R.	2021	Materials Today: Proceedings	39	-

	machining of Al-GNP composites	Binoj, J.S. Arulkirubakaran, D.				
84	Prediction of Performance Measures in Wire Electrical Discharge Machining of Aluminum–Fly Ash Composites Using Regression Analysis	Palanisamy, D. Manikandan, N. Raju, R. Arul Kirubakaran, D. Binoj, J.S.	2021	Lecture Notes in Mechanical Engineering	23	-
85	Wet-chemical synthesis and physico / electro-chemical performance characteristics of novel perovskite cathode materials for low-temperature solid oxide fuel cells	Reni, M.L. Samson Nesaraj, A.	2021	Iranian Journal of Chemistry and Chemical Engineering	40	2
86	Process automation through internet of things on copper coating process of stainless steel	Kumar, R.R. Rajalakshmy, P. Saranya, M.D. Kirubakaran, S. Elwin, J.G.R. Marichamy, S.	2021	Materials Today: Proceedings	45	-
87	Effect of Friction Stir Welding Tool on Al–SiC Composites by Varying Tool Pin Profile and Tool Material	Jayaseelan, P. Christy, T.V. Vijay, S.J.	2021	Lecture Notes in Mechanical Engineering	-	-
88	Modelling the thermal behaviour of GFRP reinforced concrete beams subjected to elevated temperature by standard fire exposure	Mathews, M.E. Manas, Y.S. Kiran, T. Anand, N.	2020	Journal of Physics: Conference Series	1706	1
89	Review on Arbiter Physical Unclonable Function and its Implementation in FPGA for IoT Security Applications	Shariffuddin, S. Sivamangai, N.M. Napolean, A. Naveenkumar, R. Kamalnath, S. Saranya, G.	2022	ICDCS 2022 - 2022 6th International Conference on Devices, Circuits and Systems	-	-
90	An experimental study on concrete block using construction demolition	Abraham, J.J. Saravanakumar, R. Ebenanjar,	2022	Materials Today: Proceedings	60	-

	waste and life cycle cost analysis	P.E. Elango, K.S. Vivek, D. Anandaraj, S.				
91	Valorization of Agro-industrial Discards in Fermentation for the Production of Cellulase Enzyme	Dinil, A. Jacob, A.	2022	Journal of Pure and Applied Microbiology	16	1
92	Comparative study on the heat transfer performance of micro-grooved anodized thermosyphon with R134a, R600a and R717 for low-temperature applications	Sudhan, A.L.S. Solomon, A.B. Immanuel, I.D.	2021	Journal of Mechanical Science and Technology	35	11
93	Smart solution for waste management: A coherent framework based on iot and big data analytics	Grace Mary Kanaga, E. Jacob, L.R.	2021	Advances in Intelligent Systems and Computing	1167	-
94	Effective removal of proteins using carbon-based nanoadsorbent: relevancy to the application of membrane-driven pre-water treatment	Somu, P. Singh, V. Paul, S.	2021	Journal of Chemical Technology and Biotechnology	96	7
95	Evolution of Industrial Robotic Grippers—A Review	Arulkirubakaran, D. Malkiya Rasalin Prince, R. Ramesh, R. Rajesh, T.C.S.N. Neil Anand, K. Mathew, S.M. Baby, S.T. Anila Sharon, J. Kishore, K.C.S.	2022	Lecture Notes in Mechanical Engineering	-	-
96	An AI powered system call analysis with bag of word approaches for the detection of intrusions and malware in Australian Defence Force Academy and	Melvin, A.A.R. Kathrine, G.J.W. Pasupathi, S. Shanmuganathan, V. Naganathan, R.	2022	Expert Systems	-	-

	virtual machine monitor malware attack data set					
97	Application of soft computing methods in robotic grasping: A state-of-the-art survey	Mahanta, G.B. Deepak, B.B.V.L. Biswal, B.B.	2022	Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering	236	2
98	Indoor Positioning Systems: A Blessing for Seamless Object Identification, Monitoring, and Tracking	Shyam, S. Juliet, S. Ezra, K.	2022	Frontiers in Public Health	10	-
99	Analysis of combustion, emission and performance attributes of hemp biodiesel on a compression ignition engine	John, C.B. Antony Raja, S.	2020	World Review of Science, Technology and Sustainable Development	16	2
100	Biosorption of Nickel from Metal Finishing Effluent Using Lichen Parmotrema tinctorum Biomass	Gratia, Z.K. Nandhakumar, R. Mahanty, B. Murugan, S. Muthusamy, P. Vinayak, K.S.	2021	Water, Air, and Soil Pollution	232	11
101	A UWB based Indoor Asset Tracking Architecture for Industry 4.0	Shyam, S. Juliet, S. Ezra, K.	2022	Proceedings - 4th International Conference on Smart Systems and Inventive Technology, ICSSIT 2022	-	-
102	IoT and Machine Learning-Based Smart Automation System for Industry 4.0 Using Robotics and Sensors	Sujatha, M. Priya, N. Beno, A. Blesslin Sheeba, T. Manikandan, M. Tresa, I.M. Jose, P.S.H.	2022	Journal of Nanomaterials	2022	-

		Peroumal, V. Thimothy, S.P.				
103	Effect of machining parameters on cutting force during dry milling of 2205 DSS and 2507 SDSS materials	George, P. Leo Dev Wins, K. Ebenezer Jacob Dhas, D.S. George, P. Anuja Beatrice, B.	2021	Materials Today: Proceedings	47	-
104	Production of biochar from Keppaphycus alvarezii (macroalgae) for the removal of eosin yellow: desorption, kinetic, and isotherm studies	Elayappan, T. Jayanarayanan, B. Daniel, A.P.	2022	Biomass Conversion and Biorefinery	-	-
105	Microhardness and Microstructural Behavior of AA7068/SiC Metal Matrix Composites Synthesized by Powder Metallurgy	John Joshua, K. Ramkumar, P. Vijay, S.J. Mohanasundaram, S.	2021	Lecture Notes in Mechanical Engineering	-	-
106	Effect of sphere configured particle damper on tribological properties during boring of hardened steel	Gunaraj, L. Paul, S. Dhas, E.J.	2021	International Journal of Modern Manufacturing Technologies	13	2
107	Major Advances in Monkeypox Vaccine Research and Development – An Update	Chandran, D. Nandanagopal, V.G. Gopan, M. Megha, K. Hari Sankar, C.R. Muhammad Aslam, M.K. Savanth, V.V. Pran, M. Nainu, F. Yattoo, Md.I. Ur Rehman, M.E. Chopra, H. Emran, T.B. Dey, A. Sharma, A.K. Saied, A.A. Dhama, K.	2022	Journal of Pure and Applied Microbiology	16	-

108	Effect of textures on machining of carbon steel under dry cutting condition	Rajesh Ruban, S. Jayaseelan, P. Suresh, M. RatnaKandavalli, S.	2020	IOP Conference Series: Materials Science and Engineering	993	1
109	Data analytics in metering infrastructure of smart grids – a review	Philips, A. Jayakumar, J.	2020	Journal of Green Engineering	10	11
110	Enhancing Mechanical Behavior of As-Built and Annealed Polyethylene Terephthalate Glycol (PETG) Fabricated With Fused Filament Fabrication by Varying Infill Densities	Ruban, S.R. Jannet, S. Raja, R. Kakur, N. Arumugaprabu, V.	2022	Encyclopedia of Materials: Plastics and Polymers	1-4	-
111	An Extensive Critique on Electric Vehicle Components and Charging Systems	Iqbal, M. Sathiyar, P. Stonier, A.A. Peter, G. Vanaja, D.S. Ganji, V.	2022	International Transactions on Electrical Energy Systems	2022	-
112	Development of banana peel powder as organic carrier based bioformulation and determination of its plant growth promoting efficacy in rice Cr100g	David Paul Raj, R.S. Agnes Preethy, H. Gilbert Ross Rex, K.	2021	Journal of Pure and Applied Microbiology	15	3
113	Comparative Study on H2O Steel Billets: Additive Manufacturing vs. Powder Metallurgy	Nasar, S. Baruch, L.J. Vijay, S.J. Srinivas, C.K. Jose, J. Popov, V.V.	2021	Physics of Metals and Metallography	122	5
114	IoT Enabled Sustainable Automated Greenhouse Architecture with Machine Learning Module	Lanitha, B. Poornima, E. Sudha, R. David, D.B. Kannan, K. Jegan, R. Peroumal, V. Kirubagharan, R. Tesfaye, M.	2022	Journal of Nanomaterials	2022	-

115	Experimental investigations and multi criteria optimization during machining of A356/WC MMCs using EDM	Singh, A. Kumar, K. Sundari, K.G. Ranjan, R. Surekha, B.	2022	Decision Science Letters	11	2
116	IoT based stir casting system of aluminium MMC	Raj, P.A.C. Kavitha, P. Sophia, S. Thilagam, K. Devi, V. Khan, J.M.F.	2021	Materials Today: Proceedings	45	-
117	Optimization of cutting parameters of martensitic stainless steel grades aisi 410 and AISI 420 during CNC dry milling	George, P. Selvaraj, D.P.	2021	Journal of Engineering Science and Technology	16	6
118	Artificial Neural Network and Genetic Algorithm-Based Models for Predicting Cutting Force in Turning of Hardened H13 Steel	Leo Dev Wins, K. Anuja Beatrice, B. Ebenezer Jacob Dhas, D.S. Anita Sofia, V.S.	2021	Lecture Notes in Mechanical Engineering	-	-
119	Techniques, challenges and future prospects for cell-based meat	Benny, A. Pandi, K. Upadhyay, R.	2022	Food Science and Biotechnology	31	10
120	Improvement in the graphite electrode wear characteristic of electrical discharge machined Nimonic 90 through plasma nitriding, laser hardening and duplex process	Vivek, J. Kumar, P.V.A. Lewise, K.A.S. Velmurugan, V.	2022	Sadhana - Academy Proceedings in Engineering Sciences	47	4
121	Multifunctional biogenic Al-doped zinc oxide nanostructures synthesized using bioreductant chaetomorpha linum extricate exhibit excellent photocatalytic and bactericidal ability	Somu, P. Khanal, H.D. Gomez, L.A. Vinaykumar, R. Shim, J.-J. Lee, Y.R.	2022	Biomass Conversion and Biorefinery	-	-

	in industrial effluent treatment					
122	Optimal Design Optimization of a Hybrid Rigid–Soft Robotic Hand Using an Evolutionary Multi-objective Algorithm	Mahanta, G.B. Deepak, B.B.V.L. Rout, A. Biswal, B.B.	2022	Lecture Notes in Mechanical Engineering	-	-
123	A comprehensive overview on intelligent mechanical systems and its applications	David, S. Anand, R.S. Sheikh, S. Jebapriya, S. Andrew, J. Xavier, S.B.	2020	Materials Today: Proceedings	37	2
124	Two-stage hybrid electrocoagulation–adsorption in the removal of disperse dyes and inorganic salts from the textile dyeing effluent	Jegathambal, P. Gafoor, A. Parameswari	2021	Desalination and Water Treatment	237	-
125	Beneficial health effects of cumin (Cuminum cyminum) seeds upon incorporation as a potential feed additive in livestock and poultry: A mini-review	Vinod, N. Sreelakshmi, K.S. Neha, A.R. Soman, M. Manalil, S. Sureshkumar, R. Sabareeshwari, V. Naveen Kumar, P. Kumar, K.K. Sangeetha, K.S. Lishma, N.P. Pran, M. Sharma, A.K. Alagawany, M. Dhama, K. Marthandan, V. Chandran, D.	2022	Journal of Experimental Biology and Agricultural Sciences	10	5
126	Heat pipe-embedded tooling for sustainable manufacturing	Kantharaj, I. Vijay, S.J. Vasanth, X.A. Mohanasundaram, S. Rai, R.S.	2021	Sustainable Manufacturing and Design	-	-

127	Investigation on the performance of fiber reinforced concrete subjected to standard fire exposure	Varghese, A. Anand, N. Andrushia, D. Arulraj, P.	2020	World Journal of Engineering	18	3
128	Herbs as Antidote for Snakebite Treatment in India — Traditional Practices and it's Future Prospects — A Review	David Paul Raj, R.S. Mathew, A.A. Jesse Joel, T. Beena Kanimozhi, R. Agnes Preethy, H.	2022	Journal of Natural Remedies	22	3
129	Evolution of Industrial Robots During Mid of Nineteenth Century– Beginning of Twentieth Century—A Review	Arulkirubakaran , D. Malkiya Rasalin Prince, R. Nagarajesh, T.C.S. Palanisamy, D. Anand, K.N. Siddharth, S. Nagasuresh, M. Kishore, K.C.S. Abhishek, N.S.	2022	Lecture Notes in Mechanical Engineering	-	-
130	Prospects of Metakaolin Admixed Palm Kernel Shell Solid Concrete Masonry Block: A Review	John, N. Shanthi, R.M. Tensing, D.	2022	Civil Engineering and Architecture	10	4
131	Iot based prognostics using mems sensor with single board computers for rotary machines	Vasanth, A. Paul, P.S. Shylu, D.S. Paul, P.M.	2021	Przeglad Elektrotechniczny	97	11
132	Correction to: Multifunctional biogenic Al-doped zinc oxide nanostructures synthesized using bioreductant chaetomorpha linum extricate exhibit excellent photocatalytic and bactericidal ability in industrial effluent treatment (Biomass Conversion and Biorefinery, (2022), 10.1007/s13399-022-03177-7)	Somu, P. Khanal, H.D. Gomez, L.A. Vinaykumar, R. Shim, J.-J. Lee, Y.R.	2022	Biomass Conversion and Biorefinery	-	-

133	Flavor Signatures of Beverages and Confectionaries	Areekal, N.N. George, S. Peter, I.M. Thankachan, R. Haponiuk, J.T. Gopi, S.	2021	Natural Flavors, Fragrances, and Perfumes: Chemistry, Production, and Sensory Approach	-	-
134	IoT based smart machinability system and performances of MRR on Haynes alloy	Sudha, R. Rajalakshmy, P. Shankar, M.S.S. Pious, A.E. Raj, P.A.C. Vijayakumar, P.	2021	Materials Today: Proceedings	45	-
135	Preface: Proceedings of the International Conference on robotics, automation and intelligent systems (ICRAINS 21)	Rajalakshmy, P. Mary, X.A. Mahanta, G.B.	2022	AIP Conference Proceedings	2670	-
136	A novel method for minimizing transient current test time by exploiting RES in SRAM	Prince, P. Sivamangai, N.M.	2021	Analog Integrated Circuits and Signal Processing	107	2
137	Green Nanomaterials: Design, Synthesis Properties, and Industrial Applications	Selvakumar, P.M. Nuzhat, S. Quadrey, M.M. Monichan, S. Samdavid Thanapaul, R.J.R. Muthukumar Nadar, M.S.A.	2022	Handbook of Smart Materials, Technologies, and Devices: Applications of Industry 4.0: Volume 1-3	3	-
138	A Literature Review on Secured Data Management using Block Chain Technology in Healthcare Sector	Preethi, S. Priyadharsini, C.	2021	2021 International Conference on Smart Generation Computing, Communication and Networking, SMART	-	-

				GENCON 2021		
139	Effect of Machining Parameters on Cutting Performance of DSS 2205 and SDSS 2507 Materials during Milling Operation	George, P. Leo Dev Wins, K. Ebenezer Jacob Dhas, D.S. Anuja Beatrice, B.	2022	Journal of Advanced Manufacturing Systems	21	4
140	Removal of heavy metals from textile industries with natural adsorbents	Mariappan, S. Issac, R.	2022	Journal of Current Science and Technology	12	2
141	Preparedness in the Aftermath of a Natural Disaster Using Multihop Ad hoc Networks— Drone-Based Approach	Paulraj, G.J.L. Jebadurai, I.J. Jebaveerasingh, J.	2021	Advances in Intelligent Systems and Computing	1133	-
142	Recovery of Bioactive Components from Food Processing Waste	Ravichandran, C. Mutharasu, R.M. Upadhyay, A.	2021	Sustainable Food Waste Management: Concepts and Innovations	-	-
143	A Machine Learning-Based Novel Energy Optimization Algorithm in a Photovoltaic Solar Power System	Prasad, K. Samson Isaac, J. Ponsudha, P. Nithya, N. Shinde, S.K. Gopal, S.R. Sarojwal, A. Karthikumar, K. Hadish, K.M.	2022	International Journal of Photoenergy	2022	-
144	Retraction: Machining of microholes in Ti-6Al-4V by hybrid micro-electrical discharge machining to improve process parameters and flushing properties (Bulletin of the Polish Academy of Sciences Technical Sciences (2020) 68:3 (565-573) DOI: 10.24425/bpasts.2020.133366)	Mugilan, T. Aezhisai Vallavi, M.S. Santhosh, S. Sugumar, D. Ezhil Singh, S.C.	2021	Bulletin of the Polish Academy of Sciences: Technical Sciences	69	4

145	Energy efficient zigbee based secured wireless data transmission and reception	Manimekalai, M.A.P. Thusnavis Bella Mary, I. Babu, J.J. Prince, S.	2021	Journal of Green Engineering	11	2
146	The State-of-the-Art Reverse Logistics for e-Waste Management: A Scenario Specific to India	Arun Vasantha Geethan, K. Jose, S. John, R. Ahmed, I.A. Rajan, P. Rajan, A.P.	2022	Strategies and Tools for Pollutant Mitigation: Research Trends in Developing Nations	-	-
147	IoT control and layer formation of FDM on polycarbonate based aluminium	Chinnasamy, A. Varalakshmi, L.M. Wessley, G.J.J. Malini, T. Sanjith, S. Sheikh, M.F.A.	2021	Materials Today: Proceedings	45	-
148	Software-Defined Network-Based Packet Keys to Secure Critical Infrastructures of Internet of Things	Taurshia, A. Kathrine, J.W. Jebapriya, S.	2022	Lecture Notes in Electrical Engineering	905	-
149	Experimental investigations of aisi 410 and aisi 420 martensitic stainless steel in cnc dry milling operation	George, P. Philip Selvaraj, D.	2021	International Review of Mechanical Engineering	15	5
150	Antlion optimization-based energy management of grid connected domestic PV system	Pradip, C. Subathra, M.S.P.	2020	Journal of Green Engineering	10	8
151	Wet chemical synthesis of graphene containing co / mn co-doped nionanocrystalline materials: Efficient electrode for electrochemical supercapacitors	Sriresh, G. Nesaraj, A.S.	2021	Iranian Journal of Chemistry and Chemical Engineering	40	5
152	Intelligent Facility Management System for Self-sustainable Homes	Gerard Joe Nigel, K. Anand, N.	2022	Smart Urban Computing Applications	-	-

	in Smart Cities: An Integrated Approach	Grace Mary Kanaga, E.				
153	Biological synthesis and characterization of titanium dioxide nanoparticle from Cynodon dactylon	Renitta, R.E. Jebaseeli, T.J. Dhanaraj, A. Paul, S.	2022	Journal of Achievements in Materials and Manufacturing Engineering	113	1
154	Green technology based biomedical device for low cost screening of arthritis in rural areas	Isaac, S. Raj, A.C. Hepsiba Anand, V. Prabakar, S.	2020	Journal of Green Engineering	10	10
155	Effectiveness of Artificial Intelligence Based Recruitment process in the Employment of Indian Hardware Industry	Amuthan, R. Arumugam, D.	2022	International Interdisciplinary Humanitarian Conference for Sustainability , IIHC 2022 - Proceedings	-	-
156	Electrocoagulation Influencing Parameters Investigation on Reactive Dyes in Textile Wastewater: A Simple Optimization Method	Garg, M. Ghosh, S. Kumar, A. Chopra, V. Mall, I.D. Gautam, S.	2021	Bow Ties in Process Safety and Environmental Management: Current Trends and Future Perspectives	-	-
157	Li-Fi: Illuminating the Future of Internet	Abraham, J.M. Kumar, H. Josemin Bala, G.	2020	2020 IEEE 15th International Conference on Industrial and Information Systems, ICIIS 2020 - Proceedings	-	-
158	Erratum to: Comparative Study on H2O Steel Billets: Additive Manufacturing vs. Powder Metallurgy	Nasar, S. Baruch, L.J. Vijay, S.J. Srinivas, C.K.	2021	Physics of Metals and Metallography	122	8

	(Physics of Metals and Metallography, (2021), 122, 5, (515-526), 10.1134/S0031918X21050100)	Jose, J. Popov, V.V.				
159	A Study on Predicting Software Defects with Machine Learning Algorithms	Anjali, C. Dhas, J.P.M. Singh, J.A.P.	2022	Proceedings of 2022 International Conference on Intelligent Innovations in Engineering and Technology, ICIET 2022	-	-
160	Digital Thermometers: Its Types, Utilities, and Global Trade Prospects for India	Anthony Raj, S. Senith, S. Kalpana Sai, B.	2021	Journal of Physics: Conference Series	1937	1
161	Research and development of ISA-DAC-instrumentation software application and data acquisition system for the foundation industry	Gopal, N. Rajalakshmi Raj, P.A.C. Jegan, R.	2022	AIP Conference Proceedings	2670	-
162	Intrusion Detection System for Cyber Attacks in Food and Beverage Industry	Beulah Rani, I. Palmer, G.M. Kathrine, G.J.W. Ewards, S.E.V.	2022	International Conference on Automation, Computing and Renewable Systems, ICACRS 2022 - Proceedings	-	-
163	Additive manufacturing techniques in construction	Sheeja, T.V. Jebadurai, S.V.S. Tensing, D.	2022	Research on Engineering Structures and Materials	8	3
164	An Intelligent Energy Management System with an Efficient IoT based Deep Learning Framework	Bazil Wilfred, C. George, S.M. Sivaranjani, S. Selvan, S.	2022	International Conference on Sustainable Computing	-	-

		Feros Khan, J.M. Beulah David, D.		and Data Communication Systems, ICSCDS 2022 - Proceedings		
165	Impact of Cutting Parameters on Cutting Force of AISI 410 and AISI 420 MSS during CNC Dry Milling	George, P. Selvaraj, D.P. George, P.	2022	Materials Science Forum	1048	-
166	Effects of Infill Speed and Heat Treatment on Mechanical Properties of Carbon Fiber Reinforced Polyethylene Terephthalate Glycol (CF-PETG) Composites	Rubans, S.R. Raja, R. Jannet, S. Venkateshwaran, N. Gurusideswar, S. Kakur, N.	2022	Encyclopedia of Materials: Plastics and Polymers	1-4	-
167	Reliable Surveillance Tracking System based on Software Defined Internet of Things	Isravel, D.P. Silas, S. Rajsingh, E.B.	2020	The Cognitive Approach in Cloud Computing and Internet of Things Technologies for Surveillance Tracking Systems	-	-
168	Influence of Fly Ash and Cement with Molasses Addition on Moulding Properties in Silica Sand: A Comparison	Rao, K.C.A. Bannaravuri, P.K. Birru, A.K. Rao, P.S. Babu Rao, G. Arulkirubakaran, D.	2022	Lecture Notes in Mechanical Engineering	-	-
169	Synthesis of adsorbent from animal waste and its applications in industrial effluent treatment	Kandasamy, S. Baskaran, N. Jeyaprakash, R.K. Nagarajan, V. Manickam, N.K. Subbiah, K.	2020	AIP Conference Proceedings	2240	-

170	Effect of particle damper technique on tribological properties during hard turning process	Lawrance, G. Paul, P.S. Joshwa, D. Sharvilin, S. Sudarsan, K. Arun, R.	2022	Materials Today: Proceedings	49	-
171	Influence of Graphite Particles on Microhardness and Microstructural Behavior of AA7068 Metal Matrix Composites Processed by Powder Metallurgy	John Joshua, K. Vijay, S.J. Ramkumar, P. Philip Selvaraj, D.	2021	Lecture Notes in Mechanical Engineering	-	-
172	Influence of Cutting Parameters on Machinability of DSS 2205 and SDSS 2507 Materials During Milling	George, P. Leo Dev Wins, K. Jacob Dhas, D.S.E. George, P. Beatrice, B.A.	2022	International Journal of Manufacturing, Materials, and Mechanical Engineering	12	1
173	Design, Fabrication, and Performance Analysis of Intelligent Mesoscale Capacitive Accelerometer for Vibration Measurement	Gomathi, K. Sakthivel, R. Joseph John Marshal, S. Pratheep, V.G.	2021	Journal of Testing and Evaluation	49	4
174	Study of Cutting Forces and Prediction of Surface Quality Analysis Using Neural Network Model, Support Vector Regression Model by Various Textured Tool Condition for Ti-6Al-4V Alloy	Arulkirubakaran, D. Prince, R.M. Kumar, R.M. Aravinthkumar, S. Joshva, C.A.	2020	IOP Conference Series: Materials Science and Engineering	923	1
175	Experimental Investigation of Twin Elliptic Orifice at Different NPR Levels	Parameshwari, S. Kumar, P. Thanigaiarasu, S. Rathakrishnan, E.	2020	Lecture Notes in Mechanical Engineering	-	-
176	Literature study on seismic resistance of structures using 3-D printed models	Samuel Abraham, D. Hemalatha, G.	2020	Journal of Critical Reviews	7	9

177	Energy Saving in a Two Stage Compressor by Reducing the Losses in Motor	Kartikeyan, V. Victor, S. Michael, P.A.	2021	Proceedings of the 6th International Conference on Communication and Electronics Systems, ICCES 2021	-	-
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Patents Published

Sl. No	Title Of Invention	Application Number	Date of Filing	Date of Publishing	Inventors
1	Method of Making Antimicrobial Fabric Using Silver Nanoparticles, Banana Sap and Natural Dye	3774/CHE/2014	1/8/2014	7/1/2016	Dr. Arun Dakshinamurthy, Dr. P Mosae Selvakumar, Deena S
2	"Derma Hierbas" an Ointment For Skin Rashes	3775/CHE/2014	1/8/2014	7/1/2016	Dr. Narendhirakannan.
3	A Cheap And Simple Process For The Preparation Of A- Diazo Oxime Ethers	4650/CHE/2014	9/24/2014	7/1/2016	Bharath Kumar Kuruba, Nusrathulla Shariff, Dr. S Vasanth Kumar, Dr. L Emmanuvel
4	Process Of Removal Of Dye From Coloured Effluent Using Aneurinibacillus Aneurinilyticus	5608/CHE/2014	7/11/2014	7/1/2016	Joshni T Chacko, Dr. Kalidass Subramaniam
5	A Method For Decolorization Of Dyes Using Composition Comprising Of Nanoparticle And Microorganisms	5610/CHE/2014	7/11/2014	7/1/2016	Joshni T Chacko, Dr. Kalidass Subramaniam

6	Rotating Spherical Fuel Injector Within A Spherical Combustor For Gas Turbine And Other Applications	6924/CHE/2015	12/16/2015	6/23/2017	Kevin Thomas Kuttothara, Dr. L Godson Asirvatham
7	Modified Expander Re-Heat Cycle Within A Spherical Combustor For Gas Turbine And Other Applications	6923/CHE/2015	12/16/2015	6/23/2017	Kevin Thomas Kuttothara, Dr. L Godson Asirvatham
8	Wound Healing Non Immunogenic Oxazolidinone Nano Scaffolds	201641015465 PCT/IB2017/052562	5/4/2016	17/02/2017	Dr. S Sundar Manoharan, Jhansi Laksmi Parimi, Dr.C. Guruvayoorappan
9	A Method For Decolourization Of Dyeing Waste Water By Electrocoagulation Using Titanium Dioxide Coated Aluminium Electrode	2474/CHE/2015	5/16/2015	11/18/2016	Vinodha Selvaraj, Dr. Jegathambal Palanichamy, Dr. Parameswari Kalivel
10	Photovoltaic Device And Fixtures	201641015466	04/05/2016	11/10/2017	Mr. Dominic Mathew
11	Method For Recovery Of Nano-Particles From Leach Liquor	201641041909	8/12/2016	4/7/2017	Dr. S. Sundar Manoharan, Dr. Princy Merlin
12	Lobicure – A Herbal Wound Healing Ointment	201741004799	10/02/2017	10/27/2017	Dr. Muthukumar Nadar, Mr. Rex Jeyaraj Kumar
13	Aerobic Pre-Fermenter	201741006585	24/02/2017	11/10/2017	Dr. Jibu Thomas, Mr. Suresh Kumar.P, Ms.Vinolia S
14	Mini Loop Thermosyphons	201741029966	24.08.2017	10/27/2017	Dr. Godson Asirvatham, Trijo Tharayil
15	Pod Ash As Reinforcement To Metal Matrix Composites	201741029943	24.08.2017	10/27/2017	Dr. T. V. Christy

16	Battery Charging Method And System	2018410133 79	09.04.2018	11/16/2018	Mr. John Paul And Ashish Johney
17	Biosynthesis Of Isopropyl Myristate	2018410281 22	26.07.2018	16/11/2018	Dr. S. Kavitha, Prof. (Em.) Yoram Oren And Mr. Padmanabhan Dhanasekaran
18	A Polyherbal Ointment For Skin Ailments	2018410369 73	01.10.2018	16/11/2018	Dr. M.S.A.Muthukumar And Dr. S. Rex Jeya Rajkumar
19	A Cystoscope Without Telescope, External Camera Or Traditional Light Source	2019410092 38	09.03.2019	6/14/2019	Dr. J. Gnanaraj
20	Machine For Baking Rice Batter	2019410127 31	29.03.2019	26.02.2021	Dr. M. S. P. Subathra, Mr. J. Edwin Moses
21	Enhanced Production Of Antisnake Venom Compound (Taraxerol) From Suspension Cultures Systems of Suphorbia Hirta L	2019410179 91	06.05.2019	14/06/2019	Dr. David Paul Raj R. S, Mr. Pratap Kumar C
22	Development Of Improved Production Process Of Cellulase From Waste Pulp And Paper Sludge Material	2019410184 65	08.05.2019	14/06/2019	Dr. Pinaki Dey
23	Synthesis Of Pegulated Caffeic Acid – A Novel Anti-Cancer Drug	2019410214 00	30.05.2019	6/7/2019	Dr. Narendhira Kannan R, Dr. Ishwarya M,
24	Low Cost Brain Mapping Tool For Epilepsy Detection	2019410216 14	30.05.2019	07/06/2019	Dr. S. Thomas George, Dr. M. S. P. Subathra, Ms. N. Evangeline Glory, Mr. Ashutosh Singhal, Ms. J. Mabel, Ms.

					S.Belvina Roseline,Ms. J. Mercy Felicia,Ms.N.J.Sai Ramya
25	A Test Set-Up Device For Ac Contractor To Automate Hum Detection And Method Thereof	2019410216 67	31.05.2019	6/7/2019	Dr. K Rajasekaran, Dr. X. Anitha Mary,,Mr. J. Devaprakash,
26	A New Technique And Needle For Laparoscopic Surgical Suturing”	2019410260 04	28.06.2019	05/07/2019	Dr. J Gnanaraj
27	Deflagration – To –Detonation Supersonic Igniter”	2019410260 05	28.06.2019	7/5/2019	Dr. Aldin Justin Sundararaj, Ms. Vinita M Samuel
28	Graphene Optical Data Storage Using Nanoholes	2019410260 06	28.06.2019	7/5/2019	Dr. N. M. Sivamangai,Mrs. P. A. Silpa,
29	Formulation And Evaluation Of Ganoderma Niosomal Topical Gel Drug Delivery System	2019410304 15	27.07.2019	09/08/2019	Dr. J .Vimalin Henna
30	Multi Finned Heat Pipe Embedded Boring Tool	2019410328 59	14.08.2019	20/09/2019	Mr. I Kantharaj
31	Chicken Antibody Generation Against Microbial Pathogen Bacillus Cereus From Human Nail	2019410489 86	28.11.2019	12/13/2019	Dr.P.Levin Anbu Michele Gomez, Dr.C.Vani, S.Abinaya, Elsa Nissi Jacob
32	Specnoscope - A Medical Device For Cervical Cancer Screening	2019410489 85	28.11.2019	12/13/2019	Dr. G. Babu Rao, Mr. R. Jobel Jose, Mr. Tummuru Vijay Kanth, Dr. J. Gnanaraj

33	Novel Volume Measurement System For An Irregular Shaped Tank	2019410489 84	28.11.2019	13.12.2019	Dr. K. Rajasekaran, Dr.P.Rajalakshmy, Dr.P.Subha Hency Jose, Mr.G.Joseph Chinnadurai, Mr. Devaprakash
34	Low Cost Solar Irradiance Measurement And Two Axis - Sun Tracking Control System	2019410506 61	09.12.2019	13.12.2019	Dr. S. Paul Sathiyam, A. Pandian
35	Grid From Work	2020410002 86	03.01.2020	10.01.2020	Dr. G. Hemalatha
36	Process Of Extraction Of Biopesticidal Compound Against Aedes Aegypti (Dengue Vector) Using Pseudomonas Aeruginosa And Products Thereof	2020410086 63	28.02.2020	06.03.2020	Dr. Vani, Lalithambika
37	Dried Banana Peel Powder As An Organic Carrier In Bioformulation For Biocontrol Of Pythium Sp	2020410109 82	13.03.2020	20.03.2020	Dr. David Paul Raj
38	Magnetically Assisted Heat Pipe For Thermal Control	2020410110 73	14.03.2020	20.03.2020	Dr. Brusly Solomon
39	Intelligent Integrated Control System For Electric Vehicle Battery	2020410118 09	18.03.2020	27.03.2020	Dr. Jayakumar, Mr. Dileepan
40	A Novel Composition For Controlling Pathogen In Maize	2020410140 07	30.03.2020	12.06.2020	Dr. Jibu Thomas, Reena Josephine

41	An Insect Repellent Composition From Micro-Algae And The Process For The Preparation Thereof	2020410144 85	31.03.2020	12.06.2020	Dr. Jibu Thomas
42	High Solid Loading Saccharification Process Of Waste Pulp And Paper Sludge (Pps) Material For Production Of Fermentable Simple Sugars In Concentrated Form	2020410193 18	06.05.2020	29.05.2020	Dr. Pinaki Dey, Steve Branden Wood
43	A Multilayer Gate Mosfet For Reducing Short Channel Effect	2020410195 70	08.05.2020	29.05.2020	Dr. D. Nirmal
44	An Escalator For Lifting The Elderly Or Physically Challenged Person From Ground Level	2020410196 84	09.05.2020	29.05.2020	Dr. Babu Rao
45	Kavid – Karunya Disinfection Chamber	2020410206 77	15.05.2020 /28.04.2021	8.10.2021	Dr. Jibu Thomas, Dr. Jacob Kalaiselvan Annamalai, Dr. Vani, Dr. Muthukumar Nadar, Dr. Jesse Joel, Mr. Robert
46	Anodized Micro Fins For Enhanced Heat Transfer In Heat Pipes With Ammonia As Working Fluid	2020410209 27	18.05.2020	05.06.2020	Dr.A. Brusly Solomon, A.L.Sriram Sudhan
47	A Low-Cost Portable Cryotherapy Instrument For Treating Sports Injuries	2020410211 46	19.05.2020	29.05.2020	Mr.Jithin V Raj, Dr.D.Pamela, Mr.K.Gerard Joe Nigel, Dr.S.P.Jai Prabhu

48	Ampoule Bottle Penetrator	2020410211 45	19.05.2020	05.06.2020	Dr.J. Prabhu, Dr. R. Nandhakumar
49	Water Purifier Using Natural Strata	2020410211 47	19.05.2020	29.05.2020	Dr.Sneha Gautam, Dr. Brema J, Mr. Prabhat Ekka, Mr. Boya Gokul
50	A Device For Determining The Quality Of Milk	2020410211 89	20.05.2020	05.06.2020	Dr.J. Prabhu, Dr. R. Nandhakumar, Mr. Joseph Chinnadurai
51	Attention Deficit Hypersensitivity Disorder (Adhd) Detection System	2020410213 56	21.05.2020	05.06.2020	Dr. S. Thomas George, Dr. D. Narain Ponraj, Mrs. Catherine Joy, Mr. Ashuthosh Singhal, Mr. Devesh Singh
52	A Microbial Fuel Cell For Generating Electricity From Wastewater	2020410218 96	26.05.2020	05.06.2020	Dr. S. Kavitha, Dr. Sakunthala Ayyasamy, Sanjana Rajeev, Suresh Kumarkrishnan, Pavithra Shanmugaraj
53	A Non-Voice Based Communication System And Method For Aiding The Paralyzed And Speech Impaired People	2020410231 21	02.06.2020	12.06.2020	Dr. P. Subha Hency Jose, Oshin R Jacob, Susma Grace Varghese, Ruth Molly Benjamin
54	A Composition For Preparing Electrospun Polymeric Nanofiber Mat For Preparing Face Mask For Antimicrobial Use	2020410240 59	08.06.2020	12.06.2020	Dr. Israel V.Muthu Vijayan Enoch, Aleyamma Alexander
55	Lithium Trivanadate Thin Film Nanorods By Pulsed Laser Deposition Technique	2020410244 67	11.06.2020	8.1.2021	Dr. Rajesh, Professor, Dr. Sakunthala Ayyasamy, Dr. Vidhya, Nandhakumar Raju, Rojin Varghese, Shobin Vijay

56	De-Colouring And Dye Removal Agent	2020410244 72	11.06.2020 /27.02.202 1	05.03.2021	Dr. Rajesh, Dr. Sakunthala Ayyasamy, Dr. Vidhya, Nandhakumar Raju, Manjula Raveendranatha Shenoy
57	A Triboelectric Nanogenerator	2020410270 95	26.06.2020	10.07.2020	Dr. D. Nirmal, Dr. S. Vasanth Kumar, Mr. Godfrey, Dr. Subramanian Ramanathan
58	Instant One Pot Chemical Synthesis Of Carbon Nano Flake (Cnf) Particles	2020410311 62	21.07.2020	07.08.2020	Dr.Samson Nesaraj, S. Dharani Priya, A. Deepi
59	A Polymeric Nanofabric Material To Prevent Microbial Pathogens	2020410314 84	23.07.2020	31.07.2020	Dr. Rajesh Swaminathan, Dr. Sakunthala Ayyasamy, Dr. Vidhya Bhojan, Dr. Nandhakumar Raju, Dr. Nitin Patel
60	Hand Gesture Controlled Trash Can For Bedridden Patients	2020410362 74	23.08.2020	04.09.2020	Mr. John Paul, Dr. Shobha Rekh, Mr. Asish Johney George
61	A Friction Stir Welding Device And The Method Involved Thereof	2020410372 66	28.08.2020	11.09.2020	Dr. S. J. Vijay, Mr. Sharon Topno, Dr. A. Brusly Solomon
62	Gi Nettings For Partially Restrained Rcc Beam Column Joint	2020410374 08	31.08.2020	25.09.2020	Mr. E. Arun Raj, Dr. Vincent Sam Jebadurai, Dr. G. Hemalatha

63	A Method Of Coating Seeds Of Gmelina Arborea With Bioformulation For Biocontrol Of Damping- Off Disease	2020410409 28	21.09.2020	02.10.2020	Dr. David Paul Raj, Geetu K M, Beena Kanimozhi R, Rohini S, Jemmy Joy
64	A Panipuri Dispensing System	2020410413 69	24.09.2020	02.10.2020	Dr. Paul Sathiyam, Mr. Sandeep Kumar, Mr. Alan, Mr. Jesinth Arnold
65	Women Safety Wearable Device	2020410464 15	24.10.2020	15.01.2021	Mr. S. Basil Xavier, Dr. G. Jasper W Kathrine, Ms. Charlotte Hephzibah Panga, Ms. Aaradhana, Ms. Susan P Matthew, Ms. Akku,
66	Improved Blowing Suction System(Ibss) For Enhanced Aerodynamic Performance In Aircraft Wing	2020410464 16	24.10.2020	15.01.2021	Mr. K. Balaji, Dr. G. Jims John Wesley
67	Process Of Preparing Mwcnt, Abaca Fiber And Epoxy Based Reinforced Nanocomposite Laminate And Product Thereof	2020410464 17	24.10.2020	15.01.2021	Rittin Abraham Kurien, Dr. Philip Selvaraj
68	Intelligent Ergo - Computer Chair	2020410466 53	26.10.2020	15.01.2021	Dr. Mona Sahu, Dr. Vijay, Dr. Wilson Kumar, Dr. Baburao, Mr. Emmanuel De Souza, Mr. Samuel Walter Ezekiel

69	Biowaste Derived Carbon Electrode Supercapacitor	202041047605	31.10.2020	6.11.2020	Dr. D. Nirmal, Dr. S. Vasanth Kumar, Mr. Godfrey, Dr. Subramanian Ramanathan, Dr. Arulapan Durairaj
70	An Artificial Intelligent Ergonomic Stand For Laptop	202041050701	21.11.2020	04.12.2020	Dr. Mona Sahu, Dr. Vijay, Dr. Wilson Kumar, Dr. Baburao, Mr. Paga Jacob Basil Roy, Mr. Konduru Srinivasa Chakravarthy, Mr. Dokka Prem Prasanth
71	Novel Material For Electro Adhesive Materials, The Products Thereof And The Methods Of Manufacture	202041052409	01.12.2020	11.12.2020	Dr. Rajesh, Dr. Nandhakumar, Dr. Vidhya, Dr. Sakuthala, Dr. Nitin Patel
72	Uv Object Sanitizer	202141007236	21.02.2021	26.02.2021	Dr. Manimegalai, Dr. S. Thomas George
73	An Improved 360-Degree Sanitizing Machine 'Duosanz' Machining System	202141007237	21.02.2021	26.02.2021	Dr. Majumdar Abhishek, Dr. Debnath Tapas, M. Sathiaraj
74	Method Of Making Vertically Aligned Liv3o8 Thin Films On Fto By Spray Pyrolysis	202141009407	05.03.2021	3.9.2021	Dr. A. Sakunthala, Dr. S. Rajesh, Dr. R. Nandhakumar, Dr. B. Vidhya, Mr. Rojin Varghese, Mr. Shobin Vijay
75	Step Impedance Resonator Structure Based Flexible Antenna For Wearable Applications	202141010036	10.03.2021	19.03.2021	Dr. Nesasudha, Mr. Doondi Kumar, Mr. Sudhakar, Mr. Jose Kommini
76	A Novel Herbal Disinfecting Composition And Dispensing Device Thereof	202141014723	29.03.2021	16.07.2021	Dr. Jibu Thomas, Dr. S. Thomas George, Dr. D. Narain Ponraj, Mr. Joseph Chinnadurai, Mr. Devaprakash

77	A Half Coil Manufactured From A Novel Composition For Brushless Dc Motor Windings With Improved Efficiency	202141016081	05.04.2021	16.04.2021	Dr. Prawin Angel Michael, Dr. S. J. Vijay
78	Household Cost Effective Biocompatible Non Uv Nanocomposite Membrane Based Water Purification System	202141017290	13.04.2021	3.9.2021	Dr. Jegathambal, Dr. A. Hepzibah Christinal, Dr. R. Emilin Renitta, Dr. Martin Mkandawire, Dr. Stephanie Macquarrie, Dr. Rajendran Kaliaperumal
79	A Novel Foam Block For Treating Textile Dyeing Effluent	202141017946	19.04.2021	30.04.2021	Dr. Jegathambal, Ms. A. Lincy, Ms. Shobina K Moses, Mr. Venkat Veeresh
80	A Device For Trapping Locust	202141020431	04.05.2021	11.06.2021	Dr. Elizabeth Amudhini Stephen, Dr. Sujitha Juliet, Dr. G. Hemalatha, Mr. Geo Kingsly Lynus
81	A Nanoparticle Coated Coolant Pipes For Concrete	202141021161	10.05.2021	11.06.2021	Dr. Trijo Tharayil, Dr. Godson Asirvatham
82	Loop Structure Based Flexible Antenna For Medical Monitoring Applications	202141025459	08.06.2021	25.06.2021	Dr. Nesasudha, Dr. Subha Hency Jose, Mr. Doondi Kumar, Mr. Sudhakar, Mr. Akhil Augustin, Mr. Jerin Jose
83	A Fabric Based Electro-Adhesive Clutch Operated Exosuit	202141040925	09.09.2021	24.09.2021	Dr. S. Rajesh, Dr. A. Sakunthala, Dr. R. Nandhakumar, Dr. B. Vidhya
84	Process Of Preparation Of Zno Nanoparticles Incorporated Bio-Organic Fertilizer And Product Thereof	202141046595	12.10.2021	29.10.2021	Dr. S. Rajesh, Dr. A. Sakunthala, Dr. R. Nandhakumar, Dr. B. Vidhya, Ms. T. Bincy

85	A Process Of Preparing Feo-Go-Hbn Composite And Product Thereof	2021410465 96	12.10.2021	29.10.2021	Dr. S. Rajesh, Dr. A. Sakunthala, Dr. R. Nandhakumar, Dr. B. Vidhya, Dr. J. Prabhu
86	Process Of Preparation Of Magnesium Ion Conducting Electrolyte Membrane And Product Thereof	2021410465 97	12.10.2021	29.10.2021	Dr. S. Rajesh, Dr. A. Sakunthala, Dr. R. Nandhakumar, Dr. B. Vidhya
87	Target Protein Predictions For Infectious Diseases	2021410579 26	13.12.2021	17.12.2021	Dr. G. Naveen Sundar, Dr. Paul Sathiyan, Dr. D. Narmadha
88	A Process For Isolating Polyglycine Compound From Xenorhabdus Stockiae	2022410092 22	21.02.2022	04.03.2022	Dr. C. Vani, Mr. Jissin Mathew
89	Tool For Optimality In Automatic Washer Punching	2022410092 23	21.02.2022	04.03.2022	Dr. R. Sabitha, Dr. J. Immanuel Johnraja, Dr. Esther Daniel, Mr.S. Aravind Raj
90	Improved Backing Plates With Cooling For Friction Stir Processing	2022410092 27	21.02.2022	11.03.2022	Dr. R. Raja, Dr. S.J. Vijay, Dr. Tapas Debnath, Dr. Sabitha Jannet, Dr. L. Godson Asirvatham
91	Ai System For Post Crash Care On Road Traffic Injuries	2022410130 76	10.03.2022	18.03.2022	Dr. R. Elijah Blessing, Dr. S. Salaja, Mrs. P. Joyce Beryl Princess
92	A Broadband Optically Transparent Metamaterial Absorber Self-Energy Harvester	2022410158 04	22.03.2022	25.03.2022	Dr. Victor Du John, Dr. Jackuline Moni, Dr. D. Narain Ponraj
93	A Portable Low Cost Cpap For Life Saving Applications	2022410214 13	11.04.2022	22.04.2022	Dr. P. Manimegalai, Dr. S. Thomas George, Derek Sanch, Sowmya, Orianna Gabriella Manners,

					Joseph Chinnadurai, Devaprakash, Patturaj
94	System And Method For Automatic Model Transformation Using Behaviour Extraction	2022410225 61	16.04.2022	06.05.2022	Dr. Mythily, Ms. Rexie, Dr. Kethsy Prabavathy, Ms. Devapriya, Dr. Brindha
95	Hybrid Power Source System For Elevators	2022410228 17	18.04.2022	13.05.2022	Dr. Prawin Angel Michael, Dr. S. J. Vijay, Dr. Victor Du John
96	Site Specific Curcumin Conjugates Of Molecular Imaging Probes For Therapy And Diagnostic (Theranostic) Imaging Applications	2022410254 94	01.05.2022	03.06.2022	Dr. Jebasingh Bhagavathsingh, Angel Green, Zavier Thaliyakuzhy, Sundar Manoharan, Nagabhusan Vellala, Brahmadathan Kootallur
97	Industrial Indoor Asset Positioning And Navigation System	2022410293 47	21.05.2022	03.06.2022	Dr. Sujitha Juliet, Dr. Kirubakaran Ezra, Ms. Shilpa Shyam
98	A Preparation Method Of Vertically Aligned Carbon Nanotubes And Reduced Graphene Oxide As Lamellars	2022410299 28	25.05.2022	03.06.2022	Ms. Priyanka P, Dr. S. Rajesh, Dr. B. Vidhya, Dr. A. Sakunthala, Dr. R. Nandhakumar
99	An Artificial Intelligence Based Real Time Multilingual Neural Sign Language Machine Translation System	2022410299 34	25.05.2022	03.06.2022	Mrs. Jennifer Eunice R, Dr. D. Jude Hemanth
100	Automatic Swab Testing Machine	2022410307 28	29.05.2022	17.06.2022	Mr. Santhosh Kumar, Dr. Anitha Mary, Dr. S. Thomas George
101	A System For Proactive Diagnosis Of	2022410385 87	05.07.2022	15.07.2022	Mr. G. Samuelraj Chrysolite, Dr. Anita Jones Mary Pushpa,

	Breast Cancer Employing Non Invasive Adhesive Sensor Array Antenna				Dr. Sugumar, Dr. Deborah Angelin Preethi
102	Edible And Biodegradable Cutlery As A Nutritional Supplement And A Method Of Making Thereof	2022410393 15	08.07.2022	15.07.2022	Dr. David Paul Raj, Dr. Pragalyaashree, Edappattu Evalin Eldho, Puthenveetil Almi Babu
103	Specnoscope Plus - An Indigenous Cervical Cancer Screening Unit	2022410601 90	21.10.2022	04.11.2022	Dr. Gadudasu Babu Rao, Mr. Limson Mathew, Dr. Kumuda Raimond, Dr. D. Sujitha Juliet, Dr. Kurinji Priya
104	A Cost Effective And Low Power Consuming Textile Effluent Treatment Method For Effluent Reclamation	2022410615 78	28.10.2022	04.11.2022	Ms. S. Sahaya Leenus, Dr. K. Parameswari
105	Capacitance Based Portable Sensor For Detecting Floating Objects	2022410707 97	08.12.2022	16.12.2022	Mr. K. Gerard Joe Nigel, Dr. Pamela, Mr. Sanu Santhosh, Mr. Delwin Mathew Joseph, Mr. Amal Sojan, Mr. Kevin Yesudas
106	Voice Based Communication System	2022410740 00	20.12.2022	13.01.2023	Dr. E. Grace Mary Kanaga, Ms. M. Bhuvaneswari, Dr. S. Thomas George, Mr. J. Denny Ebenezer Samuel, Mr. Caleb Stephen
107	Flexible Self Driven Energy Harvesting Device For Portable Biomedical Devices	2023410057 84	30.01.2023	17.02.2023	Dr. R. Jagan, Dr. Subha Hency Jose, Nimi W.S

108	A Process Of Preparation Of Pyruvic Acid Conjugated Macrocycles Of Paramagnetic Complexes	2023410088 15	10.02.2023	24.02.2023	P. Mano Ranjana, Dr. B. Jebasingh
109	Augmentation In Damping Efficiency Using 3d Printed Accumulator In Magneto-Rheological Damper For Structural Application	2023410095 98	14.02.2023	24.02.2023	S. Vevekananda Sharma, Dr. G. Hemalatha, Dr. E. Arunraj
110	3d Printing Head For Reinforced Concrete Structural Elements	2023410096 04	14.02.2023	24.02.2023	Pratheeksh Joshy, Sajin Philip, Dr. S. Vincent Sam Jebadurai, Dr. G. Hemalatha
111	Internet Of Things Based Food Recommendation System	2023410266 36	10.04.2023	05.05.2023	Ebenezer, Shreyanshi Paul, Yemimol, Sharon Rose, Bijolin Edwin, Roshni Thanka
112	Voice Enhanced Handheld Assistive Device For Elderly And Persons With Speech Disorders	2023410290 53	21.04.2023	05.05.2023	Hepsiba, Vijay Anand, Vinotha, Joseph Chinnadurai
113	Electric Field Induced Integration Of Vertically Aligned Carbon Nanotubes Into Graphene As Three Dimensional Structure	2023410305 29	28.04.2023	05.05.2023	Dr. S. Rajesh, Dr. B. Vidhya, Dr. A. Sakunthala, Dr. R. Nandhakumar
114	A Rapid Method For Extraction Of Clonazepam From Spiked Carbonated And Non-Carbonated Soft Drink Samples	2023410308 60	29.04.2023	26.05.2023	Archana Anil Kamble, C. Joseph Kennady, Ashish Badiye, Neeti Kapoor

115	Smart Cradle Device For Baby Monitoring	202341034175	15.05.2023	18.08.2023	Manimegalai, Thomas George, Amritha Michael
116	A System Of Power Generating Tile	202341042327	23.06.2023	01.09.2023	Pullanikkat Abhilash, Pullanikkat Abhishek, Praise Elizabeth, Bollavarapu Ashish Enoch, Catherina G, Bondugula Shalem Raj, Dr. Hemalatha, Dr. Sneha Gautam, Dr. Alok Sagar Gautam, Sanjeev Kumar
117	A System For Portable And Replaceable Indian Cleaver Knife For Chopping Meat	202341042328	23.06.2023	01.09.2023	Dr. F. T. Josh, Dr. Jency Joseph, Ms. Grace Judith, Ms. Sankepalle Deekshitha, M. Abarna, A. Jebasingh
118	A Process Of Preparation Of Fibre Rich Tender Coconut Water Jelly And Product Thereof	202341049612	24.07.2023	01.09.2023	Nivetha, Dr. Arun Kumar
119	Smart Vacuum Salon Chair System	202341051113	29.07.2023	01.09.2023	Pullanikkat Abhilash, Joel Varma, Febin Joseph, Cyril Samuel Dr. Sneha Gautam, Dr. Godson Asirvatham Lazarus
120	Internet Of Things Based Wearable Device For Women Safety	202341051165	29.07.2023	01.09.2023	Dr. Ebenezer, Uvaana Falicica, Rithika Baskaran, Agatha Celesty, Sejal Eden, Dr. Roshni Thanka
121	A One Pot Simultaneous Electrooxidation-Electrocoagulation Process For Effective Pollutant Removals From Textile/Pharmaceutical Waste Water	202341057303	26.08.2023	08.09.2023	Riju S Robin, Dr. Parameswari, Jovitha Jane

122	Intelligent Speech Assistive System For Voiceless People	2023410588 51	01.09.2023	06.10.2023	Dr. Salaja Silas, P Joyce Beryl Princess, Dr. Getzi Jeba Leelipushpam, Graeson Joshua Elijah, Evalt David
123	A Process Of Electrochemical Sensor Based Detection Of Tryptophan	2023410602 57	07.09.2023	06.10.2023	Sudharshan Bangaru(Rrk21nt2001) , Dr. Suresh Babu
124	Eco-Friendly Honey Bee Repellent Herbal Spray	2023410618 11	14.09.2023	06.10.2023	Dr. David Paul Raj, Sneha Annie Abraham, Kavinila
125	A Self Controlled Assistive Wearable Electronic Simulation Device	2023410699 42	16.10.2023		Dr. R. Jegan, Dr. S. Thomas George, Nimi W.S, J. Devaprakash, Mercy Golda

University Spinoffs

Sl. No	Title of the Technology	Inventors	Patent No.
1	Improved backing plates with cooling for friction stir processing	Dr.R.Raja, Dr.S.J.Vijay, Dr.Tapas Debnath, Dr.Sabitha Jannet, Dr.Godson L.Asirvatham	202241009227
2	Specnoscope Plus - A Medical Device for Cervical Cancer Screening.	Dr. G. Babu Rao, Dr. Kumudha Raimond, Mr. Limson Mathew, Dr. Sujitha Juliet, Dr. Kurinji Priya	202241060190
3	A system for proactive diagnosis of breast cancer employing non – invasive adhesive sensor array antenna	Dr.Samuelraj Chrysolite.G , Dr.Anita Jones Mary Pushpa.T, Dr.Sugumar.D, Dr.Deborah Angelin Preethi.P	202241038587
4	Hand gesture controlled trash can for bedridden patients	John Paul Asish Johney George A Shobha Rekh	202041036274

5	Hybrid power source system for elevators	Dr. Prawin Angel Michael, Dr. S. J. Vijay, Dr. H. Victor Du John	202241022817 A
6	Deflagration to detonation supersonic igniter, 2019	Dr. Aldin Justin Sundararaj Mrs. Vinita Samuel	201941026005
7	Automatic swab testing machine	Santhosh Kumar. Anitha Mary. X Thomas George	202241030728 A
8	A rechargeable cryotherapy instrument for treating sports injuries	Mr.Jithin Raj Dr.D.Pamela Mr.K.Gerard Joe Nigel Dr.S.P.Jai Prabhu Dr.Bobby Paul	202041021146
9	A test set-up device for ac contactor to automate hum detection and method thereof	Dr.K.Rajasekaran, Dr.X.Anitha mary Mr.J. Devaprakash	201941021667 A
10	Ai system for post-crash care on road traffic injuries	Dr. Elijah Blessing Dr. S. Salaja Mrs. P.Joyce Beryl Princess	202241013076 A
11	Novel material for electro-adhesive materials, products thereof and method of manufacture	Dr.S.Rajesh, Dr.B.Vidhya, Dr.R.Nandhakumar, Dr.A.Sakunthala, Dr.Nitin Patel	202041052409
12	Chicken Antibody Generation against Microbial Pathogen Bacillus Cereus from Human Nail.	Dr.P.Levin Anbu Michele Gomez, Dr.C.Vani, Ms.Abinaya, Ms.Elsa Nissi Jacob	201941048986
13	KaViD – Karunya Disinfection Chamber	Dr. Jibu Thomas, Dr. Jacob Kalaiselvan Annamalai, Dr. Vani, Dr. Muthukumar Nadar, Dr. Jesse Joel, Mr. Robert	202041020677
14	Truchet Cube Puzzle	Dr. S Jebasingh	362636-001, 350980-001
15	Women safety wearable device	Mr.S.Basil xavier Dr.G.Jasper w.Kathrine Ms.Charlotte hephzibah panga Ms.Aaradhana Ms.Susan p matthew Ms.Akku	202041046415 A

16	A low Cost CPAP for wide-speed usage	Ms. Sowmya Sudhakar, (URK19BM1001) Dr. P Manimegalai, Associate Professor Mr. Derek Sanch I, (URK19BM1020) Ms. Oriana Gabriella Manners, (URK19BM1033) Ms. Reshma Immaculate S (URK20BM1012) Ms. Amy Fedora F (URK20BM1005) Dr. S. Thomas George, Professor, HoD BME	NIL
17	Miniature gardening and indoor scaping using terrariums	Mr. Albero A, (URK20AC1110) Mr. Febin Brito M, (URK20AC1082) Mr. Anas S, (URK20AC1118) Mr. Melbin C Abraham (URK20AC1071) Ms. Dona P, (URK21AC1238) Ms. Nithya Shree BR (URK21AC1210)	NIL
18	Electronic device for mosquito eradication in septic Chambers	Dr. R. Philip Sridhar, Professor Dr. P Rajalakshmy, HoD Associate Professor Dr. X Anitha Mary, Associate Professor	NIL
19	Treatment of textile dyeing effluent from small scale industries	Dr. P. Jegathambal, Professor Dr. J. Srinivasan, Assistant Professor Dr. Prawin Angel Mechael, Associate Professor Dr. Sabitha Jannet, Assistant Professor	NIL
20	Traditional Herbal oil for pain relief Testing, validation and marketing.	Dr. David Paul Raj RS, Associate Professor Dr. Premnath D, Assistant Professor Dr. Sajan Kurian, Dean SAS	NIL
21	Commercialization of alternative protein products with low carbon footprint	Dr. Rituja Upadhyay, Associate Professor Ms. Sai Sathvika Moparathi (URK19FP1065) Mr. Gokul Krishna L. (URK19FP1051)	NIL

		Ms. Shyweta Kalokhe Mr. Vinnay Upadhyay	
22	Anti-Theft Device for Fishing net	Mr. Gerard Joe Nigel K, Assistant Professor Dr. Pamela D, Associate Professor	NIL
23	ZOE Cloud Services	Dr. J. Jaya Kumar, Professor	NIL
24	Abaya Security	Dr. Siva Mangai, Associate Professor, ECE	NIL
25	Chitosan based domestic water filtration unit	Dr. Suguna Devakumari M, Assistant Professor Dr.Praveena Katharine S Assistant Professor	NIL

Karunya Technology Business Incubation Park (K-TBIP) Incubates List

I. List of Student Incubates

Sl. No	Names	Division	Theme/Product	Company Name
1	Ms. P. Srisha (URK19AC1131)	Agriculture	Row to row method of fertilizer application machine which is very easy to handle by the farmers, cost effective and acceptable in all land forms	Inoculture
	Mr. A. Sanjay (URK19AC1148)			
	Mr. A. Derak Gladio (URK19AC1011)			
	Mr. M. Mohamed Ashif (URK19AC1127)			
2	Mr. Vinith Arockiasamy (URK18AE014)	Aero Space Engineering	Ceres, a user-friendly AI crop management system that can be implemented in drone/ robot	Nerd fliers
3	Mr. Sanu Santhosh (URK18RA024)	Robotics Engineering	Ensures fertilizer benefits by optimizing soil PH. Increases crop yield	Innoagri
	Mr. Kevin Yesudas (ULK18RA001)			
	Mr. Amal Sjan (URK18RA00003)			
	Mr. Delwin Mathew Joseph (URK18RA004)			
4	Mr. Joy Sam Raj. M (URK20CS1066)	CSE	Client's modern business problems can be solved by modern computers via web and desktop applications.	Kallardo

5	Mr. US Manikanda (URK20EC1100)	ECE	FFF 3D printers most commonly print in PLA or ABS plastic	US Enterprises
6	Mr. J. Midhun (URK20AI1047)	CSE	An easy platform for booking the charging slots or the customers who uses the EV cars	Eco charge
	Mr. R. Manohar (URK20AI1057)			
	Mr. B. Praveen (URK20AI1060)			
7	Mr. Thilak Kumar (PRK20MS1081)	MBA	Create an integrated mobile app so that the event photographers and the people can find it easy to reach each other and satisfy their requirements	Wedin
8	Mr. Victor Immanuel. C (PRK19CE1004)	Civil Engineering (alumni)	Virtual reality techniques, making use of this, elements can avoid any collisions, construction errors leading to real time model modifications	VR Wereld
	Mr. Jerushan Jeyraj (RRK21CE1004)			
	Ms. Lavanya Anapa (PRK19CS5003)			
	Mr. K. Sri Venkata Naga Raju (PRK19MS1095)			
	Mr. Satya Narayana Swamy Deonepudi (PRK19CE1010)			
9	Mr. CH.Harshith Kumar (URK19CS1035)	CSE	To improve the efficiency of a drone copter based on a green cover fixing using a radar which identifies the green cover automatically to enhance efficiency in drone copter (UAV)	Drone copter
	Mr.PhilipPaul, (URK19CS1228)			
	Mr. D.M.BevinGeoff, (URK19CS1018)			
10	Mr. S. Kishor Kumar (PRK21MS1084)	MBA	Smart Transportation using E-vehicle transporting people in a closed campus 24/7 without any human power	-
11	Ms. Daya Susan George, (URK22AI1113)	CSE	Wearable device for identification and	

	Mr. Armstrong Aldrin. A (URK22AI1093)		management of panic and anxiety disorders	-
	Mr. Ramly Alan. A (URK22AI1102)			
	Ms. Vikasini. S (URK22AI1068)			
12	Ms. Sowmya Sudhakar, (URK19BM1001)	Biomedical Engineering	A low Cost CPAP for wide-speed usage	CPAP
	Dr. P Manimegalai, Associate Professor			
	Mr. Derek Sanch I, (URK19BM1020)			
	Ms. Oriana Gabriella Manners, (URK19BM1033)			
	Ms. Reshma Immaculate S (URK20BM1012)			
	Ms. Amy Fedora F (URK20BM1005)			
	Dr. S. Thomas George, Professor, HoD BME			
13	Mr. Albero A, (URK20AC1110)	Agriculture	Miniature gardening and indoor scaping using terrariums	Hurτος
	Mr. Febin Brito M, (URK20AC1082)			
	Mr. Anas A, (URK20AC1118)			
	Mr. Melbin C Abraham (URK20AC1071)			
	Ms. Dona P, (URK21AC1238)			
	Ms. Nithya Shree BR (URK21AC1210)			
14	Mr. Samu Idhayan I, (URK21CS2006)	CSE	A User-friendly manner platform for the farmers to market their harvest	Farmer Friend
15	Mr. Gugasujith M, (URK21CS2027)	CSE	An online marketing platform for traditional goldsmiths	Handmade Authentics
16	Ms. Vedha Viboosini S L (URK22AC1047)	Agriculture	Bio fortified Micro greens Production	Micro greens
	Mr. Mohammed Saif K (URK22AC1023)			
	Ms. Dhiviya S J (URK22AC1045)			

	Ms. Madhupriya D (URK22AC1024)			
	Mr. Karthick M (URK22AC1002)			
	Mr. Abhijeet S (URK22AC1019)			
17	Ms. Harshini P, (URK20AC1035)	Agriculture	Hibiscus gulkands as an antioxidant suppliments	Hibiscus gulkands
	Ms. Sanchana Dhas A K, (URK20AC1027)			
	Ms. Madhu Pankajam N, (URK20AC1044)			
18	Mr. Aman Daniel Dalal, (PRK21FS1043)	Applied Chemistry	3-Dots Ice Creams	3-Dots
	Mr. Sharon Kumar Darnasi, (PRK21FS1029)			
	Mr. Akash Good Win M, (PRK21FS1015)			
19	Mr. G. Bexell, (PRK21AC2026)	Agriculture	Birds and wild animal infestation - prevention	-
20	Ms. TP. Tryphena, (URK21AC1267)	Agriculture	Herbal E-ball	-
21	Ms. Kanimozhi E (URK19HC1019)	Agriculture	Dry flower product making	-
	Ms. Athulya Binu (URK21AC1108)			
	Ms. Suganthiya.S (URK21AC1160)			
	Ms. Sameekshaa S (URK21AC1143)			
	Ms. Hema Surthi V S (URK21AC1090)			
	Ms. Dheetchitha Priyadharshini AM (URK21AC1095)			
	Ms. Nighisha G J (URK21AC1096)			
22	Mr. S. Parthiban (URK20RA1005)	Robotics Engineering	Kreatln	-
	Ms. Rashmi Kiran	External Members		
	Mr. Bobby Vishal			
	Mr. Dhanush AM			
23	Mr. C.L. Brijesh (URK22BT1030)	Biotechnology	Healo Packs (Lakshmi Print and Pack)	Healo Packs

II List of Faculty / Staff Incubates

Sl. No	Names	Department	Theme/Product	Company Name
1	Dr. S. Rajesh, Professor and Head	Applied Physics	Healthcare assistive energy device for physically challenged people.	Four I Tech R&D solutions pvt ltd
	Dr. R.Nandhakumar, Professor	Applied Chemistry		
	Dr. B. Vidhya, Assistant Professor	Applied Physics		
	Dr. A. Sakunthala, Assistant Professor	Applied Physics		
2	Dr. S. Rajesh, Professor and Head	Applied Physics	Low power lighted weight Exosuit	Four I Tech R&D solutions pvt ltd
	Dr. R. Nandhakumar, Professor	Applied Chemistry		
	Dr. B. Vidhya, Assistant Professor	Applied Physics		
	Dr. A. Sakunthala, Assistant Professor	Applied Physics		
3	Dr. R. Philip Sridhar, Professor	Agriculture	Electronic device for mosquito eradication in septic Chambers	Culex Mosquito Trap
	Dr. P Rajalakshmy, HoD Associate Professor	Robotics Engineering		
	Dr. X Anitha Mary, Associate Professor	Robotics Engineering		
4	Dr. N.M.Siva Mangai, Associate Professor	ECE	Avoiding animal intrusion in farm lands by installing a fence mounted fiber optic sensor cables.	FIOPSE security
	Dr. D. Sugumar, Associate Professor	ECE		
5	Dr. T. Sujithra, Assistant Professor	CSE	Low cost device for smart traffic control systems by reducing the average waiting time of emergency vehicles in signals and also to address the problems in conventional traffic control systems.	Tecknolog
	Dr. P. Getzi Jeba, Associate Professor			
	Dr. S. Punitha, Assistant Professor			
	Dr.R.Manoranjitham Assistant Professor			
6	Dr. P. Jegathambal, Professor	Water Institute		
	Dr. K Indira Petchiammal, Assistant Professor	Agriculture		
	Dr. J. Srinivasan, Assistant Professor	Agriculture		

	Dr. Prawin Angel Mechael, Associate Professor	Aerospace Engineering	Treatment of textile dyeing effluent from small scale industries	Mayim Chayim
	Dr. Sabitha Jannet, Assistant Professor	Mechanical Engineering		
7	Dr. G. Hemalatha, Professor	Civil Engineering	Light-weight aggregate coated with nano cementitious material as a substitute for coarse aggregate.	Wall Architect
	Dr. S. Vincent Sam Jebadurai, Assistant Professor	Civil Engineering		
	Dr. E. Arun Raj, Assistant Professor	Civil Engineering		
8	Dr. P. Jegathambal, Professor	Water Institute	Agriculture residue management system	Mayim Chayim
	Dr. C. Mayilsamy, HoD / Professor			
	Dr.K.IndiraPetchiammal Assistant Professor	Agriculture		
	Dr. J. Srinivasan, Assistant Professor			
	Dr.TK. KumariSugitha, Assistant Professor			
	Dr. Susan Poonguzhali, Assistant Professor			
Dr. K. Aruna, Associate Professor	Commerce			
9	Dr. S Jebasingh, Assistant Professor	Mathematics	Introducing a New Cube puzzle (mind game) 2x2 and 3x3 Cube puzzle with Truchet contours	Qurios Minds Private Limited
10	Dr. M.Suguna Devakumari, Assistant Professor	Agriculture	Designing a cost effective portable nitrate analyzer for water with smartphone cameral and optical devices	Nitrate Sensor
	R. Alex Immanual Jeyasingh,	I M.Sc. Agronomy		
11	Dr. S. Carolin Jeeva, Assistant Professor	Digital Sciences	IoT based water quality monitoring Real time monitoring of water quality - Automation and IoT	Water quality automation
	Dr. Suguna Devakumari M, Assistant Professor	Agriculture		
	Mr. Ryan Powell	Agri Student		
12	Dr. Sneha Gautam, Associate Professor			

	Dr. Hemalatha, Professor	Civil Engineering	Software for Language Editing Services for paper publication. This will be useful for scholars who wish to publish papers and articles.	Language Editing Services
	Dr. E Arunraj, Assistant Professor			
	Ms. Roshini P, Assistant Professor			
	Mr. Cyril Samuel, Assistant Professor			
13	Dr.DavidPaulRajRS, Associate Professor	Biotechnology	Traditional Herbal oil for pain relief Testing, validation and marketing.	Refuah Herbals
	Dr. Premnath D, Assistant Professor	Biotechnology		
	Dr. Sajan Kurian Professor, Dean SAS	Agriculture		
	Dr. Jebasingh, Associate Professor	Chemistry		
14	Dr. Suguna Devakumari M, Assistant Professor	Agriculture	Chitosan based domestic water filtration unit	-
	Dr.Praveena Katharine S Assistant Professor			
15	Dr. RitujaUpadhyay, Associate Professor	FPT	Commercialization of alternative protein products with low carbon footprint	Flavingred Products & Services Private Limited
	Ms. Sai Sathvika Moparthi(URK19FP1065)	FPT Student		
	Mr. Gokul Krishna L. (URK19FP1051)			
	Ms. Shyweta Kalokhe	External members		
	Mr. Vinnay Upadhyay			
16	Dr. Sugumar D, Associate Professor	ECE	Customized Antennas for next generation Wi-Fi	-
	Dr. Anita Jones Mary T, Associate Professor			
	Mr. Jebavaram J, Lab Technician Grade I			
17	Dr. Brema J, Professor	Civil Engineering	System and services to provide high quality geospatial mapping for Environmental and infrastructure projects	-
	Dr. Hemalatha G, Professor			
	Dr. R. Shanmathi Rekha R, Assistant Professor			
18	Mr. Gerard Joe Nigel K, Assistant Professor	Robotics Engineering	Anti-Theft Device for Fishing net	-
	Dr. Pamela D, Associate Professor	Biomedical Engineering		

19	Dr. Gobikrishnan S, Assistant Professor	FPT	Development of Probiotic based on millet to address cognitive impairment / (ADHD)	-
	Mrs. Suganthi R,			
	Ms. Jakki Vinuthna, (RRK21FP2003)			
20	Mr. B. Jai Ganesh, Assistant Professor	Management Studies	HR Recruitment Service	-
	Dr. J Clement Sudhahar, Professor & HoD			
21	Dr. J. Jaya Kumar, Professor	ECE	ZOE Cloud Services	-
22	Dr. J. Jaya Kumar, Professor	ECE	Smart System Development	-
23	Dr. TC. Kumari Sugitha, Assistant Professor	Agriculture	Innovative bio- formulations of plant- Probiotics for sustainable agriculture	-
	Dr. Indira Petchiammal, Assistant Professor	Agriculture		
	Dr AleyammaAlexander Assistant Professor	Nano science & Genomics		
	Dr. Nisha Malini, Assistant Professor	MBA		
	Dr. Philip Sridhar, Professor	Agriculture		
24	Dr.Jenita Thinakran, Professor	Agriculture	Plant-based protective valued added products	-
	Dr. Vimalin Hena, Assistant Professor			
	Dr. J. Ivan Wilson, Assistant Professor	FPT		
	Ms. Sherlee Singamala, Lab Technician Grade II	Agriculture		
	Ms.K. Jagadeeswari, (PRK21HC1021)	Student-M.Sc. Horticulture		
25	Dr. J. Sebastian Terence, Assistant Professor, CSE	CSE	Share 2 Care	-
	Mr. R. Sarathi			
26	Dr. Siva Mangai, Associate Professor, ECE	ECE	Abaya Security	Abaya Security

III. List of Industry Incubates

Sl. No	Names	Industry	Address	Theme/Product
1	Dr. Dileep Kumar. R	M/s Indriyam Biologics	Poojapura, Thiruvananthapuram, Kerala	<i>INDHAN</i> - A fully automated bio diesel processor <i>V-SENS</i> - Snake venom detection biosensor.
2	Mr. Varoon Damodaran	M/s Birchwood Pets	403, Suparshav, Sarvodaya Nagar, Nahur road, Mulund West Mumbai – 400080.	Pet Foods
3	Dr. G. Paul Robinson Gnanaraj	M/s Mapusoft Technologies	No: 60, Pasumai Nagar, Karunya Nagar, Coimbatore 641114.	Operating Systems
4	Mr. Santosh D	M/s. WisRight Tech Private Limited	No. A 105, AKS Sunstone Apartments, 1st Main Road, Aiswarya Nagar, Ayanambakkam, Chennai - 600 095.	Business Development with Internships
5	Mr. Renious Charles	M/s Truleaf Private Ltd	1A-1B Neem Square, KRG Nagar Main Street, Ganapathy, Coimbatore - 641 006	R&D of bakery products and multi varieties of breads



SDG 10 - REDUCED INEQUALITIES

Inequalities in opportunities affect a person's life expectancy and access to basic services such as healthcare, education, water, and sanitation. It is a particular concern that influences the long-term outcomes and opportunities, especially for students. It places those affected at a disadvantage with long-lasting consequences, such as adverse physical and mental health which can undermine their development and potential.

SDG 10 calls for reducing inequalities in income, age, sex, disability, race, ethnicity, origin, religion or economic status within a country by 2030.

10.1 Research on Reduced Inequalities

Research on inequalities is an initiative to enhance knowledge and understanding of economic and social inequalities to better respond to complex challenges. During the years 2021& 2022, 10 research papers were published in the Scopus indexed journals as given below.

S.No.	Title	Authors	Year	Journal	Volume	Issue
1	Analysis of the health, economic and environmental impacts of COVID-19: The Bangladesh perspective	Gautam, S. Setu, S. Khan, M.G.Q. Khan, M.B.	2022	Geosystems and Geo environment	1	1
2	Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and SDG2	Shams Esfandabadi, H. Ghamary Asl, M. Shams Esfandabadi, Z. Gautam, S. Ranjbari, M.	2022	British Food Journal	124	12
3	Addressing the relevance of COVID-19 pandemic in nature and human socio-economic fate	Thapliyal, J. Bhattacharyya, M. Prakash, S. Patni, B. Gautam, S. Gautam, A.S.	2022	Stochastic Environmental Research and Risk Assessment	36	10

4	Outcome based education and revised bloom's taxonomy as a catalyst for redesigning teaching and learning in engineering education	Brindha, V.E.	2020	Journal of Engineering Education Transformations	34	1
5	Prospects of Metakaolin Admixed Palm Kernel Shell Solid Concrete Masonry Block: A Review	John, N. Shanthi, R.M. Tensing, D.	2022	Civil Engineering and Architecture	10	4
6	Indo-ASEAN Free Trade Agreement and the Plantation Sector: Need for a Relook	Thomson, J. Nair, A. Kumar, F.J. Rajan, R.T. Chandran, J.	2022	SCMS Journal of Indian Management	19	3
7	Green technology based biomedical device for low cost screening of arthritis in rural areas	Isaac, S. Raj, A.C. Hepsiba Anand, V. Prabakar, S.	2020	Journal of Green Engineering	10	10
8	Vulnerabilities and Ethical Issues in Machine Learning for Smart City Applications	Sagayam, K.M. Jeyasingh, R. Winston, J.J. Jose, T.	2022	Advances in Science, Technology and Innovation	-	-
9	Digital Thermometers: Its Types, Utilities, and Global Trade Prospects for India	Anthony Raj, S. Senith, S. Kalpana Sai, B.	2021	Journal of Physics: Conference Series	1937	1
10	Analyzing the Financial Soundness and Resilience of Select Small Finance Banks with RBI's Big Data	Augustus Immanuel Pauldurai, T. Anitha, J. Vijila, M.	2022	Lecture Notes in Electrical Engineering	905	-

10.2 First-Generation Students

India has achieved significant progress towards the goal of 'Education for All' through initiatives such as Sarva Siksha Abhiyan (SSA) and Right to Education (RTE) which have given the much-needed impetus to education system in India. Of all the SDGs, education is the most vital component for sustainable development. SDG 10.2. indicates how the University addresses social and economic inequality, by taking into account the number of first-generation students.

10.2.1 Indicator: Proportion of first-generation students

621 Students were first generation students at KITS during the year 2021- 2022, which constitutes almost 8.1 % of the total student population.

10.3 International Students from Developing Countries

10.3.1 Indicator: Proportion of International Students from Developing Countries

KITS being a nodal center for IAESTE (International Association for Exchange of students for Technical Experience) draws students from across the globe to pursue their project in our state of the art research laboratories. 20 students interned in KITS despite the COVID pandemic restrictions. There is 4 International students pursuing different Courses during the year 2021 to 2022.

S.No.	Reg. No.	Sex	Deg.	Programme	Year Of Adm.	Nationality	Enrollment
1.	RRK21CS1003	Male	Ph.D.	Computer Sc. & Eng.	2021-22	Nigeria	Full Time
2.	RPI21T1002	Male	Ph.D.	Information Technology	2012-13	Nigeria	Part Time
3.	RRI21MS002	Female	Ph.D.	Management Science	2011-12	Uganda	Full Time
4.	UTK19RA1001	Male	B.Tech.	Robotics & Automation	2019-20	Canada NRI	Transfer

10.4 Proportion of Students with Disabilities

10.4.1 Indicator: Proportion of Students with Disabilities

Three students with disability enrolled during the year 2021 to 2022.

No.	Reg. No.	Gender	Degree	Program	Type Of Disability
1.	URK20CM1037	Male	M.B.A.	Business Administration	Visual Disability
2.	URK20CS2123	Male	B.Tech.	Computer Science	Learning Disability (Dyslexia)
3.	URK20CS3030	Male	B.Tech.	Computer Science	Psychiatric Disability

10.5 Proportion of Employees with Disabilities

10.5.1 Indicator: Proportion of Employees with Disabilities

- One employee is differently abled.

10.6 Measures against Discrimination

10.6.1 Non-Discriminatory Admissions Policy

Preamble

- *'Karunya, being an Institution with 'compassion', has taken several initiatives for creating a disabled friendly ecosystem. Apart from all the facilities recommended by the Building Codes, Construction Manuals and the Act of 2016, all the stipulations of different agencies of Govt. of India and Tamil Nadu are followed to give special attention to the requirements and comfort of the disabled in the campus, and those who visit the campus (lifts, ramps, etc.) These are reviewed in different meetings held by different Committees and necessary modifications and improvements incorporated. The students are also encouraged to concentrate on research projects and product development, leading to prototypes and processes which help the disabled. Health Care is one of the thrust areas of the Institution that facilitates the disabled. There are also special facilities in the Community Hospital in the campus to take care of the special needs of the disabled.'*
- *'Right of Persons with Disabilities Act, 2016 prohibits discrimination against individuals with physical and mental disabilities. Karunya has been keen in providing all facilities for the differently abled and the guidelines given in the document apply to all faculty, staff and students.'*

10.6.2 Access to University Track Underrepresented Groups Applications

- To achieve the goal of sustainable development on the basis of equality, to eliminate or reduce all inequalities, ensure the education rights of poor and disadvantaged groups, improve the admission opportunities of disadvantaged students, and effectively promote the mobility of social classes so as to achieve the measures of a social protection system,
- The University admission channels welcome disadvantaged students (such as ethnic minority, low income students, indigenous communities, students with disabilities, and economically disadvantaged students) to enroll by displaying various scholarships available at the University, Govt., etc. on the notice board and also communicate personally.
- **The following are the privileges extended to students:**
 1. Merit cum Means Scholarship for Professional and Technical Courses - Ministry of Minority Affairs, Govt. of India
 2. Post-metric Scholarship for Minorities - Ministry of Minority Affairs, Govt. of India
 3. Central Sector Scheme of Scholarships for College and University students - Department of Higher Education, Govt. of India
 4. Pragati Scholarship - All India Council for Technical Education (AICTE)
 5. Saksham Scholarship - All India Council for Technical Education (AICTE)

Listed below are the scholarships offered by the institution.

1. Institutional Merit Scholarship

2. Minority Scholarship
3. Scholarship to women students
4. Scholarship to siblings/wards of alumni, faculty and staff
5. Scholarship to children of Ex-Servicemen for MBA
6. Scholarship for KITS Alumni
7. Scholarship for B. Tech students who have cleared JEE Main Exam
8. Scholarship for innovators and inventors

Scholarships to the tune of Nine crores has been given to the students in the year 2021-22.

KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES, KARUNYA NAGAR, COIMBATORE - 641 114.						
DETAILS OF INSTITUTIONAL & GOVERNMENT SCHOLARSHIPS SANCTIONED FOR THE YEAR 2021-2022						
INSTITUTIONAL SCHOLARSHIPS						
	No. of students		No. of students		Total	
	Male	Amount	Female	Amount	Students	Amount
Institutional Merit Scholarship 2018 Batch	112	6300000	119	5700000	231	12000000
Institutional Merit Scholarship 2019 Batch	94	4960000	132	6730000	226	11690000
Institutional Merit Scholarship 2019 Batch (NRI)	2	-	3	-	5	USD 7350
Institutional Merit Scholarship 2020 Batch	133	7140000	187	9780000	320	16920000
Institutional Merit Scholarship 2020 Batch (NRI)	2	-	10	-	12	USD 17600
Institutional Merit Scholarship 2021 Batch	547	24290000	393	18540000	940	42830000
Institutional Merit Scholarship 2021 Batch (NRI)	4	-	6	-	10	USD 17150
Institutional Sports Scholarship	9	1308438	4	503688	13	1812126
Financial assistance from Student Benevolent Fund	14	1171975	3	173800	17	1345775
GATE Scholarship (Ph.D.)	-	-	1	35000	1	35000
AICTE - Pragati Scholarship Scheme for Girl Students (Technical Degree)	-	-	6	300000	6	300000
AICTE - Swanath Scholarship Scheme (Technical Degree)	1	50000	-	-	1	50000
Central Sector Scheme of Scholarships for College and University Students	8	80000	5	50000	13	130000
Financial Assistance for Education to the Wards of Beedi/CINE/IOMC/LSDM - Post-matric	1	8700	-	-	1	8700
Ishan Uday Special Scholarship Scheme for North Eastern Region	2	156000	-	-	2	156000
Ment cum Means Scholarship for Professional and Technical Courses CS	64	1855000	24	685000	88	2540000
PG Scholarships Scheme for SC ST students for pursuing Professional Courses	1	78000	-	-	1	78000
Post-matric Scholarship Schemes Minorities CS	23	200100	10	87000	33	287100
Prime Minister's Scholarship Scheme for Central Armed Police Forces and Assam Rifles	4	60000	2	46000	6	106000
TN Govt. Adi-Dravidar Welfare Scholarship to Ph.D.(full-time) students	1	100000	-	-	1	100000
Umbrella Scheme for Education of ST children - Post-matric Scholarship (PMS) for ST Students - Meghalaya	-	-	1	30000	1	30000
Grand Total	1014	47758213	887	42660488	1901	90418701
	8	0	19	0	27	USD 42100

(Rupees Nine Crores Four Lakhs Eighteen Thousand Seven Hundred and One & USD Forty Two Thousand and One Hundred only)

B. SCHOLARSHIPS FROM THE STATE GOVERNMENTS

i. Government of Tamil Nadu

Incentive Schemed for full-time Ph.D. Scholars belonging to SC/ST & Converted Christians

The Directorate of Adi-Dravidar Welfare, Government of Tamil Nadu offers Incentive to the Scholars belonging to SC / ST / converted Christian Students who pursue full-time Ph.D. programme.

ii. Government of Jharkhand

e-kalyan Scholarship to backward classes and SC/ST students from the State of Jharkhand

The Welfare Department of the Government of Jharkhand offers Post Matric Scholarship for the welfare of the students belonging to backward classes and the SC/ST who are studying outside the State of Jharkhand.

Karunya Institute of Technology and Sciences (Deemed to be University) has registered at the e-kalyan Scholarship portal for the benefit of such students from the State of Jharkhand studying in KITS.

For further details students may visit <https://ekalyan.cgg.gov.in>

II. INSTITUTIONAL SCHOLARSHIPS:

II.1. Karunya Institute of Technology and Sciences offers various scholarships from the first year and renewable for subsequent years subject to fulfilment of renewal norms:

- i) Institutional Merit Scholarships
- ii) Minority Scholarships
- iii) Scholarships to Women students
- iv) Scholarships to Siblings / wards of alumni, faculty and staff
- v) children of Ex-servicemen for MBA students
- vi) Scholarships for KITS alumni students
- vii) Scholarships to B.Tech. students who have cleared JEE (Main) examination
- viii) Scholarships to Young Innovators and Inventors

Note : The candidate is eligible for any ONE of the above scholarships.

II.2. M.Tech. (GATE scholarship for Indian Nationals & NRI / Foreign Nationals)

Scholarship	Amount	Eligibility/Renewal Criteria
M.Tech. - GATE Scholarship	GATE Stipend of ₹ 10,000 per month	valid GATE Score and CGPA inUG > 7 will be renewed every year, if the student achieves - 7.5 CGPA - No arrear - No disciplinary cases

Click here for more information ↓

[Scholarships | Admissions - Karunya](#)

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Click here for more information ↓

[Scholarships | Admissions - Karunya](#)

SCHOLARSHIPS AND AWARDS

The Office of the Student Affairs facilitates the students to apply and receive various scholarships offered by Central / State Governments and also from KITS which will be duly notified to the students through notices / e-mail / institute website.

I. GOVERNMENT SCHOLARSHIPS

Students can avail the following scholarships offered by the various Departments / Ministries of the Government of India and the details are available at the National Scholarship Portal (www.scholarships.gov.in)

A. SCHOLARSHIPS FROM THE CENTRAL GOVERNMENT

- i) Merit cum Means Scholarship & Post Matric Scholarship Scheme from the G.O.I., Ministry of Minority Affairs
- ii) Central Sector Scheme of Scholarships from the Department of Collegiate Education:
- iii) Prime Minister's Scholarship Scheme for Central Armed Police Forces and Assam Rifles from the Ministry of Home Affairs
- iv) Prime Minister's Scholarship Scheme for RPF / RPSF from the Ministry of Railway
- v) Post-matric Scholarships for Students with disabilities from the Department of Empowerment of persons with Disabilities
- vi) Financial Assistance for Education of the Wards of Beedi/Cine/IOMC/LSDM Workers – Post-Matric from the Ministry of Labour & Employment
- vii) Financial Support to the students of N.E.R. for Higher Professional Courses (NEC MERIT SCHOLARSHIP) from North Eastern Council (N.E.C.)
- viii) Ishan Uday – Special Scholarship Scheme for North Eastern Region from University Grants Commission (UGC)
- ix) Scholarships from All India Council for Technical Education (AICTE)
 - a) Pragati Scholarship Scheme for Girl Students (Technical Degree)
 - b) Saksham Scholarship Scheme for specially abled student (Technical Degree)
 - c) Swanath Scholarship Scheme (Technical Degree)
 - d) Post Graduate (PG) Scholarship Scheme for GATE qualified students – through AICTE website (www.aicte-india.org)
 - Scholarship is awarded to full time GATE/GPAT qualified students admitted to M.Tech. programs.

For further details please refer to:

(www.aicte-india.org)

II.3. Student Benevolent Fund Scholarship

Type of Scholarship	Norms
Scholarship for deserving students on demise of the breadwinner of the family	Application shall be submitted to the Student Affairs Office, KITS with the following documents to <ul style="list-style-type: none">• Death Certificate of the deceased parent issued by the Govt. death and birth registration Office (Municipal Office)• Annual Family Income Certificate



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec. 3 of the UGC Act 1956)

A CHRISTIAN MINORITY RESIDENTIAL INSTITUTION

AICTE Approved & NAAC Accredited

Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India.

Dr. A. Albert Rajan, M.E., Ph.D.,
Deputy Registrar (Student Affairs)

KU/DR(SA)/SAO-4/25/2021,
August 24, 2021.

NOTICE

POST-MATRIC SCHOLARSHIP TO THE STUDENTS BELONGING TO MINORITY COMMUNITIES FOR THE YEAR 2021-2022

(Fresh & Renewal)

The Ministry of Minorities Welfare, G.O.I. has invited application for the **Post Matric Scholarship** for the academic year **2021-2022** from the students belonging to notified religious Minorities viz. Muslims, Christians, Sikhs, Buddhists, Zoroastrians (Parsis) & Jains for **Fresh & Renewal. [Except Professional / Technical Courses].**

Mode of application: **ONLINE** through National Scholarship Portal (NSP)

Website: www.scholarships.gov.in

Eligibility Criteria:

Fresh	Renewal
<ul style="list-style-type: none">❖ The candidates who have secured not less than 50% marks or equivalent grade in the previous final examination.❖ Annual income of whose parents / guardian from all sources does not exceed Rs. 2 lakhs	<ul style="list-style-type: none">❖ Students who have been awarded Fresh Scholarship in the previous year should apply for Renewal Scholarship provided if he / she scored not less than 50% of marks in the previous year examination with out any arrears.

Last date for submission of online application : 30.11.2021

Students are expected to upload all the required documents clearly scanned (refer annexure) for online verification by the institution.

Further, a scanned copy of the application (submitted online through NSP portal) should be sent to the Student Affairs Office through studentsection@karunya.edu for verification and record.

For further information and clarification the students shall contact Student Affairs Office .
(Ph.: 0422-2614324/2614323)


DEPUTY REGISTRAR (SA)

To
All B.A. / B.Sc. / B.Sc. (Agri.) / B.Com. / M.Sc. / M.A. students through e-mail

Ce to: Dean (ET, SABS & SSAMM) and all HODs - for information.
The Registrar – for kind information



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Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India.

Dr. A. Albert Rajan, M.E., Ph.D.,
Deputy Registrar (Student Affairs)

KU/DY.REG/MCM/025/2021,
August 24, 2021.

NOTICE

Central Sector scheme of Scholarship **for the year 2021-'22 (Fresh & Renewal)**

The Department of Higher Education, Directorate of Collegiate Education, Chennai has invited applications from the aspirants of Central Sector Scholarship Scheme (CSSS) for the year **2021-2022 (Fresh & Renewal)**.

Eligibility Criteria:

<u>Fresh</u>	<u>Renewal</u>
<ul style="list-style-type: none">❖ Class XII pass out students of the current academic year (2021)❖ 80% marks in H.Sc. or equivalent examination❖ Parent's annual income should not exceed Rs.8 lakhs	<ul style="list-style-type: none">❖ Should have secured 50 % or more marks in the preceding examination.❖ 80% attendance❖ Not indulged in ragging activities / in-disciplinary activities
Last date for submission of online application : 30-11-2021	

Eligible students are required to apply online for the **Central Sector scheme of Scholarship** in the website **www.scholarships.gov.in** for **both Fresh & Renewal** category.

Students are expected to upload all the required documents clearly scanned (refer annexure) for online verification by the institution.

Further, a scanned copy of the application (submitted online through NSP portal) should be sent to the Student Affairs Office through studentsection@karunya.edu for verification and record.

For further information and clarification the students shall contact Student Affairs Office .
(Ph.: 0422-2614324/2614323)


DEPUTY REGISTRAR (SA)

To
All 1 year U.G. students only through e-mail.

Cc to: Dean (ET, SABS & SSAAM) / All HODs - for information.
Cc to: The Registrar – for kind information



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Deputy Registrar (Student Affairs)

KU/DY.REG/AICTE/027/2021.
August 24, 2021.

NOTICE

AICTE – PRAGATI / SAKSHAM SCHOLARSHIP FOR THE YEAR 2021-'22

The All India Council for Technical Education has invited applications *for the following Scholarships for the academic year 2021-'22* from the students admitted into I year B.Tech. or II year B.Tech. (Lateral Entry) programs.

I. Pragati Scholarship (Exclusively for Girl Students)	
Eligibility Criteria :	Amount of Scholarship: Rs.50,000 p.a.
❖ Girl Students admitted into I year Degree or II year Degree (Lateral Entry) Technical Courses	
❖ Family Income from all sources is not more than Rs.8 lakhs per annum during the current financial year.	
❖ <i>Maximum two girl children per family are eligible</i>	
II. Saksham Scholarship for Specially Abled Students	
Eligibility Criteria :	Amount of Scholarship: Rs.50,000 p.a.
❖ Specially Abled Students admitted into I year Degree or II year Degree (Lateral Entry) Technical Courses	
❖ Family Income from all sources is not more than Rs.8 lakhs per annum during the current financial year.	
❖ <i>Specially abled student having disability of not less than 40%</i>	
Last date for submission of online application : 30.11.2021	

Mode of application: online through *National Scholarship Portal (NSP)*

Website: www.scholarships.gov.in

Students are expected to upload all the required documents clearly scanned (refer annexure) for online verification by the institution.

Further, a scanned copy of the application (submitted online through NSP portal) should be sent to the Student Affairs Office through studentsection@karunya.edu for verification and record.

For further information and clarification the students shall contact Student Affairs Office .
(Ph.: 0422-2614324/2614323)


DEPUTY REGISTRAR (SA)

To
All I B.Tech. / I B.Tech. (Lateral Entry) students - through e-mail

Cc to: Dean (ET) and all HODs of Engg. Departments
Cc to: The Registrar – for kind information



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Dr. A. Albert Rajan, M.E., Ph.D.,
Deputy Registrar (Student Affairs)

KU/DR(SA)/MCM/026/2021,
August 24, 2021.

NOTICE

MERIT CUM MEANS SCHOLARSHIP **FOR PROFESSIONAL AND TECHNICAL COURSES TO THE** **STUDENTS BELONGING TO MINORITY COMMUNITIES** **FOR THE YEAR 2021-2022 (Fresh & Renewal)**

The Ministry of Minority Welfare, G.O.I. has invited applications for *Merit Cum Means Scholarship for the academic year 2021-2022* from the students belonging to notified religious Minorities Viz. Muslims, Christians, Sikhs, Buddhists, Zoroastrians (Parsis) & Jains for **Fresh & Renewal**. [Degree or Post graduate level professional / Technical Courses]

Mode of application: online through *National Scholarship Portal (NSP)*
Website: www.scholarships.gov.in

Eligibility Criteria :

<u>Fresh</u>	<u>Renewal</u>
<ul style="list-style-type: none">❖ Students pursuing technical / professional courses❖ However, such students should have not less than 50% marks at higher secondary / graduation level / polytechnic for lateral entry.❖ <i>Selection will be done strictly on merit basis.</i>❖ Annual income of whose parents / guardian from all sources does not exceed Rs. 2.5 lakhs	<ul style="list-style-type: none">❖ Students who have been awarded Fresh Scholarship in the previous year can apply for Renewal Scholarship provided if he/ she scored not less than 50% of marks in the previous year examination with out any arrears

Last date for submission of online application : 30.11.2021

Students are expected to upload all the required documents clearly scanned (refer annexure) for online verification by the institution.

Further, a scanned copy of the application (submitted online through NSP portal) should be sent to the Student Affairs Office through studentsection@karunya.edu for verification and record.

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To
All B.Tech. / M.Tech. / M.B.A. - students through e-mail

Cc to: Dean (ET, SABS & SSAMM) and all HODs
The Registrar – for kind information

10.6.3 Access to University Underrepresented Groups Recruit

10.6.4 Anti-discrimination Policies

a) Equal Employment Opportunity Policy

- *Karunya Institute of Technology and Sciences is a self-financing Christian Minority Institution. No employee or applicant will be subjected to discrimination because of race, colour, age, sex, religion, marital status, disability, military status or any other characteristic protected by law. This policy is applicable to all terms and conditions of employment, including recruitment, hiring, promotion, training assignment, evaluations, compensation and termination.*

b) Policy against Harassment

- *In General Karunya Institute of Technology and Sciences is committed to provide all employees with an environment that is free of discrimination and harassment. We will not tolerate conduct that constitutes or could lead or contribute to harassment based on sex, race, colour, religion or any characteristic or status protected by law. Examples of such prohibited conduct include, but are not limited to · Ethnic slurs · Use of computer (including the internet and email) to view or distribute racially offensive communications - Threatening, intimidating or hostile acts directed at a particular sex or religious group. Harassment does not require intent to offend. Thus, inappropriate conduct meant as a joke or even a compliment can constitute prohibited harassment.*

10.6.5 University Diversity Officer

In lieu of the University Diversity Officer, a Deputy Registrar (Student Affairs) and his team consisting of Director (Student Affairs), Chairman, Internal Complaints Committee has been designated to implement the policies and conduct relevant programmes.

10.6.6 Support for Underrepresented Groups

Academic And Career Support: Faculty members support the students academically. The first-year students from vernacular medium of instruction at schools are helped by having English classes during the first few months of their University life in order to help them cope better with their academics.

Mentoring System At University: Students are encouraged to seek the help of their Mentors regarding academics or any other issues that concern them.

Medical Facilities: Karunya Hospital in the campus which is primarily responsible for treating injuries and illnesses in the University students is also actively involved in prevention and promotion of health.

Psychological Support: Professional Counsellors at Wellness Centre at the University and at Karunya Hospital provide support and resources to students, helping them navigate challenges, manage stress, enhance resilience, and promote their mental and emotional well-being throughout their academic journey.

Support From Department Of Value Education (DOVE):

DOVE nurtures values in students, empowers them spiritually, induces inner healing and encourages them to face challenges life. They are also involved in developing their skills, identify their leadership qualities and trains them to be leaders with a vision, Students are also offered a platform to exhibit their talents.

Financial Support: Details of scholarships have been given under SDG 10.6. 2

10.6.7 Accessible Facilities

(Displayed in The Website Under The Policy For Disabled Friendly And Barrier Free Environment)

Accessibility Policy

1. *All the services, activities and the benefits thereof, are fully made available to qualified people with disabilities. The Institution shall provide for creating a disable friendly campus, and ensure appropriate/ reasonable accommodations for each person with a disability and be willing to resolve access problems. The campus shall be barrier free and accessible for differently abled persons.*
2. **Principles Guiding Accessibility:**
 - *All UG and PG programs and activities shall be accessible.*
 - *Text books and study material shall be available to all students with disabilities.*
 - *Awareness programs shall be conducted for all teachers and non-teaching staff regarding the issues of accessibility.*
 - *The web services shall be compliant to national and international accessibility standards and regulations such as Web content Accessibility Guidelines with appropriate version and Government of India Guidelines for Web accessibility.*

The Institution shall encourage students with all types of disabilities listed in Rights of Persons with Disabilities 2016 and as per government regulations from time to time.

Karunya shall make reasonable changes in the educational plan and assessment frame work to meet the particular needs of students with disabilities. The guidelines and regulations regarding the examinations for disabled persons shall be issued by the Controller of Examinations depending on necessity.

10.6.8 Disability Support Services

(Displayed In The Website Under The Policy For Disabled Friendly And Barrier Free Environment)

Barrier free infrastructure and environment are created following the UGC Scheme for Persons with Disabilities.

- *Ramps and lifts in all buildings.*
- *Electric vehicles are available to move in the campus where there is a restriction on fossil-fuel based vehicles.*

- *Facilities are provided from time to time as per government rules.*
- *Disability sensitization sessions are part of the students and employee induction program.*
- *Staff are trained to assist people with disabilities, including persons with learning disabilities.*
- *Accessible Toilets.*

(The above has been displayed in the web site under the ‘Policy For Disable Friendly And Barrier Free Environment)

10.6.9 Disability Access Scheme

Accessibility And Access For Persons With Disabilities

Persons with disability is afforded the opportunity to acquire the same information, engage in the same interactions, and enjoy the same services as a person without a disability in an equally effective and equally integrated manner, with substantially equivalent ease of use.

The disabled are also provided Mentors like the other students of the University. (20 students are provided with a Mentor), whose help they can seek periodically or whenever they have a need; either in academics or for personal issues.

Student Mentoring:

(This policy has been stated in the University Teaching And Learning Process Policy)

‘There shall be one faculty member for mentoring a group of 20 students. H.O.D.s shall assign the Mentors in the beginning of the academic year, who will closely interact with the students assigned to them and liaison with the other faculty members, wardens, parents and counselors. The separate policy available for mentoring shall be followed by the Mentors to make the life in the fully residential campus of Karunya a pleasant experience for the student community.’

Advanced And Slow Learners:

(This policy has been stated in the University Teaching And Learning Process Policy)

‘The advance and slow learners shall be identified during the three week student induction programme (SIP) and the internal assessments based on their performance. Remedial coaching shall be organized to enhance their knowledge and skills and their improvement shall be monitored continuously.’

10.6.10 Disability Accommodation Policy

In accordance with ‘United Nations Disability Inclusion Strategy’, Disability Accommodation Policy has been instituted by KITS since its inception. Necessary facilities, appropriate modifications and adjustments, are made for persons with disabilities which enables them to

enjoy and exercise on a equal basis with others of all human rights and fundamental freedom. These are manifest from the policies of KITS.

All The Policies quoted above in SDG 10. 6 would apply.



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved

NAAC A++ Accredited

SDG 11 : SUSTAINABLE CITIES AND COMMUNITIES

11.2 Support of Arts and Heritage

11.2.1 The Bethesda International Meditation Centre



Meditation Centre with Green Spaces

(Link: <http://surl.li/mznxt>)

11.2.2 Library Facilities



11.2.3 Public access to museums and collections



Public access to museums and collections (UNBOX and AQUA MUSEA)

11.2.3 Public access to open and green spaces



Accessible public spaces with open green areas (Children Park)

11.2.5 Arts and Heritage contribution



11.3 Expenditure on arts and heritage

PRODUCT MUSEUM EXPENSES				
Date	Particulars	Vch Type	Vch No.	Debit Amount
08-Dec-21	Kit - Rep & Main Civil KS Art and Tech TDS - Contract <i>Being removal, cutting, modification and refixing of Gypsum boards for product museum.</i>	Journal	5434	6,861.00
10-Jan-22	Kit - Rep & Main Civil C. Katheras & Co. TDS - Contract <i>Being supply & installation of Vinyl flooring at product museum at Civil Engg.</i>	Journal	6209	44,708.00
27-Jan-22	Kit - Rep & Main Civil Alex Curtains TDS - Contract <i>Being supply & fixing of printer black out roller blinds for Civil Museum,</i>	Journal	6641	2,822.00
28-Jan-22	Kit - Rep & Main Civil KS Art and Tech TDS - Contract <i>Being supply & installatino of display case units and wall panelling at Product Museum at Civil dept. WO210</i>	Journal	6667	2,46,421.00
21-Mar-22	GK Tech Solutions KITS - Payment A/No 917010084728524 Axis <i>Being purchase of CCTV camera for Civil Museum</i>	Payment	7821	29,382.00
22-Mar-22	Non Consumables - Civil Engg. Classic Airconditioners TDS - Contract <i>Being supply & installation of AC in Product Museum at Civil Dept. WO3070</i>	Journal	8191	1,42,350.00
24-Mar-22	Kit - Rep & Main Electrical Gopalan Electricals TDS - Contract <i>Being electrical installatino work for Product Museum at Civil Dept. WO309</i>	Journal	8274	1,38,304.00
31-Mar-22	Gopalan Electricals Agst Ref 63	Payment	8040	1,288.00
	KITS - Payment A/No 917010084728524 Axis <i>Being electrical installatino work for Product Museum at Civil Dept. WO309</i>		1288.00 Dr	
22-Apr-22	D.R.K. Stickers KITS - Payment A/No 917010084728524 Axis <i>Purchase of foam board with printing (Technology museum)</i>	Payment	196	20,916.00
22-Apr-22	Technology Museum Expenses D.R.K. Stickers <i>Purchase of foam board with printing (Technology museum)</i>	Journal	213	5,163.00

29-Apr-22	Technology Museum Expenses D.R.K. Stickers <i>Purchase of print and lamination sheet for technology museum</i>	Journal	364	13,806.00
10-May-22	Gopalan Electricals KITS - Payment A/No 917010084728524 Axis <i>Being network provisioning at technology museum tds 2% On rs. 8126/- @ rs. 163/- deducted</i>	Payment	689	34,396.00
10-May-22	Technology Museum Expenses TDS - Contract Gopalan Electricals <i>Being network provisioning at technology museum tds 2% On rs. 8126/- @ rs. 163/- deducted</i>	Journal	662	9,589.00
13-May-22	Kit - Rep & Main Civil LEGNO TDS - Contract <i>Being supply & installation of Anutone Baffle acoustic boards for product museum at Civil Engg. block. WO 036</i>	Journal	805	2,52,840.00
25-May-22	Technology Museum Expenses TDS - Contract Gopalan Electricals <i>Payment of UPS provisioning at technology museum expenses paid to gopalan electricals tds 2% On rs. 9280/- @ rs. 186/- deducted</i>	Journal	1162	10,950.00
TECHNOLOGY MUSEUM EXPENSES				9,59,796.00
<u>WATER MUSEUM EXPENSES</u>				
19-May-22	Kit - Rep & Main Civil KS Art and Tech TDS - Contract <i>Being grid false ceiling work at Water Museum for Water Institute at Civil Block. WO052</i>	Journal	1038	78,541.00
24-May-22	Devichand Machine Tools KITS - Payment A/No 917010084728524 Axis <i>Advance payment for purchase of water lifting device model for water museum - 50% advance</i>	Payment	1054	66,823.00
24-May-22	Smijo Jose KITS - Payment A/No 917010084728524 Axis <i>Being advance payment for purchase of 3d models for water museum-30% advance</i>	Payment	1055	33,984.00
28-May-22	Kit - Rep & Main Civil C. Katheras & Co.	Journal	1285	39,926.00

	<i>Being purchase of carpet tiles for Agro Hydro Museum</i>			
28-May-22	Kit - Rep & Main Civil Alex Curtains	Journal	1288	51,030.00
	<i>Being purchase of Zebra blinds for Agro Hydro Museum</i>			
04-Jun-22	Equipments (Engineering) Equipments for Research (Engineering) Bharath Electronics & Appliance	Journal	1553	14,400.00 43,200.00
	<i>Being purchase of LED TV 55" for Water Museum. Adv adjstuted Inv No. 220400120 / 13.05.2022</i>			
44,718.00	Kit - Rep & Main Civil C. Katheras & Co.	Journal	1669	39,926.00
	<i>Being purchase of carpet tiles for Water Museum (Agro Hydro Museum)</i>			
07-Jun-22	Equipments (Engineering) Devichand Machine Tools	Journal	1691	1,33,647.00
	<i>Being purchase of water lifting device models for Water Museum</i>			
07-Jun-22	Furniture & Fixtures - KITS Furnify Home Decor Solutions Pvt Ltd	Journal	1693	20,650.00
	<i>Being purchase of black nube puffy for Water Museum</i>			
08-Jun-22	Devichand Machine Tools KITS - Payment A/No 917010084728524 Axis	Payment	1614	66,824.00
	<i>Being purchase of water lifting device models for Water Museum</i>			
13-Jun-22	Arun Innovations KITS - Payment A/No 917010084728524 Axis	Payment	1789	53,100.00
	<i>Being purchase of Tehri & Idukki & Cauvery Basic Dam models for Water Museum</i>			
13-Jun-22	Arun Innovations KITS - Payment A/No 917010084728524 Axis	Payment	1790	2,47,800.00
	<i>Being purchase of Tehri & Idukki & Cauvery Basic Dam models for Water Museum</i>			
13-Jun-22	Equipments (Engineering) Arun Innovations	Journal	1859	1,06,200.00
	<i>Being purchase of Cavery Delta Dam models for water museum</i>			
13-Jun-22	Equipments (Engineering) Arun Innovations	Journal	1861	3,30,400.00
	<i>Being purchase of Tehri & Idukki & Cauvery Basic Dam models for Water Museum</i>			
14-Jun-22	Raveendran.S KITS - Payment A/No 917010084728524 Axis	Payment	1805	4,000.00
	<i>being installation of water fountain in front of water museum during NAAC visit</i>			
16-Jun-22	SmiJo Jose KITS - Payment A/No 917010084728524 Axis	Payment	1894	89,296.00
	<i>Being purchase of 3D models for water museum.</i>			
16-Jun-22	Equipments (Engineering)	Journal	1981	1,23,280.00

	Smijo Jose <i>Being purchase of 3D models for water museum.</i>			
27-Jun-22	Kit - Rep & Main Furniture C. Katheras & Co. TDS - Contract <i>Being carpet tiles laying charges for Agro Hydro Museum</i>	Journal	2279	14,631.00
06-Jul-22	Kit - Rep & Main Furniture Guru Wood Tech TDS - Contract <i>Being supply & installation of display platform for Agro Hydro Museum. WO 126</i>	Journal	2613	1,90,334.00
13-Jul-22	Kit - Rep & Main Civil Blessing Furniture Work TDS - Contract <i>Being assembling of door and fixing of water museum at civil dept.</i>	Journal	2818	2,006.00
21-Jul-22	Kit - Rep & Main Civil Gopalan Electricals TDS - Contract <i>Being electrical work at Water Museum at Civil Dept. WO133</i>	Journal	3192	51,777.00
05-Aug-22	Mrp Corporation KITS - Payment A/No 917010084728524 Axis <i>Being installation of AC for Water Museum at Civil block.</i>	Payment	3620	1,01,167.00
05-Aug-22	Kit - Rep & Main Electrical Mrp Corporation TDS - Contract <i>Being installation of AC for Water Museum at Civil block. NAAC</i>	Journal	3768	33,282.00
25-Aug-22	R. Mahalakshmi (Civil Contractor) KITS - Payment A/No 917010084728524 Axis <i>Being shifting of platforms and furnitures at Dr. DGS centre and Water Museum. WO124</i>	Payment	4086	1,49,834.00
25-Aug-22	Kit - Rep & Main Furniture R. Mahalakshmi (Civil Contractor) TDS - Contract <i>Being shifting of platforms and furnitures at Dr. DGS centre and Water Museum. WO124 NAAC</i>	Journal	4223	7,800.00
19-Nov-22	Kit - Rep & Main Civil Crizy Consultants and Builders TDS - Contract <i>Being interior wall painting for water museum at civil engineering block GF. WO374</i>	Journal	7283	24,769.00
	WATER MUSEUM EXPENSES			21,18,627.00

Minutes of the meeting held on 11.04.2022 at 4:45 pm in KCDC hall for establishing Water Museum

Members Present
 Dr. E.J. James, Pro-VC(RC)
 Dr. Riddling Margaret Waller. Pro-VC(QS)
 Dr. K R S Krishnan, Director (IIE)
 Dr. Sajan Kurien, Dean (SABS)
 Dr. Christopher Gunasing, Chief Engineer
 Dr. S. J. Vijay, Coordinator (AR)
 Dr. C. Mayilswami, Prof. (WI)
 Dr. P. Jegathambal, Prof. (WI)
 Dr. Chinnusamy, Prof. (Agri.)
 Dr. Rajendran, Prof. (Agri.)
 Dr. P. A. Joseph, Prof. (Agri.)
 Dr. Varaprasad, Asso. Prof. (Agri.)
 Dr. Udayakumar, Asst. Prof. (Agri.)
 Dr. Dishant James, Asst. Prof. (Agri.)
 Dr. Levin Anbu Gomez, Prof. (Biotech)
 Mr. Gerard, Prof. (RE)
 Ms. E. Deborah, Architect
 Mr.Jijo Mathew, Events Manager
 Mr. Franklin, Events Manager

Points Discussed:

1. The theme and concept of the Water Museum was presented before the committee.
 - a. **Suggestions to initiate the work:**
 - i. Noah's Ark – Historical view, archaeology findings, wall depiction etc. (Biodiversity) Dr. P. Jegathambal has agreed to work on it with Chief Engineer and Architect
 - ii. Cauvery basin – 3 D map, hydraulic structures, irrigation, land use. (Dr.J.Brema shall be asked for producing 3D maps in GIS platform). Details on sharing of water (TN, Kerala, Karnataka & Pondicherry). Cauvery delta – conveyance systems, crops, Ramsar site, biodiversity, historicity, etc.
 - iii. Watershed concept – Development strategies, cascade systems – tanks, green water, blue water (Dean (SABS), Dr.C. Mayilswami & Agriculture faculties)
 - iv. Forests & Hydrology (Dr.E.J.James)
 - v. PAP project, Dr.C.Mayilswami & Agriculture faculty members
 - vi. Flash Floods-Chair
 - vii. Evolution of water lifting devices in Tamil Nadu (Dean (SABS)
 - viii. Tank and other irrigation systems, evolution of pumps, traditional, modern, solar, wind mill, hydraulic structures etc
 - ix. Rainwater harvesting – charts and maps
2. It is proposed that artists be identified for completing different models.
3. Dr. E.J.James, Dr. K.R.S.Krishnan and Dr C.Mayilswami proposed a few artists who can carry out the work.
4. Possibilities of 3 D printing may be placed for which CAD models may be useful

As suggested by the Pro Vice Chancellor (QS), we may set up a Water Museum in KITS, since it is the Area of Distinction of Karnataka. We may start the work now, but it may not be possible to do complete the entire work before NRIAC visit. However, some projects can be put forward by the time the visit is over. The budget of Rs 10 lakh may be used for this purpose.

11.4 Sustainable Practices

11.4. Promote sustainable commuting



Encouraging sustainable commuting through a cycling rally

11.4. Provide affordable housing for students and staff



11.4 Provide priority to pedestrians on campus



11.4. Work with local authorities on planning issues





SDG12 – Consumption and Production (Waste Management System)

Karunya Institute of Technology and Sciences (KITS) follows the principle of 3Rs (Reduce, Reuse and Recycle) model to address the challenges of waste management in its 720 acre campus. Being a residential campus with 7625 students in 15 resident halls (hostels) and 661 faculty/staff members, many of whom reside on campus in the 17 apartment complexes, the 3R model is effective in dealing with the different types of waste namely; solid, liquid and e-waste. KITS is committed to promoting sustainability and corporate social responsibility through the effective management of its solid waste and grey water. The waste management system of KITS includes:

- Solid waste management
- Liquid waste management
- E-waste management

In this domain 76 papers were published in the Scopus/WoS Indexed Journals and list is furnished:

Sl.No.	Title	Authors	Year	Journal	Volume	Issue
1	Inconsistencies of e-waste management in developing nations – Facts and plausible solutions	Gollakota, A.R.K. Gautam, S. Shu, C.-M.	2020	Journal of Environmental Management	261	-
2	SARS-CoV-2 in wastewater: Challenges for developing countries	Pandey, D. Verma, S. Verma, P. Mahanty, B. Dutta, K. Daverey, A. Arunachalam, K.	2021	International Journal of Hygiene and Environmental Health	231	-
3	IoT-enabled solid waste management in smart cities	Vishnu, S. Jino Ramson, S.R. Senith, S. Anagnostopoulos, T. Abu-Mahfouz, A.M. Fan, X. Srinivasan, S. Kirubaraj, A.A.	2021	Smart Cities	4	3

4	Post-fire damage assessment and capacity based modeling of concrete exposed to elevated temperature	Thanaraj, D.P. Anand, N. Prince Arulraj, G. Zalok, E.	2020	International Journal of Damage Mechanics	29	5
5	Excellent Photocatalytic degradation of Methylene Blue, Rhodamine B and Methyl Orange dyes by Ag-ZnO nanocomposite under natural sunlight irradiation	R., S. Jebasingh, J.A. S., M.V. Stanley, P.K. Ponmani, P. Shekinah, M.E. Vasanthi, J.	2021	Optik	231	-
6	Characteristics of expanded polystyrene (EPS) and its impact on mechanical and thermal performance of insulated concrete form (ICF) system	Arun Solomon, A. Hemalatha, G.	2020	Structures	23	-
7	Production of bioethanol from food waste: Status and perspectives	Singh, A. Singhanian, R.R. Soam, S. Chen, C.-W. Halder, D. Varjani, S. Chang, J.-S. Dong, C.-D. Patel, A.K.	2022	Bioresource Technology	360	-
8	Advanced technologies on the sustainable approaches for conversion of organic waste to valuable bioproducts: Emerging circular bioeconomy perspective	Ashokkumar, V. Flora, G. Venkatkarthick, R. SenthilKannan, K. Kuppam, C. Mary Stephy, G. Kamyab, H. Chen, W.-H. Thomas, J. Ngamcharussrivichai, C.	2022	Fuel	324	-
9	Exemplification of sustainable sodium silicate waste sediments as coarse aggregates in the performance evaluation of geopolymer concrete	Kanagaraj, B. Anand, N. Johnson Alengaram, U. Samuvel Raj, R. Kiran, T.	2022	Construction and Building Materials	330	-

10	Green production of silica nanoparticles from maize stalk	Adebisi, J.A. Agunsoye, J.O. Bello, S.A. Haris, M. Ramakokovhu, M.M. Daramola, M.O. Hassan, S.B.	2020	Particulate Science and Technology	38	6
11	An IoT-based bin level monitoring system for solid waste management	Ramson, S.R.J. Moni, D.J. Vishnu, S. Anagnostopoulos, T. Kirubaraj, A.A. Fan, X.	2021	Journal of Material Cycles and Waste Management	23	2
12	The bond strength of self-compacting concrete exposed to elevated temperature	Mathews, M.E. Anand, N. Kodur, V.K.R. Arulraj, P.	2021	Proceedings of the Institution of Civil Engineers: Structures and Buildings	174	9
13	Microbial disease management in agriculture: Current status and future prospects	Lindsey, A.P.J. Murugan, S. Renitta, R.E.	2020	Biocatalysis and Agricultural Biotechnology	23	-
14	Performance evaluation of sodium silicate waste as a replacement for conventional sand in geopolymer concrete	Kanagaraj, B. Anand, N. Raj R, S. Lubloy, E.	2022	Journal of Cleaner Production	375	-
15	Spatio-temporal estimates of solid waste disposal in an urban city of India: A remote sensing and GIS approach	Gautam, S. J., B. R., D.	2020	Environmental Technology and Innovation	18	-
16	Investigation on engineering properties and micro-structure characteristics of low strength and high strength geopolymer composites subjected to standard temperature exposure	Kanagaraj, B. Anand, N. Andrushia, A.D. Lubloy, E.	2022	Case Studies in Construction Materials	17	-

17	A LoRaWAN IoT-Enabled Trash Bin Level Monitoring System	Ramson, S.R.J. Vishnu, S. Kirubaraj, A.A. Anagnostopoulos, T. Abu-Mahfouz, A.M.	2022	IEEE Transactions on Industrial Informatics	18	2
18	Understanding the management of household food waste and its engineering for sustainable valorization- A state-of-the-art review	Haldar, D. Shabbirahmed, A.M. Singhanian, R.R. Chen, C.-W. Dong, C.-D. Ponnusamy, V.K. Patel, A.K.	2022	Bioresource Technology	358	-
19	An improved enzymatic pre-hydrolysis strategy for efficient bioconversion of industrial pulp and paper sludge waste to bioethanol using a semi-simultaneous saccharification and fermentation process	Dey, P. Rangarajan, V. Nayak, J. Das, D.B. Wood, S.B.	2021	Fuel	294	-
20	Worn Surface Morphological Characterization of NaOH-Treated Chopped Abaca Fiber Reinforced Epoxy Composites	Kurien, R.A. Selvaraj, D.P. Koshy, C.P.	2021	Journal of Bio-and Tribo-Corrosion	7	1
21	Sugarcane bagasse into value-added products: a review	Shabbirahmed, A.M. Haldar, D. Dey, P. Patel, A.K. Singhanian, R.R. Dong, C.-D. Purkait, M.K.	2022	Environmental Science and Pollution Research	-	-
22	Assessing suitability of commercial fibre reinforced plastic solar still for sustainable potable water production in rural India through detailed energy-exergy-economic analyses and environmental impacts	Sharon, H. Prabha, C. Vijay, R. Niyas, A.M. Gorjian, S.	2021	Journal of Environmental Management	295	-

23	Sinaptic acid safeguards cardiac mitochondria from damage in isoproterenol-induced myocardial infarcted rats	Stanely Mainzen Prince, P. Dey, P. Roy, S.J.	2020	Journal of Biochemical and Molecular Toxicology	34	10
24	Investigation on improving the residual mechanical properties of reinforcement steel and bond strength of concrete exposed to elevated temperature	Kiran, T. Anand, N. Mathews, M.E. Kanagaraj, B. Andrushia, A.D. Lubloy, E. G, J.	2022	Case Studies in Construction Materials	16	-
25	Performance evaluation on engineering properties of sodium silicate binder as a precursor material for the development of cement-free concrete	Kanagaraj, B. Anand, N. Samuvel Raj, R. Lubloy, E.	2022	Developments in the Built Environment	12	-
26	Performance of Sustainable Insulated Wall Panels with Geopolymer Concrete	Kanagaraj, B. Kiran, T. Gunasekaran, J. Nammalvar, A. Arulraj, P. Gurupatham, B.G.A. Roy, K.	2022	Materials	15	24
27	Influence of mineral admixtures on the residual mechanical properties and durability characteristics of self-compacting concrete subjected to high temperature	Kiran, T. Mathews, M.E. N, A. Alengaram, U.J. Andrushia, A.D.	2022	Australian Journal of Civil Engineering	20	2
28	Effect of protective coating on axial resistance and residual capacity of self-compacting concrete columns exposed to standard fire	Ealiyas Mathews, M. Kiran, T. Anand, N. Lubloy, E. Naser, M.Z. Prince Arulraj, G.	2022	Engineering Structures	264	-

29	Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and SDG2	Shams Esfandabadi, H. Ghamary Asl, M. Shams Esfandabadi, Z. Gautam, S. Ranjbari, M.	2022	British Food Journal	124	12
30	Current perspective on improved fermentative production and purification of fungal cellulases for successful biorefinery applications: a brief review	Dey, P. Rangarajan, V. Singh, J. Nayak, J. Dilip, K.J.	2022	Biomass Conversion and Biorefinery	12	3
31	Effect of elevated temperature on interfacial shear transfer capacity of self-compacting concrete	Mathews, M.E. Anand, N. Lublóy, É. Kiran, T.	2021	Case Studies in Construction Materials	15	-
32	Derivation of synthetic fuel from waste plastic: investigation of engine operating characteristics on DI diesel engine	Rajamohan, S. Marshal, J.J. Suresh, S.	2021	Environmental Science and Pollution Research	28	10
33	Studies on mechanical properties of high calcium fly ash based sustainable geopolymer concrete	Vijaya Prasad, B. Anand, N. Arumairaj, P.D. Kumar, M.S. Dhilip, T. Srikanth, G.	2021	Journal of Physics: Conference Series	2070	1
34	Influence of fibers on fresh properties and compressive strength of geopolymer concrete	Vijaya Prasad, B. Anand, N. Kiran, T. Jayakumar, G. Sohliya, A. Ebenezer, S.	2022	Materials Today: Proceedings	57	-
35	Rheological and mechanical characterization of self-compacting concrete with utilization of supplementary sustainable cementitious materials	Ealiyas Mathews, M. Anand, N. Prince Arulraj, G. Kiran, T.	2020	IOP Conference Series: Earth and Environmental Science	491	1

36	Influence of fiber on shear behavior of concrete exposed to elevated temperature	Varghese, A. Anand, N. Arulraj, P.G.	2020	International Journal of Engineering, Transactions A: Basics	33	10
37	Development and strength assessment of sustainable high strength fiber reinforced concrete	Jayakumar, G. Mathews, M.E. Kiran, T. Yadav, B.S.K. Kanagaraj, B. Anand, N.	2021	Materials Today: Proceedings	49	-
38	Recent Advancements of Supercapacitor Electrode Materials Derived From Agriculture Waste Biomass	Rumjit, N.P. Thomas, P. Lai, C.W. Wong, Y.H. George, V. Basilraj, P. Johan, M.R.B.	2022	Encyclopedia of Energy Storage: Volume 1-4	1-4	-
39	Post-fire behaviour and improving the performance of hot rolled open sections subjected to standard fire exposure	Kiran, T. Anand, N. Mathews, M.E. Andrushia, A.D. Walls, R. Kanagaraj, B. lubloy, E.	2022	Case Studies in Construction Materials	16	-
40	Study on fresh and mechanical properties for different grades of geopolymer concrete with recycled coarse aggregate	Vinay Kumar, V. Bhikshma, V. Vijaya Prasad, B.	2022	Materials Today: Proceedings	60	-
41	Bio efficacy assay of laccase isolated and characterized from trichoderma viride in biodegradation of low density polyethylene (LDPE) and textile industrial effluent dyes	Johnnie, D.A. Issac, R. Prabha, M.L.	2021	Journal of Pure and Applied Microbiology	15	1

42	Dairy Waste Management: A Narrative Review on Current Knowledge	Anand, T.S. Vahab, H. Chandran, D. Shanavas, A. Kumar, M. Nainu, F. Bagath, M. Mohankumar, P. Mohapatra, R.K. Chakraborty, S. Alagawany, M. Dhama, K.	2022	Indian Veterinary Journal	99	8
43	Investigation on Crack Control and Crack Pattern Analysis of Self-compacting Concrete Exposed to Standard Fire Exposure	Mathews, M.E. Anand, N. Andrushia, A.D. Kiran, T.	2021	RILEM Bookseries	31	-
44	Structural response of self-compacting concrete beams under elevated temperature	Mathews, M.E. Andrushia, A.D. Kiran, T. Yadav, B.S.K. Kanagaraj, B. Anand, N.	2021	Materials Today: Proceedings	49	-
45	Flexural behavior of fire damaged self-compacting concrete beams strengthened with fiber reinforced polymer (FRP) wrapping	Mathews, M.E. N, A. A, D.A. Kiran, T. Al-Jabri, K.	2021	Journal of Structural Fire Engineering	12	4
46	Experimental Investigation on Fresh and Hardened Properties of High Calcium Flyash Based Geopolymer Concrete	Vijaya, P.B. Arun, K.P. Anand, N. Arumairaj, P.D. Dhillip, T. Kumar, M.S.	2022	Materials Science Forum	1048	-
47	Ensuring Sustainability via Application of Root Zone Technology in a Rubber Product Industry: A Circular Economy Approach	C, G. Jacob, L. Gautam, S. Singh, N.K. Kumar, R.P.	2022	Sustainability (Switzerland)	14	19
48	Biodegradation of Plastics by Microorganisms	Mazumder, M.A.R. Jubayer, M.F. Ranganathan, T.V.	2021	Biotechnology for Zero Waste: Emerging Waste Management Techniques	-	-

49	Biogas production by pilot-scale anaerobic co-digestion and life cycle assessment using a real scale scenario: Independent parameters and co-substrates influence	Mosquera, J. Rangel, C. Thomas, J. Santis, A. Acevedo, P. Cabeza, I.	2021	Processes	9	11
50	A new concept of smart universities using internet of things (IoT)	Achenkunjujohn, A. Venkatesh Kumar, P.	2020	International Journal of Scientific and Technology Research	9	3
51	Modelling the thermal behaviour of GFRP reinforced concrete beams subjected to elevated temperature by standard fire exposure	Mathews, M.E. Manas, Y.S. Kiran, T. Anand, N.	2020	Journal of Physics: Conference Series	1706	1
52	An experimental study on concrete block using construction demolition waste and life cycle cost analysis	Abraham, J.J. Saravanakumar, R. Ebenanjar, P.E. Elango, K.S. Vivek, D. Anandaraj, S.	2022	Materials Today: Proceedings	60	-
53	Effect of elevated temperature on Stress-Strain behaviour of Self-Compacting concrete	Solomon, A.A. Mathews, M.E. Anand, N. Kiran, T. Jayakumar, G. Yadav, B.S.K. Sudheer, G.	2021	Materials Today: Proceedings	49	-
54	Valorization of Agro-industrial Discards in Fermentation for the Production of Cellulase Enzyme	Dinil, A. Jacob, A.	2022	Journal of Pure and Applied Microbiology	16	1
55	Smart solution for waste management: A coherent framework based on iot and big data analytics	Grace Mary Kanaga, E. Jacob, L.R.	2021	Advances in Intelligent Systems and Computing	1167	-

56	Biosorption of Nickel from Metal Finishing Effluent Using Lichen Parmotrema tinctorum Biomass	Gratia, Z.K. Nandhakumar, R. Mahanty, B. Murugan, S. Muthusamy, P. Vinayak, K.S.	2021	Water, Air, and Soil Pollution	232	11
57	Development of banana peel powder as organic carrier based bioformulation and determination of its plant growth promoting efficacy in rice Cr100g	David Paul Raj, R.S. Agnes Preethy, H. Gilbert Ross Rex, K.	2021	Journal of Pure and Applied Microbiology	15	3
58	Characterization of refuse derived fuel samples prepared from municipal solid waste in Vellore, India	Thawani, B. Mahanty, B. Behera, S.K.	2022	Environmental Technology (United Kingdom)	43	12
59	Recovery of Precious Metals from Electronic and Other Secondary Solid Waste by Bioleaching Approach	Peter, D. Sakayaraj, L.S.A. Ranganathan, T.V.	2021	Biotechnology for Zero Waste: Emerging Waste Management Techniques	-	-
60	Low-Cost Real-Time Implementation of Malicious Packet Dropping Detection in Agricultural IoT Platform	Terence, J.S. Purushothaman, G.	2021	Lecture Notes in Networks and Systems	127	-
61	Multifunctional biogenic Al-doped zinc oxide nanostructures synthesized using bioreductant chaetomorpha linum extricate exhibit excellent photocatalytic and bactericidal ability in industrial effluent treatment	Somu, P. Khanal, H.D. Gomez, L.A. Vinaykumar, R. Shim, J.-J. Lee, Y.R.	2022	Biomass Conversion and Biorefinery	-	-
62	Heat pipe-embedded tooling for sustainable manufacturing	Kantharaj, I. Vijay, S.J. Vasanth, X.A. Mohanasundaram, S. Rai, R.S.	2021	Sustainable Manufacturing and Design	-	-

63	Investigation on the performance of fiber reinforced concrete subjected to standard fire exposure	Varghese, A. Anand, N. Andrushia, D. Arulraj, P.	2020	World Journal of Engineering	18	3
64	Prospects of Metakaolin Admixed Palm Kernel Shell Solid Concrete Masonry Block: A Review	John, N. Shanthi, R.M. Tensing, D.	2022	Civil Engineering and Architecture	10	4
65	Correction to: Multifunctional biogenic Al-doped zinc oxide nanostructures synthesized using bioreductant chaetomorpha linum extricate exhibit excellent photocatalytic and bactericidal ability in industrial effluent treatment (Biomass Conversion and Biorefinery, (2022), 10.1007/s13399-022-03177-7)	Somu, P. Khanal, H.D. Gomez, L.A. Vinaykumar, R. Shim, J.-J. Lee, Y.R.	2022	Biomass Conversion and Biorefinery	-	-
66	Sorption isotherm study on vacuum and freeze-dried jamun pulp	Jebitta, R.S. Allwin, J.S.I. Pandian, K.N.S.	2022	Food Research	6	1
67	Recycling of saw dust as a filler reinforced cotton seed oil resin amalgamated polystyrene composite material for sustainable waste management applications	Newton Balakrishnan, M.E. Muralkar, P. Ranjana Ponraj, M. Nadiger, S. Dhandayutham, S. Justus, S. Bhagavathsingh, J.	2022	Materials Today: Proceedings	58	-
68	The State-of-the-Art Reverse Logistics for e-Waste Management: A Scenario Specific to India	Arun Vasantha Geethan, K. Jose, S. John, R. Ahmed, I.A. Rajan, P. Rajan, A.P.	2022	Strategies and Tools for Pollutant Mitigation: Research Trends in Developing Nations	-	-

69	Covid medical waste segregation robot using Yolov5	Masih, A.K. Stanley, P.K.	2022	AIP Conference Proceedings	2670	-
70	Characterization and molecular identification of poly urethane degrading bacteria	Yazhini, V.S. Prabha, M.L. Issac, R.	2021	Journal of Pure and Applied Microbiology	15	3
71	Synthesis of adsorbent from animal waste and its applications in industrial effluent treatment	Kandasamy, S. Baskaran, N. Jeyaprakash, R.K. Nagarajan, V. Manickam, N.K. Subbiah, K.	2020	AIP Conference Proceedings	2240	-
72	Approaches to Plant Nutrient Management Through Fertilization in India: Then, Now and the Future	Praveena Katharine, S. Suguna Devakumari, M.	2022	Reviews in Agricultural Science	10	-
73	Bioconversion of Waste to Wealth as Circular Bioeconomy Approach	Peter, D. Rathinam, J. Vasudevan, R.T.	2021	Biotechnology for Zero Waste: Emerging Waste Management Techniques	-	-
74	Changing Patterns in the Spread of Human Monkeypox: A Dangerous New Development in Disease Epidemiology	Chandran, D. Hridya, P. Prasanth, D. Abernaa, D. Kaaviya, A.V. Menon, P.S.S. Vinodhini, D. Aslam, M.K.M. Pran, M. Savanth, V.V. Nainu, F. Yattoo, M.I. Ur Rehman, M.E. Chopra, H. Emran, T.B. Dey, A. Sharma, A.K. Dhama, K.	2022	Journal of Pure and Applied Microbiology	16	1 S
75	Classification Of Hyperspectral Images Using Deep Learning Architecture for Remote Sensing Applications	Mishaa Manikandan, M. Jennifer, C. Angel, M. Rachel, A. Diana Andrushia, A. Mary Neebha, T.	2022	8th International Conference on Advanced Computing and Communicatio	-	-

				n Systems, ICACCS 2022		
76	Development of an advanced enzyme reusable saccharification process of waste paper pulp sludge material through membrane bioreactor system: A concept towards green solid waste management practices for PPS material	Dey, P. Vani, C. Abraham, A. Tripathy, M. Mathew, J. Greeshma, C.V.	2020	Research Journal of Chemistry and Environment	24	-

Solid Waste Management

Collection of solid waste is done through placing collection bins strategically at different locations on campus. On segregation, the biodegradable waste is subject to degradation by organic composting and the bio-fertilizer thus obtained is utilized in the 329-acre experimental farm for academic, research and community development activities. The crop residues, dry leaves collected from hostels and gardens are recycled in vermicomposting pits at the Karunya farm. Nearly 4 tons of campus waste is recycled per year.



Vermicomposting Unit in North farm - KITS

Paper Waste Management

It is estimated that around 75 - 100 kg of waste paper is segregated from the collection bins on a daily basis on campus. KITS has installed a Paper Recycling Plant to the tune of Rs. 25 Lakhs to make use of the waste paper generated on campus to produce eco-friendly paper. Currently, 25 – 30 tons of paper boards (Grey Board) are produced and sold to vendors on a yearly basis. This plant also serves as a model paper recycling facility for visiting students to develop entrepreneurial, research and leadership skills.



Paper Recycling Plant

The Karunya Hospital - an in-house medical facility serving 10,000 residents on campus generates 18 - 25 kg of biomedical waste per month and suitably disposed through agencies approved by the Tamil Nadu Pollution Control Board.



Collection of Biomedical Waste

Biogas Plant

KITS has installed 4 Biogas plants with an investment of Rs. 130 lakh to treat 360 cu.m of kitchen and food waste generated from its kitchens. These plants provide 114 kg of cooking gas/day (equivalent to 6 commercial gas cylinders) through the treatment of kitchen and food waste. Currently, around 70% of the night soil and 20 % of the food waste generated in the hostel zones (both ladies and gents) of Karunya Campus are treated by existing biogas plants.

A general outlay of the solid waste collected and treatment/management strategy used by KITS is tabulated below.

Type of Solid Waste	Treatment / Management
Solid Waste	All solid waste is subject to collection, segregation and disposal. Organic waste undergoes aerobic and vermicomposting
Paper Waste	Managed through an ecofriendly paper recycling unit with a capacity to treat 75-100 kg of waste paper /day
E-Waste	Approximately 3,500 kg/year is generated and disposed through agencies authorized by Pollution Control Board
Biomedical Waste	Around 250-300 kg/year is generated and disposed through agencies authorized by Pollution Control Board

Kitchen and Food Waste	<ul style="list-style-type: none"> • 20% of the food waste is utilized through Biogas Plant. • 80% used for piggeries.
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Liquid Waste Management

The grey and black water from the residences are treated in the 5 Sewage Treatment Plants (STP) installed on campus, at an investment of Rs. 300 lakh. 2500 KLD of wastewater is treated at the STPs that are fitted with screens to remove large non-biodegradable solid, a fluidized bed bio-reactor for aerobic treatment of wastewater and a filtration system to remove suspended matter, micro-organisms and algae, and a sludge drying bed. The treated water is reused for gardening and irrigation through 118 outlets on campus.

STP - Father Duraisamy Residence – A case of effective liquid waste management

Feed given to STP	: Water from FDR, EGR & Hephzibah Hostels.
Capacity of the STP	: 4, 00,000 LPD
Number of beds available to remove the sludge	: 12
Sludge removal from STP	: Once in 4 days
Number of beds filled	: 4
Water Recycled at Father Duraisamy Residence	: 2, 40,000 LPD

Sludge is utilised in farming and gardening purposes and the details are given below

1. JMR & JVR - Backside (Fields)
2. Syndicate Bank, New Auditorium - Garden
3. Hephzibah & Angelina Residence - Garden
4. Then fields extend up to SEMMEDU (outer).

Scientific and Technological Intervention in Waste Management at KITS

Faculty and students are actively involved in pilot projects related to waste management. At the Water Institute – a Centre of Excellence, the following research activities are pursued with grants from MoEF & CC and DST, GoI

- Evaluating the performance of the unit operations in the STPs, based on modeling and simulation studies – Model
- Periodic monitoring and characterization of the raw and treated effluents from STPs
- Biochar preparation using agricultural farm waste for purification of contaminated water
- Isolation of microbes from campus STPs for the bioremediation of waste water and treatment of effluents from small scale textile dyeing units in and around Coimbatore
- Treatment of used cutting fluid from mechanical workshops on campus using the Petroleum Remediation Product (PRP®), a NASA product from UniRem Technology, Pittsburgh, USA

- Treatment of greywater using microbial fuel cells.
- Recycling and reuse of detergent water using electrocoagulation technology
- A conceptual model on decentralized wastewater treatment at household and community level

A project titled “*Design of 2 TPD Rotary Kiln Gasification Pilot Plant with high CV syngas production*” was initiated at KITS with the objective of gasification of plastic waste. Run at a cost of Rs. 6.12 crores, this project will be a working model for industries/ governments. This project offers stakeholders the opportunity to better understand plastic waste disposal in an environmentally friendly manner while producing energy, which will partially offset the cost of waste management.



Plastic Gasification Unit at KITS

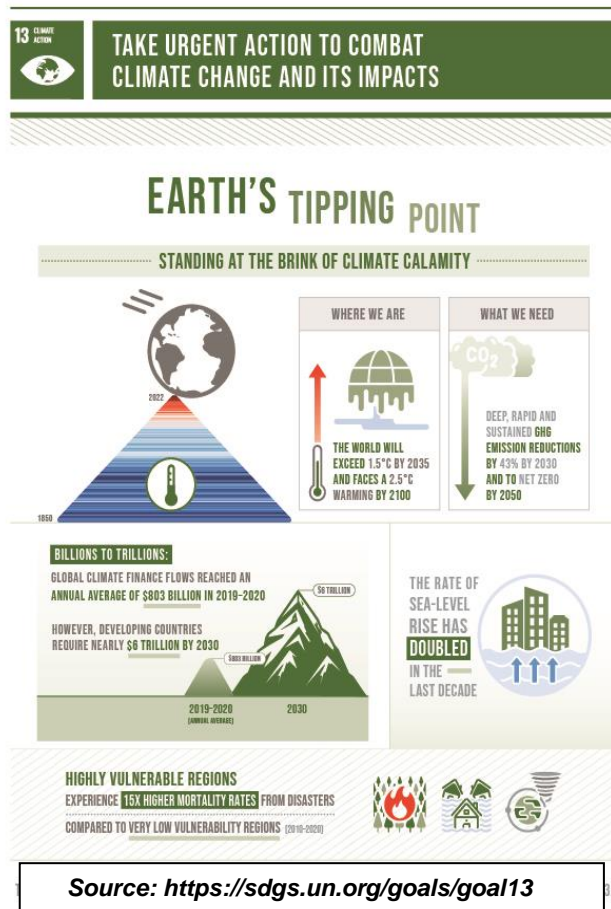


SDG 13 Climate Action



Preamble

As an institution of higher education and programmes in sciences, engineering, agriculture, management and media, KITS is committed to teach and carry out research, extension and consultancy works in the areas of Sustainable Development Goals.



The 720 acre campus of Karunya with more than 320 acre farm land serves as experimental and demonstration laboratories, and field stations to find eco-friendly solutions to the problems in the areas of global importance and thrust areas of the institution such as Water, Food, Healthcare and Sustainable energy. The Institution's strategies and activities in the above mentioned four thrust areas compels us to work towards mitigation of climate change and adaptation measures.

Most of the Technology missions of KITS also focus on research and demonstration projects relating to the climate change mitigation, in the areas of environmental pollution, natural resources management, ecosystem preservation and biodiversity conservation.

The prevailing challenges in climate action have been recognized by the faculty and students of KITS residing in the Karunya campus for more than a decade

Green Initiatives towards Climate Action:

KITS campus located in the foothills of Western Ghats is known for its floral and faunal biodiversity. Taking up the challenge of conserving the natural resources, ecosystems and biodiversity, KITS is in the process of developing innovative scientific and technological interventions to build a carbon neutral campus. Some of the green initiatives taken by KITS in combating the climate change impacts are: Sewage Treatment Plants, paper recycling unit, vermicomposting yards, solar power plant, biogas plants, solar water heaters, LED lights, Rotary Kiln Gasification Pilot Plant for plastic waste and Salzer energy saver device.

1. Low-Carbon Energy Use (Use of Renewable Energy Sources)

To offset the climatic conditions and to have a sustainable environment, KITS strategizes all its operations considering the issues related to climate and environment. The following green initiatives have been implemented on campus.

- 95 kW Grid tied Solar Power Plant in the administrative block
- 20 kW Grid tied Solar Power Plant in hostels
- Solar water heating system of 85,600 LPD
- 7958 LED Tube lights
- Eco friendly Paper recycling unit
- DST funded Rotary Kiln Gasification Pilot Plant for plastic waste management

- 5 sewage treatment plants

Renewable Energy Sources and Energy Savings:

Sl.No	Description of Item	Qty	Power Savings/year
1	Solar Water heating system	85,600 LPD	15,45,718 kWh

Sl.No	Description of Item	Year	Qty	Power Consumption	
1	18W LED Tubelights	2019	5944 Nos	278179	3,39,997 Units
2		2020	1705 Nos	79794	97526 Units
3		2022	2860 Nos	133848	1,63,592 Units

Renewable Energy Sources (power in kWh)						
Source	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Solar PV	129750	131560	129260	128720	123419	157783
Solar Water heating system	1545718	1545718	1545718	1545718	1545718	1545718
LEDs						601115
Total	1675468	1677278	1674978	1674438	1669137	2304616



Solar Water Heater- Ladies Hostel 1



Solar Water Heater – Ladies Hostel 2



Solar Water Heater- Boys Hostel



Solar Water Heater- Boys Hostel



95 kW Grid Tied Solar Power Plant in Administrative Block

Details of Renewable Energy Sources (Solar) at KITS

a. 95 kW Grid Tied Solar Power Plant In Main Building

The 95 kW Grid – Tied Solar Power Plant has 312 Poly crystalline solar panels connected through four inverters to the Distribution Board. The power generation is monitored through online monitoring unit from the inverters.

Salient Features of Solar Power Plant:

1. Grid – Tied 95kW Photo Voltaic Poly Crystalline Solar Power Plant
2. 25 kW Capacity of Inverter of 4 Nos – Make – SMA
3. No of Inverters – 4 Nos
4. No of Strings in each Inverter – 4 Nos
5. No of Solar panels connected in each inverter – 84 Panels (Except 4th inverter - 60 Nos)
6. Total No of Modules (Panels) – 312 Nos (Each – 310 Watts) – Make – EMMVEE

b. 20 kW Grid Tied Solar Power Plant in Hostels

Salient Features of Solar Power Plant.

1. Grid – Tied 20kW Photo Voltaic Poly Crystalline Solar Power Plant
2. 25 kW Capacity of Inverter of 1 No – Make – SMA
3. No of Inverters – 1 Nos
4. No of Strings in each Inverter – 4 Nos
5. No of Solar panels connected in each inverter – 66 Panels
6. Total No of Modules (Panels) – 16 Nos (Each – 310 Watts) – Make – EMMVEE

Hostel	Angelina Residence	Hephzibah Residence	Father Duraisamy Residence	Edward George Residence	New JVR Residence	New JMR Residence	New BRR Residence	New Bethany Residence
Specifications								
System Model	TWINWALL model Solar system							
Type of Collector	Flat Plate Collector							
System Capacity	3500 Lts per day	2500 Lts per day	3500 Lts per day	2500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	3 Units	1 Unit	2 Units	2 Units	2 Units	2 Units	2 Units
System Temperature	60@c	60@c	60@c	60@c	60@c	60@c	60@c	60@c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m ² for 3500 LPD System and 45 m ² for 2500 LPD System							
Application	Hot Water							
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 Kw with thermostat							
Tank Capacity	3500 Lts with air vent provision	2500 Lts with air vent provision	3500 Lts with air vent provision	2500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision
Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger							
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts							

Hostel	Sevugapandian Residence	Sundararaj Residence	P R Garg Residence	Dakshinamoorthy Residence	Oprah Residence	Evangeline Residence
Specifications						
System Model	VESAT Solar Products					
Type of Collector	Flat Plate Collector					
System Capacity	3500 Lts per day	3500 Lts per day	500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	2 Units	1 Unit	1 Unit	1 Unit	2 Units
System Temperature	60@c	60@c	60@c	60@c	60@c	60@c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m ² for 3500 LPD System					
Application	Hot Water					
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 kW with thermostat					
Tank Capacity	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision
Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger					
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts					

2. Education and Research on Climate Change and Action

To create awareness on the climate change, impacts, mitigation and adaptation, KITS is involved in imparting knowledge through:

- offering courses related to climate change at all levels of education.
- strengthening the research in climate action through creating infrastructure in renewable energy sources such as biomass, solar and wind
- involving faculty and students in technology missions related to the climate
- encouraging research publications through collaborations
- organizing events/workshops/conferences for dissemination of knowledge
- enhancing capacity building through guest lectures

2.1 Education Programme on Climate Action:

- KITS has integrated sustainability related issues in the curriculum by offering 113 courses covering renewable energy sources, sustainable building materials, global climate change, green and smart building across different programmes.
- The campus with 40% greenery has a rich biodiversity serving as a habitat for several indigenous plants endemic to Western Ghats, migratory bird species and a host of insects. Students are introduced to the diversity of flora and fauna through several courses highlighting nature conservation.
- KITS has introduced green solutions for natural resources conservation, rainwater harvesting, sewage treatment, paper recycling, solar energy harnessing, biogas production creating an environment with a target of achieving SDGs.
- Courses on Cleaner Production and Sustainable Development, Renewable Energy and Green Technology and Sustainable Building Concepts and Design are offered to students across disciplines.
- Courses on Natural Resources Management and Environment Conservation is offered by the School of Agriculture and Biosciences. The School offers two courses for UG and PG programs on Climate Change and Environment Conservation namely Agrometeorology and crop weather forecasting and Introductory Agro-Meteorology & Climate Change.
- Students earn non-academic credits for extension activities related to nature clubs in the areas of water, solid waste management, environment, green campus and community health.

2.2 Infrastructure Facilities in Renewable Energy Sources such as Biomass, Solar and Wind

2.2.1 National Aeronautics and Space Administration (NASA) has set up an "AERONET" (AERosol RObotic NETwork) station at KITS to study the air quality of Western Ghats. The University signed an agreement with the Office of International and Interagency Relations, NASA. The project is managed by NASA's Goddard Space Flight Center.

2.2.2 Agrometeorology Observatory

KITS has installed a Class-B Meteorology Observatory and Automatic Weather Station (AWS) that monitors global solar irradiance, sunshine recorder, rainfall, air temperature, soil temperature at different depths, relative humidity, soil moisture, wind speed, wind direction data, as well as

photosynthetic active radiation and leaf wetness, which are critical for research and development. The recorded meteorological data contributes towards research and development under SDG-13.



2.2.3 KITS has the state -of-the-art Model facility- **Rotary Kiln Gasification Pilot Plant** for converting plastic waste into a source of energy. In collaboration with industry partner, Techurja Inc., and with the support of a 6.12 crore grant by DST, GoI, KITS has unlocked the potential of plastic through groundbreaking processes.



2.2.4 Solar and Wind Energy Laboratory

- PV Module characterization kit to study the effect of different angular positions, I-V Characteristics at different electrical connections.
- PV System characterization kit to study the efficiency of the whole PV System by studying the efficiency of individual unit.
- Solar Simulator (solar cell characterization unit) to study the dependency of solar cell output on light intensity and temperature.

2.2.4 Wind Tunnel Experimental Set-up

- Two wind tunnels with artificial wind generation.
- Small Wind Turbines can be tested for various wind speed profiles.
- Power Generation and Efficiency of wind turbines can be tested.
- Maximum power tracking from wind turbine power curve.



2.2.5 Eco-Friendly Paper Recycling Unit

2.2.6 Sewage Treatment Plants

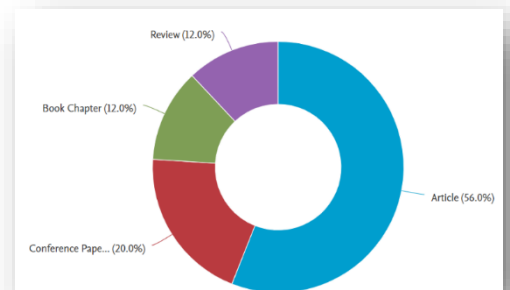
2.3 Research on Climate Action and Publications

For more than a decade, KITS is involved in research activities related to climate change, mitigation and adaptation through 10 Technology Missions (Wetland Conservation Mission, Drone Technology for Agricultural Mission, Smart Technology for Precision Farming, Green and Sustainable Manufacturing, Green Energy Technology Mission, Technology Mission for Food Security, Smart Intelligent Building Mission, Smart Vehicle Mission, Satellite and GIS Application Mission, Smart City Mission).



and adaptation through 10 Technology Missions (Wetland Conservation Mission, Drone Technology for Agricultural Mission, Smart Technology for Precision Farming, Green and Sustainable Manufacturing, Green Energy Technology Mission, Technology Mission for Food Security, Smart Intelligent Building Mission, Smart Vehicle Mission, Satellite and GIS Application Mission, Smart City Mission).

50 research documents (articles, books, conference and review papers) have been



published by the faculty and students of KITS related to SDG 13 in collaboration with 18 countries and with around 95 other academic and research institutions. Since the inception of SDGs in 2018, there is increase in publication of research documents from 2 in the year 2018 to 17 in the year 2023. This depicts the involvement of KITS in climate action.

2.4 Capacity Building Activities:

To enhance the knowledge on climate change impacts, mitigation and adaptation and to build capacity, nine national and international seminars, experience sharing workshops, conferences and training programmes were conducted.

2.4.1 A Two-day event on the theme of 'Climate Change' and 'Sustainable Agriculture'



Karunya Technology Business Incubation Park (KTBIP) and the School of Agricultural Sciences organized A Two-day event on the theme of ‘Climate Change’ and ‘Sustainable Agriculture’ with a view to commemorate India’s G20 Presidency and its theme, ‘Vasudhaiva **Kutumbakam**’ (One Earth One Family), with a focus on sustainable and environment-friendly lifestyles during May 10th and 11th, 2023. The event showcased the creative endeavors of the students of B.Sc. (Hons) Agriculture, with a focus on the theme ‘Climate Change - causes, impacts, and mitigation’. The exhibits were in the form of models, charts, paintings, presentations, blogs, and vlogs, highlighting the importance of sustainable agriculture and its impact on the **environment**.

The students displayed various products, methodologies, farming practices, cultivars, and artefacts. These products included herbal products, bio-fertilizers, vermin compost,

souvenirs based on dry leaves, seedlings, and plantings.

2.4.2 International Conference on ‘Integrated Water Resources Management: Prospects and Challenges’



Karunya Institute of Technology and Sciences, Coimbatore organized an International Conference on “Integrated Water Resources Management: Prospects and Challenges” from 8 to 9th December 2022 sponsored by the Ministry of Jal Sakthi, Govt. of India. The conference

deliberated upon the themes of hydrology, geospatial techniques, application of IoT and AI in water resources management, agriculture, water quality, water treatment technologies, wetland ecology, decision support system, water conservation and groundwater recharge, the impact of climate change on water resources, water economics, governance, policies and capacity building. A total of 4 keynote lectures and 6 theme papers were presented. Around 120 papers were presented in 12 technical sessions.

2.4.3 Water Summit

KITS organized Water Summit India 2022 on 18th September 2022. Renowned experts in the field of water technology deliberated and prepared the Water Vision document for Coimbatore. Twenty renowned experts from across the country representing diverse academic and research organizations, industry, Government and NGO outfits participated in the Water Summit. The Vision Document was prepared highlighting innovative, novel and practical suggestions for facing the challenges in the water sector of different hydro-ecological zones of India. This will help to combat the climate change impacts.



KITS in dissemination of knowledge on the aspects of Climate Change and Action

3. KITS Climate Action Plan shared with local government and local community groups

KITS has a policy on Mitigating the Impact on Climate and the Environment which has been posted in the website for public. Link: <https://www.karunya.edu/iqac/sustainability>

4. Commitment to carbon neutral university (according to Greenhouse Gas Protocols)

Green audit is carried out regularly. With the support of this policy, efforts are taken continuously to reduce greenhouse gas emission and support the environment to improve the climate.

Standard Used: United Nations Framework Convention on Climate Change :

Total Scope 1 and 2 carbon emissions in tCO₂e (tonnes (t) of carbon dioxide (CO₂) equivalent (e).

a. Base line Year: 2015

Total Electricity Consumption: 7417799 kWh: CO₂ Emission- 4989.8 tonnes

b. Reporting year (2021-2022)

➤ Total Electricity Consumption for the campus and residences: 3862181 kWh: CO₂ Emissions – 2598 tonnes

➤ Vehicles:

- No. of buses from KITS to Coimbatore -10
Running 2000 km approximately per month – $10 * 2000 * 12 = 2,40,000$ km
CO₂ Emission – 28.68 tonnes
- No. of cars – 10

Running 3000 km approximately per month – $10 \times 3000 \times 12 = 3,60,000$ km
 CO2 Emission – 49.395 tonnes
 CO₂ Emissions (Scope 1 and Scope2 together) – Reporting Year (2021-2022) – 2676.075 tonnes

CO₂ emission reduction due to Renewable Energy sources:

Renewable Energy Sources (power in kWh)						
Source	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Solar PV	129750	131560	129260	128720	123419	157783
Solar Water heating system	1545718	1545718	1545718	1545718	1545718	1545718
LEDs						601115
Total	1675468	1677278	1674978	1674438	1669137	2304616

CO₂ emission reduction – **1550.2 tonnes**

The Institution is committed to achieve zero carbon emission (carbon neutrality) by 2060.



14 SDG LIFE BELOW WATER

14.1 Research on life below water

LIST OF PUBLICATIONS

1. Engineering

Sr. no	Title	Authors	Affiliation	Journal & Volume	Year
1.	Development of static mixer for water treatment and investigation of effect of geometrical parameters on mixing effectiveness	Denny, Ashwin ^a ; Smart, D., S. Robinson Kurissingal, Denny C.; Kumar, J., Pradeep ^b ; Smart, Jose Jenish ^d	Department of Mechanical Engineering, KITS, Coimbatore	ARPN Journal of Engineering and Applied Sciences, Volume 17, Issue 3, Pages 262 - 272	February 2022
2.	Temporal Assessment of Sedimentation in Siruvani Reservoir Using Remote Sensing and GIS	Brema J. ^a ; Tamilarasan A. ^b	Department of Civil Engineering, KITS, Coimbatore	Geospatial Modeling for Environmental Management: Case Studies from South Asia, Pages 59 - 821 (Book chapter)	January 2022

2. Environmental science

Sr. no	Title	Authors	Affiliation	Journal & Volume	Year
1	Assessment of groundwater geochemistry using multivariate water quality index and potential health risk in industrial belt of central Odisha, India	Naik Manas Ranjan ^a ; Mahanty Biswanath ^b ; Sahoo Sunil Kumar ^c ; Jha, Viveka Nand ^c ;	Department of Biotechnology, KITS, Coimbatore,	Environmental Pollution, Volume 303, 15 June 2022, Article number 119161	June, 2022
2	Potential of MOF-based novel adsorbents for the	Duarah, Prangan ^c ; Haldar, Dibyajyoti ^a ;	Department of Biotechnology, KITS,	Advanced Materials for Sustainable Environmental	January 2022

	removal of aquatic pollutants	Purkait, Mihir Kumar ^b	Coimbatore (Book Chapter)	Remediation: Terrestrial and Aquatic Environments Pages 29 - 47 (Chapter 2)	
3	Exposure and health risk assessment of nitrate contamination in groundwater in Coimbatore and Tirupur districts in Tamil Nadu, South India	Pazhuparambil Jayarajan, S. K., & Kuriachan, L.,	Water Institute, KITS, Coimbatore	Environmental science and pollution research international, Vol 28, pages 10248–10261.	October 2021
4	Integration of sensors for dam water quality analysis – A prototype	Rose, Lina ^a ; Mary, X. Anitha, Karthik C. ^c	Department of Biomedical Engineering, KITS, Coimbatore	Water Science and Technology, Open Access Volume 84, Issue 10-11, Pages 2842 - 2856	November 2021
5	Hydrologic flow regimes in humid tropics river basin	Chellaiah, Gajendran, Eazon, Daniel Biju	Department of Civil Engineering, KITS, Coimbatore	Water Science and Technology, Open Access Volume 84, Issue 10-11, Pages 3143 - 3154	November 2021
6	Urban stormwater harvesting for domestic water supply: A water evaluation and planning approach	Pravin S.S.; Gajendran C; Divya T.	KITS, Coimbatore, India	Water Science and Technology Open Access Volume 84, Issue 10-11, Pages 2871 - 2884	November 2021
7	Thermal modeling, characterization, and enviro-economic investigations on inclined felt sheet solar distiller for seawater desalination	Hilarydoss, Sharon ^a ; Delhiraja, Krithika ^b ; Reddy, Kalvala Srinivas ^c ; Philip, Ligy ^b ; Chand, Drupad ^a ; Benny, Belmin ^a	Department of Mechanical Engineering, KITS, Coimbatore	Environmental Science and Pollution Research, Volume 28, Issue 45, Pages 63572 – 63588	December 2021
8	Nutrient chemistry and seasonal variation in the groundwater quality of a Riverine Island on the west coast of Kerala, India (Sustainable Water	Sajil Kumar P.J. ^a ; Kokkat, Aswin ^b ; Kurian P.K. ^c ; James E.J. ^b	Water Institute, KITS, Coimbatore	Sustainable Water Resources Management Open Access Volume 7, Issue 6, Article number 105	December 2021

	Resources Management, (2020)				
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14.2 Supporting Aquatic Ecosystems through Education

14.2.1 Fresh-water ecosystems (community outreach)

Community outreach program for Drinking water supply and Irrigation

In a commendable initiative, the Community Outreach Program by Prof. C. Mayilswami, Water Institute and Dr. Prawin Angel, Aerospace Engineering in collaboration with the Agriculture team, KITS, facilitated drinking water supply and drip irrigation for vegetables in Kaalimangalam (Ward no.11) and Pachinampathy villages of Alandurai Town Panchayat. This program, conducted on January 10, 2022, addresses critical issues related to water supply and agriculture in the community.

Drinking Water Supply: The program recognizes the pressing need for improved access to clean drinking water and install additional drinking water supply taps and a cement stone for washing clothes. This initiative aims to enhance the daily lives of residents by providing reliable access to safe drinking water and improved hygiene facilities.



Location of Pachinampathy village



Installation of pipe line



Drinking water supply



Drinking water tank construction and distribution



Kitchen garden piping layout



Drip irrigation

Irrigation Support: Another vital aspect of this program is the provision of irrigation support to the community garden. The Agriculture team's proposal involves providing essential resources for a kitchen garden benefiting 40 families such as grow bags with potting mix, banana and papaya suckers, various fruit plants, vegetable seeds, passion fruit plants, pandals, and labour charges for planting. Additionally, considering the water supply limitations, it is suggested that hand watering be employed for irrigation, and an existing submersible pump set in the second tube well may be utilized for watering coconut plants. This initiative aims to improve food security, agricultural diversity, and economic well-being of the local community.

Household Biogas Generation: The village community were trained to produce biogas and vermicompost in their houses. Biogas a renewable fuel produced when organic matter, such as food or animal waste, is broken down by microorganisms in the absence of oxygen, is an eco-friendly zero waste practice that creates awareness on sustainable environment among the villagers.

Trainings are also extended to the village women for making nutritional foods for leading a healthy lifestyle.



Household biogas plant



Vermicompost site



Training on food preservation



Treeplanting by Karunya Agri students

In conclusion, the Community Outreach Program is a laudable effort by Team Karunya to address pressing issues related to drinking water supply, disposal of waste, Vermicomposting, food preservation and storage in selected villages - Kaalimangalam and Pachinampathy. By providing essential resources and support, this program strives to enhance the overall quality of life and sustainability of the community, showcasing a commitment to social welfare and community development.



Community outreach team

14.3 Supporting aquatic ecosystems through action

14.3.3 Maintain ecosystems and their biodiversity (direct work)

A Mural Showcasing the Essence of Biodiversity on Campus

The mural depicts an event recorded in the world history when it rained forty days and forty nights upon earth. In the same day Noah entered into the ark with his family and beasts and fowl of every kind.



Karunya Aqua Museum



Mural painting work

The flood waters prevailed for forty days upon the earth, lifting the ark and the waters prevailed upon the earth on hundred and fifty days. All flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping creatures and every man. Noah and his family were with him in the ark only remained alive.

14.4 Water Sensitive Waste Disposal

14.4.1 Water discharge guidelines and standards

KITS Effluent Treatment Plant

KITS has seamlessly integrated the Sewage Treatment Plants into its campus infrastructure, marking a commendable stride towards sustainable and responsible wastewater management. The facility plays a pivotal role in ensuring the institute's commitment to environmental stewardship and resource conservation. With a daily capacity to treat approximately 10 lakh litres of sewage and an additional 1.2 lakh litres of kitchen water, it not only fulfils the institution's water treatment needs but also sets a noteworthy example of how advanced sewage treatment can be effectively implemented within an educational institution.

Furthermore, the treated water, amounting to 4 lakh litres/day, is judiciously employed for irrigation and gardening within the campus. This utilization of reclaimed water not only serves as a sustainable alternative but also significantly reduces the institution's reliance on freshwater sources for landscaping and horticultural needs. By meticulously incorporating the Sewage Treatment Plant into its operations, the Institute demonstrates its commitment to environmental responsibility and the invaluable lessons it imparts to students on the importance of water management and treatment.



Display of treatment plant vision and cost of build details and Pump house facility



Air compressors and activated carbon tanks for de-odouring and clarification of treated water

14.4.2 Action plan to reducing plastic waste

R&D prototype of 2 TPD Rotary Kiln Gasification Pilot Plant for converting non-recyclable plastic waste into high quality syngas for generating steam has been installed at KITS, Coimbatore in collaboration with its industry partner, Techurja Inc., Bangalore and the institutional partner, Central Mechanical Engineering Research Institute, Durgapur. The project has come up with most economical solution for waste management and renewable energy. The purpose is to build a demonstration rotary kiln gasification plant that disposes 2 TPD of non-degradable waste to produce high calorific syngas, which will be used to produce steam. Since the quality of the syngas, specifically its calorific value is a key parameter that determines the efficiency and therefore the economics of the plant, it is considered as a major factor in deriving the objectives of the project.



Checking of Kiln chamber alignment Steam Drum Installation and Feed Water Piping



Heat Recovery Boiler installation and integration with Combustion Chamber

14.5 Maintaining a local ecosystem

14.5.1 Minimizing alteration of aquatic ecosystems (plan)

Aquatic ecosystems perform numerous valuable environmental functions. They recycle nutrients, purify water, attenuate floods, augment and maintain streamflow, recharge ground water, and provide habitat for wildlife and recreation for people. Rapid population increases in many parts of the world led to the pollution of surface waters by fertilizers, insecticides, motor oil, toxic landfill leachates, and feedlot waste. At the same time that water pollution and releases of nutrient-laden municipal sewage effluents have increased, water consumption has also increased, thus reducing the flows available for the dilution of wastes. Therefore, since the loss and impairment of aquatic ecosystems is accompanied by loss and impairment of valuable environmental functions and amenities important to humans, and since restoration of aquatic ecosystems is possible, a large-scale aquatic ecosystem restoration program should be implemented to regain and protect the physical, chemical, and biological integrity of surface water such as

- i. Correct non-point source pollution problems
- ii. Arrest the decline of wildlife populations and
- iii. restore all types of wildlife habitats with priority to endangered species habitat.

14.5.3 Programmes towards good aquatic stewardship practices

A good aquatic stewardship is defined as using water in a way that is socially equitable, environmentally sustainable and economically beneficial. This is achieved through a stakeholder inclusive process such as Water filtration systems help individuals practice good aquatic stewardship, be cognizant of water usage and make sure that all pipes and faucets are intact and secure ensures there is no passively lose and waste water.

14.5.4 Collaboration for shared aquatic ecosystems

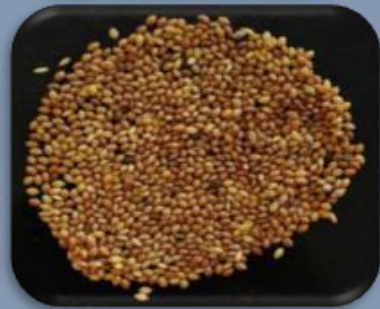
- i. Address emerging threats to food safety and access, as well as food and nutrition security in the Aquatic, through research that addresses how climate and environmental change is affecting the abundance, accessibility, and use of traditional foods and traditional ways of life.
- ii. Provide research and technical support for water and sanitation infrastructure.
- iii. Observe, understand, predict, and project Aquatic ecosystem change and its impacts on humans and the entire Earth system.
- iv. Understand interactions between social, ecological, and physical Aquatic systems, particularly in the context of coastal, climate, and cryospheric change.
- v. Improve multi-species and ecosystem approaches to predict climate change impacts on species distributions and on economically viable access to commercial and subsistence species in the next 50 years.

14.5.5 Watershed management strategy

People and the ecological integrity of aquatic systems rely on healthy watersheds. Environmental Protection Agency (EPA) employs a suite of programs to protect and improve water quality in the nation's watersheds—rivers, lakes, wetlands, and streams—as well as in our estuarine, coastal, and ocean waters. In partnership with states, territories, local governments, and tribes, EPA's core watershed programs help:

- Protect, restore, maintain, and improve water quality by financing wastewater treatment infrastructure
- Conduct monitoring and assessment
- Establish pollution reduction targets
- Update water quality standards
- Issue and enforce discharge permits and
- Implement programs to prevent or reduce non-point source pollution.

SDG15: LIFE ON LAND



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Brief Introduction

Forests and natural resources are the integral factors in combating climate change, protecting biodiversity and the habitations of indigenous population. At a global level, deforestation and desertification which are caused by anthropogenic activities and climate change pose major threat to sustainable livelihood. Karunya Institute of Technology and Sciences (KITS) is located in a sprawling campus of 720 acres at the foot hills of Siruvani in Western Ghats, which is a UNESCO declared biodiversity hot spot. Concerted efforts are being taken to maintain the serenity of the nature and its wealth by maintaining a green campus.

15.1 Research on Land Ecosystems

Extensive research programmes are conducted to solve the problems identified in the localities near KITS with a mission to conserve and preserve the biodiversity. As a result, 84 research publications emanated during the year 2022 and 2023, with co-authors from developing nations such as Bangladesh and Nepal, and across developed nations such as USA, Spain, Brazil, Chile, Japan, France, China and Saudi Arabia.

15.1.1 Life on Land: Cite Score

15.1.2 Life on Land: FWCI

15.1.3. Life on Land: Publications

Publications in 2022

S.No	Title	Authors	Journal	Year	Vol/Doi	Cite score	Foreign Authors	FWCI
1	SARS-CoV-2 emerging Omicron subvariants with a special focus on BF.7 and XBB.1.5 recently posing fears of rising cases amid ongoing COVID-19 pandemic	Pran M et al	Journal of Experimental Biology and Agricultural Sciences	2022	10(6), pp. 1215-1221	0.7	Bangladesh	4.94
2	Essential oils as valuable feed additive: A narrative review of the state of knowledge about their beneficial health applications and enhancement of production performances in poultry	Pran M et al	Journal of Experimental Biology and Agricultural Sciences	2022	10(6), pp. 1290-1317	0.7		1.64
3	Demand and Supply of Cut Flowers Production in Krishnagiri District of Tamil Nadu-An Approach by Data Envelopment Analysis	Thulasiram et al	Agricultural Science Digest	2022	42(6), pp. 747-751	0.3		
4	Apple (<i>Malus domestica</i> Borkh.) seed: A review on health promoting bioactivities and its application as functional food ingredient	Pran M et al	Food Bioscience	2022	50:102155	5.6		1.81

5	Jamun (<i>Syzygium cumini</i> (L.) Skeels) seed bioactives and its biological activities: A review	Pran M et al	Food Bioscience	2022	50:102109	5.6		0.9
6	Improving the properties of corn starch films for application as packaging material via reinforcement with microcrystalline cellulose synthesized from elephant grass	Haldar, Dibyajyoti et al	Food Packaging and Shelf Life	2022	34:100937	12.9		4.32
7	Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and SDG2	Sneha Gautam et al	British Food Journal	2022	124(12), pp. 4219-4233	5.4	Italy	2.48
8	Acacia catechu (L.f.) Willd.: A Review on Bioactive Compounds and Their Health Promoting Functionalities	Pran M et al	Plants	2022	11(22),3091	5.4	US, Poland	0.52
9	Deciphering environmental factors and defense response of rice genotypes against sheath blight disease	Naveen Kumar R et al	Physiological and Molecular Plant Pathology	2022	122:101916	4.4		0.36
10	Production and characterization of bacterial cellulose scaffold from <i>Acetobacter</i> sp. for tissue engineering	Jenet Saranya, et al	Journal of Applied Biology and Biotechnology	2022	10(6), pp. 87-94	1.6		
11	Beneficial health effects of cumin (<i>Cuminum cyminum</i>) seeds upon incorporation as a potential feed additive in livestock and poultry: A mini-review	Pran M et al	Journal of Experimental Biology and Agricultural Sciences	2022	10(5), pp. 912-921	0.7	Egypt	0.54
12	Deep Learning-Based Leaf Disease Detection in Crops Using Images for Agricultural Applications	Eunice J, Jude Hemanth	Agronomy	2022	12(10),2395	3.8	Bangladesh	
13	Accumulation of cadmium in maize roots inoculated with root organ culture of <i>Rhizophagus irregularis</i> improving cadmium tolerance through activation of antioxidative defense enzymes	Vinuradha, R et al	Journal of Applied Biology and Biotechnology	2022	10(5), pp. 84-93	1.6		0.33
14	Multi-omics intervention in <i>Setaria</i> to dissect climate-resilient traits: Progress and prospects	Pramitha L et al	Frontiers in Plant Science	2022	13:892736	7.1		0.29
15	Monkeypox: An Update on Current Knowledge and Research Advances	Pran M et al	Journal of Experimental Biology and Agricultural Sciences	2022	10(4), pp. 679-688			10.97

16	Biology, morphology and molecular characterization of <i>Rhaphipodus subopacus</i> (Coleoptera: Cerambycidae): a new pest of cocoa (<i>Theobroma cacao</i> Linnaeus)	Hiremath S et al	Applied Entomology and Zoology	2022	57(3), pp. 213-223	2.7		
17	Authentic report of the emesine bug <i>Gardena melinarthrum</i> Dohrn, 1860 (Hemiptera: Heteroptera: Reduviidae) from India	Hiremath S et al	Journal of Threatened Taxa	2022	14(6), pp. 21296-21301	1		
18	An updated research on the antimicrobial properties of <i>Chromolaena odorata</i> (L). leaf and flower extracts against wound promoting pathogens: A comparative and combinatorial in vitro /in silico approach	Mathew Meena et al	Medicinal Plants	2022	14(1), pp. 129-143	0.7		
19	Synergistic Modulation of Seed Metabolites and Enzymatic Antioxidants Tweaks Moisture Stress Tolerance in Non-Cultivated Traditional Rice Genotypes during Germination	Sugitha Thankappan et al	Plants	2022	11(6),775	5.4	Saudi Arabia	0.9
20	Stability Analysis and Heterotic Studies in Maize (<i>Zea mays</i> L.) Inbreds to Develop Hybrids With Low Phytic Acid and High-Quality Protein	Pramitha L et al	Frontiers in Plant Science	2022	12:781469	7.1		0.42
21	Taxonomic revisionary study on economically important pest species of Spilomelinae [Crambidae: Lepidoptera] from Tamil Nadu, India	Rathikannu, S., Chitra, N.	Journal of Entomological Research	2022	46(4), pp. 897-902	0.3		
22	Cuticle degrading enzyme production by some isolates of the entomopathogenic fungus	Parveen, S.S., Jeyarani, S.	Journal of Entomological Research	2022	46(4), pp. 722-725	0.3		
23	Assessment of toxicity of different doses of acetamiprid 20 SP to the egg parasitoid, <i>Trichogramma chilonis</i> (Ishii) (Hymenoptera: Trichogrammatidae)	Vinuradha, R et al	Journal of Entomological Research	2022	46(4), pp. 775-779	0.3		
24	Outbreak of <i>Glyphodes caesalis</i> (Lepidoptera, Pyraloidea, Crambidae, Spilomelinae) on exotic varieties of jackfruit (<i>Artocarpus heterophyllus</i>) and a note on records of its occurrence in Kerala	Hiremath S et al	Journal of Tropical Agriculture	2022	60(1), pp. 125-128	0.7		0.4

25	Bioremediation of textile dyeing industry effluent from small scale industries using a microbial consortium of Bacillus sp., Escherichia coli, and Aspergillus niger	Kannan, et al	Journal of Applied Biology and Biotechnology	2022	10, pp. 100-106	1.6		
26	Rhizosphere Engineering of Rice with Plant Growth Promoting Rhizobacteria (PGPR) Elicits Crop Growth and Soil Microcosm in Blue-R Dye Contaminated Soil	Sugitha Thankappan et al	Communications in Soil Science and Plant Analysis	2022	53(18), pp. 2434-2446	3		0.36
27	Arbuscular mycorrhiza-A health engineer for abiotic stress alleviation	Vinuradha, R et al	Rhizosphere Engineering	2022	pp. 171-198			
28	Biodiversity of South Indian tea clones with detection of plant-based adulterants in tea dust using DNA barcoding	Avarave, S., Thomas, J. et al	Natural Product Research	2022	36(18), pp. 4614-4619	4.5		0.31
29	Synergistic protective effect of Camellia sinensis leaf buds and Camellia sinensis flowers against cisplatin-induced nephrotoxicity in rats and characterization of its bioactive compounds	Avarave, et al	Natural Product Research	2022	36(17), pp. 4470-4474	4.5		0.31
30	Yield and Quality of Multi-Cut Forage Sorghum (Sorghum Bicolor (L.) Moench) as Influenced by Various Organic Manure and Nitrogen Levels	Pran M et al	Indian Veterinary Journal	2022	99(1), pp. 34-41	0.6		0.85
31	Machine learning modeling techniques and statistical projections to predict the outbreak of COVID-19 with implication to India	Anne, W.R., Jeeva, S.C.	Lessons from COVID-19: Impact on Healthcare Systems and Technology	2022	pp. 289-311			
32	Impact of Drying Methods on the Quality of Bioactive Components in Tree Tomato (Cyphomandra betacea)	Pragalyashree et al	Trends in Sciences	2022	19(2),2060	0.8		
33	Changing Patterns in the Spread of Human Monkeypox: A Dangerous New Development in Disease Epidemiology	Chandran, et al.	Journal of Pure and Applied Microbiology	2022	16(1 S), pp. 3106-3118	1.6		
34	Optimization of Biosurfactant Production using Chrysenes Degrading Bacteria Isolated from Marine Water	Thomas, et al	Journal of Pure and Applied Microbiology	2022	16(4), pp. 2580-2591	1.6		
35	Identification of the novel HLA-DPA1 allele, HLA-	Ameen, et al.	HLA	2022	100(5), pp. 549-550	2		0.58

	DPA1*01:03:34 in a Kuwaiti family							
36	Prevalence and Risk Factors of staphylococcal Subclinical Mastitis in Dairy Animals of Chitwan, Nepal	Pran M et al	Journal of Pure and Applied Microbiology	2022	16(2), pp. 1392-1403	1.6	Nepal	0.71
37	Immobilization of enzymes for bioremediation: A future remedial and mitigating strategy	Gomez Levin Anbu	Environmental Research	2022	212, Article No 113411	11	South Korea, Chile	5.02
38	Metaheuristic optimization techniques to design solar-fuel cell-battery energy system for locomotives	Immanuel Selvakumar	International Journal of Hydrogen Energy	2022	47: (3) 1845 - 1862	12.1		0.93
39	Ensuring Sustainability via Application of Root Zone Technology in a Rubber Product Industry: A Circular Economy Approach	Sneha Gautam et al	Sustainability	2022	14(19):12141	5.8		
40	Phytochemical Screening and Bioactivity Studies of Endophytes Cladosporium sp. Isolated from the Endangered Plant Vateria Indica Using In Silico and In Vitro Analysis	Jesse Joel et al	Applied Biochemistry and Biotechnology	2022	194: 10, 4546 - 4569	5.6	South Korea	0.62
41	Global implications of biodiversity loss on pandemic disease: COVID-19	Brema J et al	Book Chapter in COVID-19 and the Sustainable Development Goals	2022	305-322			4.9
42	Optimization of Biosurfactant Production using Chrysenes Degrading Bacteria Isolated from Marine Water	Kavitha S et al	Journal of Pure and Applied Microbiology	2022	16(4)	1.6		
43	Biodiversity of South Indian tea clones with detection of plant-based adulterants in tea dust using DNA barcoding	Jibu Thomas et al	Natural Product Research	2022	36 (18) , pp.4614-4619			
44	Sensitivity of normalized difference vegetation index (NDVI) to land surface temperature, soil moisture and precipitation over district Gautam Buddha Nagar, UP, India	Sneha Gautam et al	Stochastic Environmental Research and Risk Assessment	2022	36(6): 1779-1789	0.96		

Publications in 2023

S.No	Title	Authors	Journal	Year	Vol/Doi	Cite Score	Foreign Authors	FWC I
1	Exploration of an impedimetric electronic tongue and chemometrics for characterization of black tea from different origins	Thomas, Jibu et al	Journal of Food Composition and Analysis	2023	123:1055-35	5.5	Brazil	
2	Laboratory evaluation of temperature effects on germination, radial growth and sporulation of entomopathogenic fungi and on their pathogenicity to red spider mite, <i>Tetranychus urticae</i> koch	Sumaya S. Parveen	Indian Journal of Agricultural Research	2023	57(3):376-382	1		
3	An Improved Agro Deep Learning Model for Detection of Panama Wilts Disease in Banana Leaves	Sangeetha, Ramachandran	AgriEngineering	2023	5(2):660-679	4.6	Spain	
4	Assessment of storage stability and quality characteristics of thermo-sonication assisted blended bitter melon seed oil and sunflower oil	Naik, Mohan et al	Journal of Food Process Engineering	2023	46(6)	5.3		3.01
5	2-(dec-2-enyl)-3-methylquinolin-4-yl-C ₂₀ H ₂₇ NO and 7-amino-N-methylphenazine-1-carboxamide—C ₁₄ H ₁₃ N ₄ O ₂ : potent bio-active compounds against dengue vector <i>Aedes aegypti</i>	Lalithambika et al	International Journal of Tropical Insect Science	2023	43(2):703-718	1.6		3.02
6	Population phenology of insect pests in vegetable French bean, <i>Phaseolus vulgaris</i> L. and environmental forecast modeling for major pests using ARIMAX analysis	Dinesh Kumar et al	International Journal of Tropical Insect Science	2023	43(2):475-484	1.6		
7	Impact of different levels of iron fertilizer on growth and yield physiology of Kodo millet under rainfed conditions – An overview	Samundeswari et al	Journal of Applied Biology and Biotechnology	2023	11(2):33-40	1.6		
8	Analysis of genetic diversity and population structure in worldwide coconut germplasm (<i>Cocos nucifera</i> L.) using microsatellite markers	Ramchandrer S et al	Scientia Horticulturae	2023	309, 111681	8.4		2.6

9	Effect of Inter and Sequential Cropping of Pulses in Little Millet (<i>Panicum sumatranse</i> L.) based Cropping System	Sharmili K et al	Indian Journal of Agricultural Research	2023	57(1):52-55	1		
10	Rice straw recycling: A sustainable approach for ensuring environmental quality and economic security	Sugitha Thankappan et al	Pedosphere	2023	33(1):34-48	9.4	Mexico	3.86
11	Cottonseed Oil: Extraction, Characterization, Health Benefits, Safety Profile, and Application	Pran M et al	Food Analytical Methods	2023	16(2):266-280	6	France, USA, Ethiopia, Spain	7.46
12	Synergistic effect of sorafenib with <i>Platyclusus orientalis</i> (l) leaf extract on cervical cancer	Samuel Elvis et al	Bioscience Journal	2023	39:e39011	1		
13	Assessing the genetic diversity and association of traits among the rice (<i>Oryza sativa</i> L.) landraces and varieties from Tamil Nadu	Jebakani et al	Electronic Journal of Plant Breeding	2023	14(3), pp. 818-832	1		
14	Growth analysis and parametric budgeting of different exogenous phytohormones on direct sown finger millet (<i>Eleusine coracana</i> L.) under irrigated conditions	Srinithi, et al	Journal of Applied and Natural Science	2023	15(3), pp. 1254-1262	0.5		
15	Radio frequency disinfestation of <i>Tribolium castaneum</i> (Herbst) in semolina: An emerging thermal technique	Manoj D et al	Journal of Food Process Engineering	2023	Article in press	5.3		
16	Characterization of little millet (<i>Panicum sumatrense</i> Roth. ex. Roem. and Schultz) landraces and varieties for genetic diversity and association of traits	Selvaraj, et al	Electronic Journal of Plant Breeding	2023	14(2), pp. 561-571	1		
17	Evaluating the variability parameters among rice (<i>Oryza sativa</i> . L) landraces and varieties from Tamil Nadu	Duraiswamy, et al.	Electronic Journal of Plant Breeding	2023	14(2), pp. 487-495	1		
18	Design and Evaluation of a Photobioreactor for Carbo Capture and Mitigation Using Microalgae	Adhithya, et al	International Journal on Algae	2023	25(2), pp. 157-166	0.6		

19	Assessing growth performance and agro-meteorological indices of green gram (<i>Vigna radiata</i> L.) varieties influenced by soil amendments and foliar application under sodic soil in Cauvery delta zone of Tamil Nadu	Mohanapriya, et al	Journal of Applied and Natural Science	2023	15(2), pp. 570-581	0.5		
20	Development of bioformulations using plant extracts for the control of dengue vector, <i>Aedes aegypti</i>	Jayaraman, et al	Journal of Applied and Natural Science	2023	15(2), pp. 760-766	0.5		
21	Molecular characterization and SNP identification using genotyping-by-sequencing in high-yielding mutants of proso millet	Francis, N et al	Frontiers in Plant Science	2023	14:1108203	7.1		
22	Analyzing the variability parameters of the landraces and varieties of little millet (<i>Panicum sumatrense</i> Roth ex Roem. & Schult.)	Sneha et al	Electronic Journal of Plant Breeding	2023	14(1), pp. 360-370	1		
23	Genetic manipulation of anti-nutritional factors in major crops for a sustainable diet in future	Duraiswamy et al	Frontiers in Plant Science	2023	doi: 10.3389/fpls.2022.1070398	7.1		0.91
24	Integrated management of Fusarium wilt disease of banana in Kerala, India	Pran M et al	Vegetos	2023	Article in press	2		
25	Smart farming application using knowledge embedded-graph convolutional neural network (KEGCNN) for banana quality detection	Sajitha and Diana	Journal of Agriculture and Food Research	2023	14:100767	3.8	Kuwait	
26	Foxtail Orchid (<i>Rhynchosytilis retusa</i>): Anti-Diabetic Properties, Biodiversity, and Propagation (Book Chapter)	Lhamo, Pema et al	Ancient and Traditional Foods, Plants, Herbs and Spices used in Diabetes	2023	pp. 205-220			
27	Mobile Technology for Smart Agriculture: Deployment Case for Pearl Millet Disease Detection	Anitha Mary et al	Studies in Systems, Decision and Control	2023	452 :.11-20	1.6		
28	Predicting the area and production of sugarcane in Tamil Nadu, India using neural networks	Dinesh Kumar et al	Current Science	2023	124(4), pp. 500-504	1.7		
29	Anti-infective potential of plant-derived quorum sensing inhibitors against multi-drug resistant	Sybia Vasantha Packiavathy	World Journal of Microbiology and Biotechnology	2023	39(6),147	6.7	China, Canada	

	human and aquatic bacterial pathogens							
30	Dynamic Model Selection and Optimal Batch Design for Polyhydroxyalkanoate (PHA) Production by <i>Cupriavidus necator</i>	Lhamo, P., Mahanty, B.	Applied Biochemistry and Biotechnology	2023	Article in press	5.6		
31	Recent Advances in using <i>Lipomyces starkeyi</i> for the Production of Single-Cell Oil	Jacob, A., Mathew, J.	Journal of Pure and Applied Microbiology	2023	17(2), pp. 693-704	1.6		0.92
32	Impact of Acetic Acid Supplementation in Polyhydroxyalkanoates Production by <i>Cupriavidus necator</i> Using Mixture-Process Design and Artificial Neural Network	Lhamo, P., Mahanty, B.	Applied Biochemistry and Biotechnology	2023	Article in press	5.6		
33	Enhanced Bioremediation of arsenic-contaminated groundwater using bacterial biosorption, sequestration, and phytoremediation techniques (Book Chapter)	Levin Anbu et al	Emerging Technologies in Applied and Environmental Microbiology: Developments in Applied Microbiology and Biotechnology	2023	pp. 85-96			
34	Biotechnological interventions for improving the seed longevity in cereal crops: progress and prospects	Pramitha L et al	Critical Reviews in Biotechnology	2023	43(2), pp. 309-325	17.5		0.93
35	Managing Human-Elephant Cohabitation: Strategies for Mitigating Conflict and Encouraging Coexistence	Pratap, C.B., et al	E3S Web of Conferences	2023	405:04018	1		
36	A coastal band spectral combination for water body extraction using Landsat 8 images	Kumutha Raimond et al	International Journal of Environmental Sceicne and Technology	2023				
37	Vertical assessment of soil quality in permanent manurial experiment of dryland ecosystem, Tamil Nadu, India	Balagnaesh et al	Current Science	2023	124(11): 1308-1318	0.22		
38	Genetic diversity, allelic variation and marker trait associations in gamma	Ramchand er S	International Journal of Radiation Biology	2023	98(1):90-99	0.8		

	irradiated mutants of rice (Oryza sativa L.)							
39	Tunicate Swarm Algorithm with Deep Learning Based Land Use and Cover Change Detection in Nallamalla Forest India	Hemanth et al	Applied Sciences	2023	DOI10.3390/app13021173	0.57		
40	Improving the Efficiency of Photovoltaic Panels Using Machine Learning Approach	Khilar et al.	Interantional Journal of photoenergy	2023	DOI10.1155/2022/4921153	0.56		

15.2 Supporting Land Ecosystems through Education

15.2.1 Events about sustainable use of land

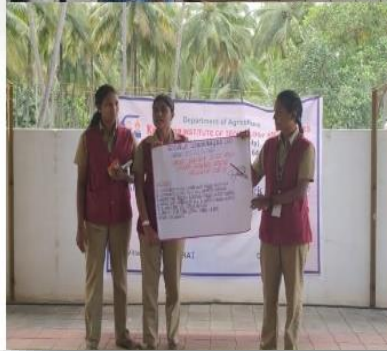
The indigenous tribal communities, of Madhvarayapuram block, are most often visited by the faculty and students of KITS to assist them with the latest technologies in the farm sector. As a flagship programme of Indian Government on “doubling farm income”, sensitization and awareness programmes were organized to encourage sustainable farm livelihood. Indigenous landraces especially millet crops were collected from the tribal milieu, and are conserved by the School of Agricultural Sciences.

Through the Karunya outreach extension programme, students have not only being sensitized but have taken up- major interventions in planting and demonstration of best agricultural practices in the Pachanampathy village and the adjoining farms. The women folk were trained with agri-preneurial activities such as mushroom cultivation and post-harvest value addition of food, enabling them to generate additional income. The CCAC of KITS also works hand in hand in solving the agrarian problems in the far-flung unreached tribal hamlets including animal husbandry with the support of the faculty members.

To achieve the Sustainable Development Goal on ‘Life on Land’, the curriculum was mapped to ensure that the course outcome complies with the expectation of the goal. The course on Rural Agricultural Work Experience (RAWE) with a weightage of 20 credits caters to SDG15 through the extended activities in villages and hamlets interspersed in southern India. During the year 2022, the students conducted 120 demonstrations, 25 farmer meetings, 15 exhibitions and social awareness programmes which benefitted 1110 farmers. Approximately 33 live demonstrations were conducted to 627 beneficiaries during 2023, mostly on the farm-based technologies like organic input preparation, yellow sticky traps to control insects, snail eradication, zero cost vermicompost production, drone technology, integrated disease and pest management etc. Besides exhibitions were organized on advanced technologies and product development such as hydroponics, vermicompost, solar cabinet dryer, plastic mulch, IoT based seed sowing machine, root feeding of coconut trees with micronutrients, preparation of agarbatti from waste flowers, *Chrysoperla* egg card for controlling soft bodied insect pests, IFS model, blue sticky trap, nutrised pack, biofertilizers and bio-boosters that benefitted 809 farmers.

Activities Supporting Land Ecosystem through Education during 2022

S.No	Activity	No. of beneficiaries
1	120 Demonstrations on innovative agricultural technologies were conducted by IVth year RAWE students in 22 villages in the year 2022	410 farmers
2	25 farmer meetings were conducted to discuss and find solutions for the problems they face both on and off farm	220 farmers
3	15 Exhibitions on innovative agricultural technologies were conducted in the villages	250 farmers
4	Awareness programs on social issues were conducted in 6 villages	130 farmers



Glimpse of demonstrations, field days and awareness programmes conducted during the year 2022



Activities Supporting Land Ecosystem through Education during 2023

Sl.No.	Demonstrations conducted	Place	No. of Beneficiaries
1	Corm injection, Seed treatment with turmeric, Seed treatment with <i>Azospirillum</i> , Jeevaamirtham, Soil sampling	Karur	15
2	Organic insect repellent, Yellow sticky trap, Blue sticky trap, Jeevamirtham, Corm and pseudostem injection	Karur	8
3	Herbarium, Soil analysis, Corm injection, Preparation of fish amino acid, panchakavya, jeevamirtham, 3G, indigenous flour slurry , Integrated farming system.	Karur	25
4	Panchakavya, poochi viratti, Jeevamirtham	Karur	14
5	Panchakavya, Jeevamirtham	Karur	7
6	Spraying of panchakavya with battery operated power sprayer in groundnut and cucumber field.	Tuticorin	30
7	Panama wilt management by pseudostem injection	Tuticorin	30
8	Neem seed kernel extract	Tuticorin	30
9	Sorghum seed hardening, Drip irrigation module.	Tuticorin	60
10	Seed treatment for Yellow mosaic virus in Black gram, Seed treatment for fall army worm in maize	Tuticorin	70
11	Cultivation of azolla	Tuticorin	15
12	Awareness on traps and organic inputs, Pheromone trap, Light trap, Yellow sticky trap, Organic inputs: <i>Trichoderma viride</i> , <i>Azospirillum</i> , Phosphobacteria. Preparation of Panchakavya, Seed Treatment with biofertilizers	Karamadai	13
13	Organic and inorganic input and pesticides	Karamadai	10
14	Yellow Sticky Trap	Karamadai	12
15	Awareness about yellow sticky trap, Solar Trap, Bucket Trap, Pheromone trap, Preparation of panchakavya and dhasagavya and biofertilizer seed treatment, Coconut root feeding.	Karamadai.	25
16	Pseudostem injection in banana, Jeevamirtham, Sugarcane sett treatment.	Gobichettipalayam	13
17	Jeevamirtham, Rhinolure trap, Coconut root feeding, Yellow sticky trap.	Gobichettipalayam	20

18	Preparation Jeevamurtham, NSKE, and neem leaf extract preparation, Root feeding on coconut, Yellow sticky trap.	Gobichettipalayam	12
19	Paring and pralinage in banana, micronutrients booster, integrated farming system, salt water seed treatment for paddy, Coimbatore composting method, yellow sticky trap.	Gobichettipalayam	15
20	Preparation of Jeevamurdham & panchagavyam, Biofertilizer application, Yellow sticky traps, Tricho card(Parasitoids) and Root feeding on coconut	Gobichettipalayam	10
21	Pairing and Pralinage, Pseudostem injection in banana.	Thondamuthur	10
22	Yellow sticky trap, Rhinolure, Red palm weevil trap, Biofertilizers	Thondamuthur	11
23	Corn injection in Banana, Pairing and pralinage in Banana, Yellow sticky trap, Preparation of Jeevamirutham, Blue sticky trap, Trichogramma card , Green lace wing card, Preparation of vermicompost	Thondamuthur	25
24	Rhinoceros beetle management, Onion root rot management	Thondamuthur	15
25	Pairing and pralinage, Soil sample collection, Deworming in cattle, Seed treatment	Madampatty, Thondamuthur	15
26	Coconut bud rot, Gill net trap, Pheromone trap.	Thondamuthur	
27	Nutri seed pack on tomato, Root feeding in coconut, preparation of agarbatti from waste flowers, <i>Chrysoperla</i> egg card for controlling soft bodied insect pests.	Thondamuthur	22
28	Yellow sticky trap, Bordeaux mixture preparation, zero cost vermicompost model, Preparation of neutral homemade pesticide using garlic.	Thondamuthur	25
29	Pest and Disease management, Apiary, Organic mulching.	Thondamuthur	30
30	Drone Technology	Thondamuthur	6
31	ZECC Jeevamurtham, organic fertilizers like namma, shreya, vermiwash, compost	Pathanamthitta, Kerala	15
32	African snail eradication demonstration	Kottayam, Kerala	1
33	organic fertilizers like nanma & Memma	Thiruvananthapuram, Kerala	18
			627



Field Demonstration and Farmer's Discussion Meeting



Exhibitions conducted to create awareness among farming community

Sl.No.	Activity/Models	Place	No. of Beneficiaries
1	Betelvine model, Jeevaamirtham, panchakavya, herbal pesticide, Meenamulam, Carbofuran, Carbendazim, <i>Azospirillum</i> , charts on jeevaamirtham preparation, diseases and pests of banana, paring and pralinage procedure, deficiency symptoms of banana.	Karur	15
2	Integrated farming system model, livestock farming model, display of millets, yellow sticky trap, blue sticky trap, Jeevamirtham, banned pesticides, Charts on resource mapping, social mapping, problem tree, land use pattern, crop calendar, millets slogan, transect walk, awareness program on millet consumption and avoid using of banned pesticides.	Karur	11
3	Banana bunch feeding technology, Panchakavya, Jeevamirtham, Biofertilizer importance, Organic Farming awareness, Rhinolure, Yellow sticky trap.	Karur	25
4	Organic Products	Karur	14
5	Seed varieties, Organic farming. Charts on fish meal, Jeevamirtham, Panchakavya, Village resources.	Karur	7
6	Displayed and explained the purpose of sticky traps & biofertilizers.	Tuticorin	30
7	Biofertilizer, biopesticides, value added products, livestock management	Tuticorin	30
8	Indigenous and landraces of thuthukudi and biofertilizers, Bio fungicide, Bio pesticide.	Tuticorin	30
9	Moringa based by products.	Tuticorin	60
10	Rain water harvesting, waste management by vermicompost, Maize fall army worm management (IPM), pheromone trap, white sorghum as border crop and ploughing with neem cake, Black gram Yellow mosaic virus management. Yellow sticky trap	Tuticorin	70
11	IFS, Panchakavya, Organic fertilizers, Nutrimix , Palm based products.	Tuticorin	15
12	Village models, PRA charts, 3D models of village, Traps, Seeds, Biofertilizers, Seed cubes, Barcon larvae and pupa, Tricho card, Crysoperla eggs.	Karamadai	30
13	PRA charts, 3D models of village, Traps, Seeds, Biofertilizers and seed cubes.	Karamadai	30
14	PRA charts, 3D models of village, seeds, Biofertilizers and seed cubes.	Karamadai	30
15	PRA charts, 3D models of village, seeds, Biofertilizers and seed cubes.	Karamadai.	30
16	Uses of honeybee and its products, Vermicompost preparation, Sugarcane red rot, paddy stem borer, Potassium deficiency and leaf roller in rice, Sugarcane stem borer and iron deficiency, Banana anthracnose and sigatoka management	Gobichettipalayam	14
17	Awareness on drip irrigation	Gobichettipalayam	25

18	Major crop pests & diseases, Soil types, Traditional rice and millet varieties, Charts on jeevamurtham, NSKE , neem leaf extract.	Gobichettipalayam	15
19	Integrated farming system (IFS) and also promoted the TNAU vegetable booster	Gobichettipalayam	13
20	IFS and farm resource management models	Gobichettipalayam	10
21	Village development Plan, Apiary model, Sericulture model, Disease and pest attack reference, Indigenous knowledge, Organic formulations, Scientific technologies.	Thondamuthur	25
22	IOT based model (Seed sowing machine), Indigenous technology, IFS, Jeevamirtham mixer, Pachakavya demonstration, Pseudo stem injection, Corm Injection, Hebarium, Organic inputs, Charts(seed sowing machine, diseases, pests, deficiency symptoms, Schemes)	Alandurai, Thondamuthur	40
23	Village development model, Low-cost technology in organic farming, Value added products, Preparation of banana leaf Halwa &Coconut flour, Farmers round table discussion	Thondamuthur	20
24	Sericulture rearing model, Coconut hybridization "Netta kutta", Onion storage, Soil Solarization, Onion root rot management, Rhinoceros beetle management castor cake, crop rotation, Herbarium, Matrix chart.	Thondamuthur	32
25	Zero energy cool chamber, mushroom unit, PRA map, Resource map, Diseases and pest herbarium, Year of millets.	Thondamuthur	15
26	IFS model, Madvarayapuram village model, green shade net, Specimens on crop diseases, Coconut coir mulching	Thondamuthur	
27	Nutri seed pack on tomato, Root feeding in coconut Preparation of agarbatti from waste flowers, <i>Chrysoperla</i> egg cards	Thondamuthur	40
28	Hydroponics, Vermicompost, Solar cabinet dryer, Plastic mulch.	Thondamuthur	25
29	IFS model	Thondamuthur	30
30	Parthenium compost, Sericulture & sericulture unit, Shadenet for horticultural crops, Indigenous technology, Narasipuram Village map, Management for Rhinoceros beetle, Drone and its uses in agriculture, Charts (Panchakavya,Jeevamirtham, Pests in onion and bhendi)	Thondamuthur	15
31	Jeevamurthum preparation and vegetable trap working	Pathanamthitta, Kerala	25
32	IFS Model, Charts on <i>Pseudomonas</i> , Conoweeder and Drum seeder)	Kottayam, Kerala	20
33	KVK model, Drone Spraying at Chenkal Paddy Field.	Thiruvananthapuram, Kerala	18
	Total		809



Exhibitions and Awareness Programmes



15.2.2 Sustainably farmed food on campus.

The campus produces sustainable farmed food on campus by growing organic greens in 0.75 acres. Greens such as amaranthus, coriander and spinach are cultivated using the organic input such as cowdung, cow urine, vermi-compost, panchagavya, dasagavya, and 3G extract. Azolla is also cultivated in the coconut farm to enrich soil and to be used as poultry feed. Besides two units of biocontrol agents production, biofertilizer production, vermicomposting units, and mushroom cultivation contribute to SDG 15 through efficient recycling of farm waste.

Students' Involvement in Organic Greens Production Plot



Azolla cultivation

Azolla is cultivated in 5 silpaulin bags (7' x 4' x 1') and 20 cement rings (Length- 2', Breadth- 4'). Native soil, cow dung and neem oil cake are used as substrates and nutrients. The harvested azolla is used as a poultry feed.

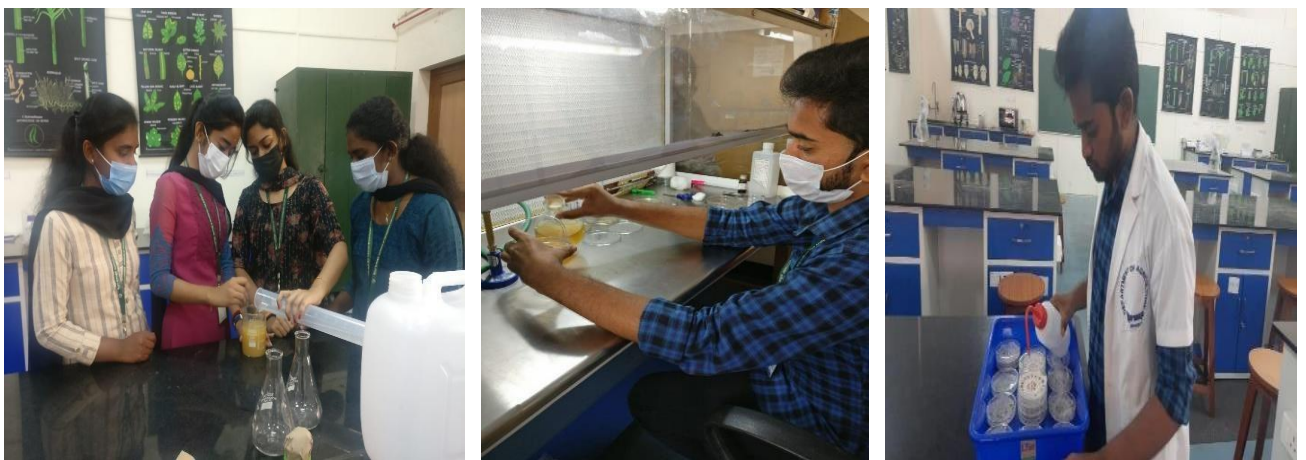




Harvesting azolla for using as a manure and poultry feed



Preparation of Panchagavya for organic cultivation in KITS farm



Students' Involvement in Preparing Media and Formulation of Biocontrol Agents



Liquid Formulation of biocontrol agent *Bacillus subtilis* for integrated disease management in KITS farm



Nutrition Garden established in KITS farm

Student READY/ Inplant-Training/ Internship/ Experiential Learning Programme (ELP)

Furthermore, the Experiential Learning Programme (20 credits) provide students an excellent opportunity to develop entrepreneurial skills through hands-on experience, confidence in their ability to design and execute enterprises and projects leading to a sustainable livelihood. Through eleven modules, 341 students were trained to initiate their own entrepreneurial activities.

Module No.	ELP Modules	Number of Students
ELP 01	Seed Production Technology	16
ELP 02	Soil, Plant and Water Testing Services	4
ELP 03	Organic Production and composting	140
ELP 04	Commercial Floriculture and Landscaping	51
ELP 05	Commercial Nursery Management and Protected Cultivation	150
ELP 06	Production Technology for Bio agents and Bio fertilizer	18
ELP 07	Mushroom Cultivation Technology	190
ELP 08	Commercial Beekeeping	39
ELP 09	Agribusiness Management	47
ELP 10	Agricultural Information Support Services	15
ELP 11	Poultry Production Technology	134



ELP 01 - Seed Production Technology



ELP 02 - Soil, Plant and Water Testing Services



ELP 03 - Organic Production Technology



ELP 04 - Commercial Floriculture and Landscaping



ELP 05: Commercial Nursery Management and Protected Cultivation



ELP 06 - Production Technology for Bioagents and Biofertilizers



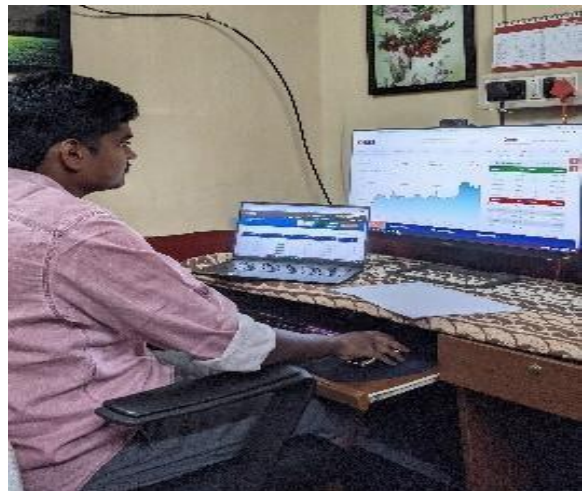
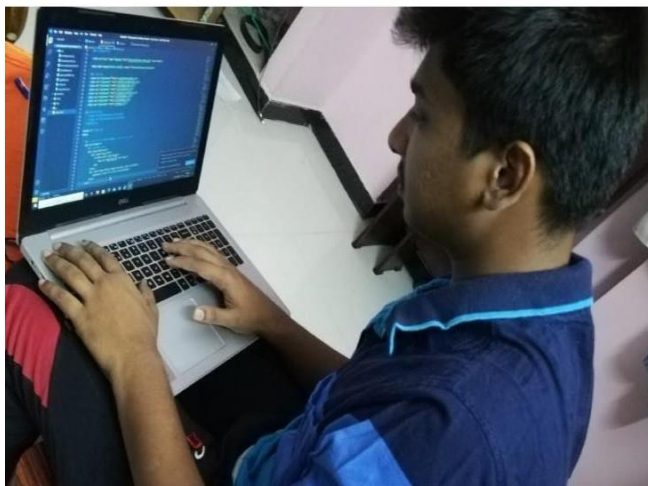
ELP 07 Mushroom Cultivation Technology



ELP 08 - Commercial Beekeeping



ELP 09- Agribusiness Management



ELP 10 - Agricultural Information Support Services



ELP 11 - Poultry Production Technology

Products Developed by Students under each ELP Module

Module No.	Module	Products Developed
ELP 01	Seed Production Technology	Good quality seeds of popular varieties of Green gram, fodder sorghum, Pearl millet, Greens etc.
ELP 02	Soil, Plant and Water Testing Services	Soil health card to farmers for soil testing
ELP 03	Organic Production Technology	Bhendi, Palak, Amaranthus, Cowpea, Lablab, using self-made Organic manures, Panchagavya and Biofertilizers like Azolla.
ELP 04	Commercial Floriculture and Landscaping	Ornamental flowers, cut flowers, fresh flowers, ornamental plants, Potpourri of different sizes, Peepal leaf art.
ELP 05	Commercial Nursery Management and Protected Cultivation	Medicinal plants -Tulsi, Coleus and value added products - Lemon grass blended tea powder, vetiver, senna and tulsi powders
ELP 06	Production Technology for Bioagents and Biofertilizer	Biofertilizers like <i>Azospirillum</i> , <i>Bacillus subtilis</i> , Bio control agents like egg parasitoids, larval parasitoids, biofungicides – <i>Trichoderma viridae</i>
ELP 07	Mushroom Cultivation Technology	Oyster mushroom, Button mushroom
ELP 08	Commercial Beekeeping	Honey
ELP 09	Agribusiness management	Creation of Digital Marketing Skills, Website and Product marketing.
ELP 10	Agricultural Information Support Services	Creation of Digital Marketing Skills, Website and Product marketing.
ELP 11	Poultry Production Technology	Broiler Chicken, Meat

15.2.3 Maintain and extend current ecosystems' biodiversity

Veterinary Clinic

Two faculty members, Dr. M. O. Kurien (Professor) and Dr. Pran (Assistant Professor) of the Division of Animal Sciences are approved practitioners' as per the Veterinary Council of India.

Actions are being initiated to establish a veterinary hospital to cater to the needs of the rural community. The Veterinary professionals conduct awareness programmes on livestock management in the neighboring villages and hamlets. Apart from this KITS is having an animal husbandry unit, hosting an ox, 5 cows, 3 calves and 12 goats.

The Hatchery Unit

Two Hatchery Units, one attached to the farm and the other attached to the veterinary lab are located in the north instructional farm. Each incubator (YESAM Incubator) has an incubation capacity of 120 eggs and is fully automated. Both duck and chick eggs are used in the hatchery. This is strictly for academic purpose and has not been put on a commercial scale.

15.2.4 Educational programme on ecosystems

The instructional farm spanning over 329 acres includes a North farm of 129 acres and a South farm of 200 acres (150 acres for field crops and 50 acres under agro-forestry). A state of art polyhouse, green house, mist chamber, B class centralized meteorological observatory, veterinary unit and field classrooms are located in the north farm. A butterfly garden, medicinal garden and rose garden spread over two acres are used for live demonstrations. A large expanse of land is also available for the cultivation of a variety of field and horticultural crops. Separate blocks of mango, banana, sapota, grapes, guava, dragon fruit, moringa, curry leaf and various underutilized and under exploited fruits for instructional purposes are being maintained. Coconut based intercropping, mixed cropping and mixed farming models are also being practiced.

In Horticulture, hands-on-training is given on propagation techniques, nursery bed preparation, hi-tech nursery production, nursery management techniques, preparation of main field, irrigation channels, production technology and breeding of fruits, vegetables, flowers, spices, plantation crops, medicinal and aromatic plants, lawn setting, landscape design, bouquet preparation, flower arrangements and bonsai.

In Plant Breeding and Genetics, students are exposed to techniques such as selection and hybridization, and dormancy breaking techniques, seed pelleting and priming methods in seed science and technology.

In Crop Physiology, students are hands-on-training on identification of nutritional disorders and deficiencies, and in Soil Science and Agricultural Chemistry, they learn from collection of soil samples, determination of soil colour to estimation of soil organic carbon content, analysis of major and micro nutrients.

Crop protection deals with the identification of diseases, collection of disease affected plant specimens, preparation of fungicide spray solution, mushroom cultivation, production of bio-control agents and application, classification, and use of pesticides. In Entomology, studies start with insect anatomy, collection of pests from field and horticultural crops, their control, preservation, display and storage of insects, identification of predators and parasitoids.

In Agronomy, the field classes cover identification of various field crops, improved varieties, introduction to general meteorology, field meteorological observatory, integrated farming systems, identification of weeds and their control, cultural practices and crop production aspects of lowland and upland rice production. Further, in the Veterinary and Animal Sciences course, poultry and livestock management are taught in general.



Intercropping: Coconut +Cocoa



Guava Instructional Farm



Grapes Instructional Farm



Fruits Demonstrational Orchard



Turmeric Block



Cucurbit Block



Mango Instructional Block



Moringa Block

15.2.5 Sustainable management of land for agriculture and tourism (educational outreach)

KITS being situated in the lap of Western Ghats, is a habitat for diverse insects, birds (both resident and migratory), indigenous and exotic plant species including medicinal herbs, and a host of invertebrates and vertebrates. With an immense interest to conserve the biodiversity, considerable effort has been taken for afforestation, establishment of ornamental and herbal gardens, conservation of germplasm for indigenous millets and rice, creation of farm ponds, installation of polyhouse and greenhouse for protected cultivation and preservation of underutilized plant genetic resources.

Rose Garden

Rose garden was established with the aim to impart knowledge to the B.Sc (Hons) Agri students about the different types of roses, their cultivation and their utility in cut flower and perfume industries. The total area of the garden is 70 cents wherein seven kinds of roses namely Miniature, Floribunda, Hybrid Tea, Grandiflora, Polyantha, Climbing and Edward roses are raised for academic demonstrations.



CELESTIAL NIGHT ROSE



CIFA GOLD



COCONUT ICE



POLIANTHA



SENTIMENTAL ROSE



TAJMAHAL ROSE

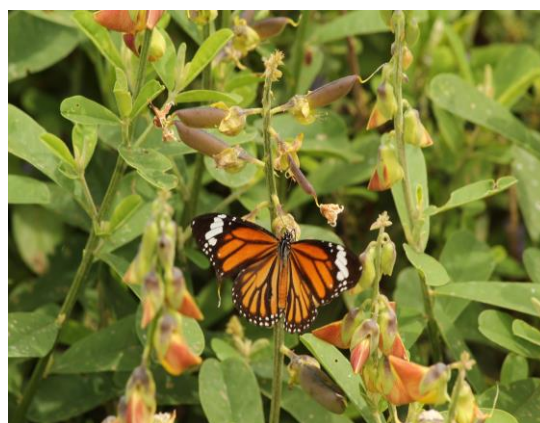
Butterfly Garden

In KITS Butterfly Garden, one can witness native butterflies hovering in the open landscape. The different butterfly species identified in KITS butterfly garden are given below:

List of Butterfly Species in KITS

S.No	Common name	Scientific name
NYMPHALIDAE		
1	Common crow	<i>Euploea core</i>
2	Plain tiger	<i>Danaus chrysippus</i>
3	Striped tiger	<i>Danaus genutia</i>
4	Blue tiger	<i>Tellervo limniace</i>
5	Common evening brown	<i>Melanitis leda</i>
6	White fourring	<i>Ypthima ceylonica</i>
7	Tawny coster	<i>Acraea violae</i>
8	Blue pansy	<i>Junonia orithya</i>
9	Grey pansy	<i>Junonia atlites</i>
10	Yellow pansy	<i>Junonia hierta</i>
11	Chocolate pansy	<i>Junonia iphita</i>
12	Lemon pansy	<i>Junonia lemonias</i>
13	Great eggfly	<i>Hypolimnas bolina</i>
14	Danaid eggfly	<i>Hypolimnas misipus</i>
15	Common baron	<i>Euthalia aconthea</i>
16	Common castor	<i>Ariadne merione</i>
17	Common leopard	<i>Phalanta phalantha</i>
18	Common fourring	<i>Ypthima huebneri</i>
PAPILIONIDAE		
19	Common bluebottle	<i>Graphium sarpedon</i>
20	Tailed jay	<i>Graphium agamemnon</i>
21	Common Mormon	<i>Papilio polytes</i>
22	Lime butterfly	<i>Papilio demoleus</i>

23	Common rose	<i>Pachliopta aristalochiae</i>
24	Crimson rose	<i>Pachliopta hector</i>
25	Southern birdwing	<i>Triodes minos</i>
	PIERIDAE	
26	Common grass yellow	<i>Eurema hecabe</i>
27	Common emigrant	<i>Catopsilia pomona</i>
28	Common gull	<i>Cepora nerissa</i>
29	Common jezebel	<i>Delias eucharis</i>
	LYCAENIDAE	
30	Many tailed oakblue	<i>Tadhuka multicaudata</i>
31	Guava blue	<i>Virachola isocrates</i>
32	Banded blue pierrot	<i>Discolampa ethion</i>
33	Silver forget me not	<i>Catochrysops panormus</i>
34	Forget me not	<i>Catochrysops strabo</i>
35	Peablu	<i>Lampides boeticus</i>
36	Gramblue	<i>Euchrysops cnejus</i>
37	Plains cupid	<i>Edales pandava</i>



Danaus genutia



Tellervo limniace



Euploea core



Overview of butterfly garden

Medicinal Garden

Indigenous and Herbal medicine is one of the 25 technology missions of KITS. The medicinal garden spans across an area of 70 cents housing 15 tree species, 10 shrubs, 15 climbers and 40 annuals. The medicinal plants are broadly grouped into various categories such as anti-cancerous, anti-asthmatic, anti-analgesic, anti-inflammatory, anti-diabetic, skin care, insect bites, hair care, gastrointestinal disorders, liver and kidney functioning. The ambient climatic conditions in KITS provide good growth conditions for the medicinal plants, thus increasing the scope to collect and conserve more plants in the years to come.



Coleus zeylanicus



Cerpogia sp.(Frog fruit)



Gymnema sylvestre



Lawsonia inermis (Henna)



Acalypha indica



Hibiscus rosasinensis



Alpinia galanga



Justicia adhatoda



Asparagus sp



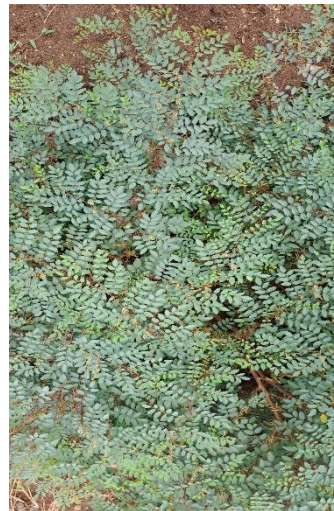
Solanum trilobatum



Leucas aspera



Tinospora cardiophylla



Indigofera tinctoria

Farm Management

An implement shed has been developed in the North Farm of KITS which displays the farm implements useful for farm mechanization. The major implements include: tractor, paddy reaper for harvesting of paddy crop, power tiller and other primary /secondary tillage implements for weeding and threshing. The shed also acts as the instructional unit in which students get familiarized with different implements and learn the working principle and know the functional parts of all the implements.

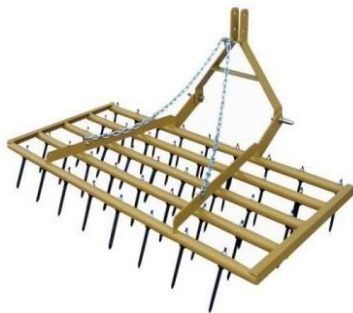


Cut Model of Tractor

Farm Machineries for Sustainable Management of Land Ecosystem



Implement Shed in KITS



Implements for Primary Tillage



Sowing Implements

***Harvesting & Threshing
Machineries***



15.3 Supporting land ecosystems through action

KITS is maintaining more than 75% of green cover area and open unutilized landfills zone after building construction as per the guidelines of World Green Building Council, Indian Green Building Council, Environmental Regulations and Compliances.

15.3.1 Sustainable use, conservation and restoration of land (policy)

The policy on sustainable use, conservation, and restoration of land encompasses various measures including the implementation of rainwater harvesting systems, designing landscapes, and controlling soil erosion. It also involves the operation of water irrigation, utilizing methods like drip and sprinkler Irrigation. The professional execution of all these ecological plans on the campus is entrusted to organizations such as Eco clubs, Nature clubs, Forums, SSL, NCC (National Cadet Corps), and NSS (National Service Scheme). According to the policy,

- Rainwater harvesting structures and recharge wells have been commissioned in the campus at different locations.
- KITS campus has very good landscape design with zero disturbance to the natural vegetation.
- Being a green campus, water conservation methods are being efficiently practiced in KITS. Well planned irrigation structures such as sprinklers and drip are installed in the entire farm lands to increase the water use efficiency.
- With an immense interest to conserve the biodiversity, considerable effort has been taken for afforestation, establishment of ornamental and herbal gardens, conservation of germplasm for indigenous millets, creation of farm ponds, installation of polyhouse

and greenhouse for protected cultivation and preservation of underutilized plant genetic resources.

Sustainable Use and Land Restoration



Rain Water Harvesting System in KITS



Landscape Design and Soil Erosion Control



Drip Irrigation System in KITS to Increase Water Use Efficiency

Germplasm Collection and Conservation of Little Millet (*Panicum sumatrense*)



CO 4 Samai
IS- Arched
PC- Intermediate



Paakulumkarunsamai
IS- Arched
PC- Compact



Chittansamai
IS- Diffused
PC- Open



Kolunthanasamai
IS- Diffused
PC- Open



Kothusamai
IS- Arched
PC- Intermediate



Kottatharasamai
IS- Diffused
PC- Open



ATL 1
IS- Diffused
PC- Open



Sirusamai
IS- Diffused
PC- Open



Vellaisamai
IS- Globose, elliptic
PC- Compact



Periyasamai
IS- Arched
PC- Compact



Jawadhu local samai
IS- Diffused
PC- Open



Perungolaisamai
IS- Arched
PC- Intermediate

*IS: Inflorescence shape; PC: Panicle compactness



ATL 1 (light brown)



Kolunthana samai (Brown)



Chittan samai (Brown)



IR 20 samai (light brown)



Kottathara samai (Brown)



CO 4 samai (Grey)



Vellai samai (Brown)



Periya samai (Golden yellow)



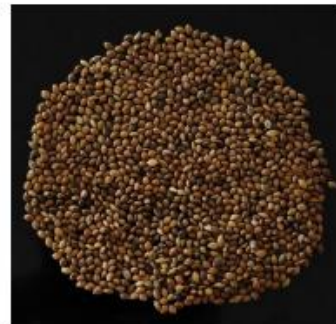
IR 8 samai (light brown)



Siru samai (light brown)



Kalman samai (brown)



Kothu samai (brown)



Paakulam karunjamai (Dark grey) Jawadhu local samai (light brown) Perungolai samai (Brown)



Kochamai (Golden yellow) Perunsamai (Brown)

Cultivation of Rare and Exotic Vegetables in Polyhouse





Conservation of underutilized fruit trees in KITS (Passion Fruit – *Passiflora edulis*)



Role of Eco club, Nature club, Associations, Cells, Forums, NCC and NSS bodies in Green Campus initiatives

KITS has well developed students' voluntary bodies such as NCC, NSS, Swachh Bharath Abhiyan under Clean India Mission. These bodies are actively involved in tree planting programmes and cleaning the surrounding areas of rural and urban people across Coimbatore city.

Best practices followed on Green Campus initiatives in KITS

1. KITS is maintaining more than 75% of the greencover area after building construction as per the guidelines of World Green Building Council and Indian Green Building Council to provide a healthy environment and ecofriendly atmosphere to the stakeholders.
2. The campus is located in the foot hills of the Western Ghats which provide pure atmosphere to the stakeholders under natural environment, topology, landscape and no soil erosion. The campus is established without disturbing the natural vegetation along with the artificially created topography like pathways and parking areas.
3. Centre for Extension is established by the KITS to enhance non-academic activities and outreach programmes among the students in which all the students have to earn non-academic credits from their involvement in the non-academic activities.
4. KITS has several Clubs such as Nature Club Aqua Unit, Nature Club Environment Unit, Nature Club Green Campus Unit, Nature Club Solid Waste Management Unit, Nature Club Wastewater Treatment Unit, Youth Red Cross Club, Community Health Services Club, Rotaract Club, Leadership & Management Club, Nature Journalism Club, Nature Astronomy Club, Food & Nutrition Club, Nature Photo & Video Club, Science & Faith Dialogue Club, Red Ribbon Unit, Women Empowerment Club towards extension / non-academic activities to strengthen campus community connection with a view to reach out to the underprivileged and marginalized in the society through action oriented interventions and social initiatives.
5. KITS has taken smart initiatives towards creating a Green campus in the areas of green computing and waste management. The desktop infrastructure is virtualized through VMWare virtualization technology.
6. As a biodiversity rich spot, KITS more than 1500 species of flora and fauna belonging to 52 plant families and 55 birds and insect families which covers trees, herbal plants, shrubs, climbers, lianas, twiners and lawns.
7. The KITS Management has established rainwater harvesting models to recharge wells by collecting rainwaters from the building roofs, open areas and playgrounds including unexplored areas which are channelized to flow of rainwaters to increase the ground water level. KITS has a roof top rain water harvesting system to store the rainwater. Catchment Area : 201 sq.mts. 25000 litre tank capacity in which water stored is used for recharging the aquifers and for gardening.

8. The campus has a maximum number of more oxygen producing and carbon-di- oxide absorbing plants such as *Areca* Palm, Money plant, Neem tree, Arjun tree and Pongam trees including some of the shrub and herbal plants.

15.3.2 Monitoring IUCN and other conservation species (policies)

The commonly available native as well as wild plant species in KITS are Neem (*Azadirachta indica*), Amla (*Phyllanthus emblica*), Coconut (*Cocos nucifera*), Hibiscus (*Hibiscus rosasinensis*), Peacock Flower (*Caesalpinia pulcherrima*), Royal poinciana (*Delonix regia*), Pongam (*Pongamia pinnata*), Pampas grass (*Cortaderia selloana*), Portia tree (*Thespesia populnea*), Star Gooseberry (*Phyllanthus acidus*), Henna (*Lawsonia inermis*), Guava (*Psidium guajava*), Assyrian plum (*Cordia myxa*), Red lucky seed (*Adenantha pavonina*), Asna (*Terminalia elliptica*), Mastwood (*Calophyllum inophyllum*), Arjun tree (*Terminalia arjuna*), Star Gooseberry (*Phyllanthus acidus*), Pala indigo plant (*Wrightia tinctoria*), Maramalli (*Millingtonia hortensis*), Magizhambho (*Mimusops elengi*), Murungai (*Moringa oleifera*), Iyal vagai (*Peltophorum ferrugineum*), Nettilingam (*Polyalthia longifolia*), Sorgamaram (*Simarouba glauca*), Manja arali (*Stenolobium stans*), Naval (*Syzigium jambolanum*), Vasantha rani (*Tabebuia rosea*), Tekku (*Tectona grandis*), Marudhu (*Terminalia arjuna*) and Puvarasu (*Thespesia populnea*).

The visiting and living birds in the campus are Peacock (*Pavo cristatus*), Crow (*Corvus splendens*), Pigeon (*Columba livia domestica*), Woodpecker (*Dendrocopos pubescens*), Owl (*Tyto alba*), Hen (*Gallus domesticus*), Sparrows (*Passer domesticus*), Myna (*Acridotheres tristis*), Vulture (*Gyps indicus*), Eagle (*Clanga clanga*), Parrot (*Haliaeetus albicilla*), Finch (*Haemorhous cassinii*), Swan (*Cygnus olor*), Pelican (*Pelecanus onocrotalus*), Common babbler (*Argya caudate*), Jungle Babbler (*Turdoides striata*), Garden lizard (*Calotes versicolor*), Butterfly (*Euploea core*), Squirrel (*Sciurus sp.*) and Carpenter ants (*Camponotus sp.*).

KARUNYA UNIVERSITY
(Karunya Institute of Technology and Sciences)
(Declared as Deemed-to-be-University under section-3 of the UGC Act, 1956)
KARUNYA NAGAR, COIMBATORE – 641 114

Dr. E. J. James
Officiating Vice-Chancellor

KU/VC/00/ 53 /2013
June 24, 2013

OFFICE ORDER

Sub: Establishment of Centre for Conservation and Management of Natural Resources

Considering the importance of natural resource management, especially the conservation of water, energy and food, and also treatment of solid and liquid waste in the campus, a Centre for Conservation and Management of Natural Resources is established with immediate effect.

The main purpose of the Centre is to develop and sustain an eco-friendly green campus and to conserve the flora and fauna as well as other natural resources in the most effective manner in the campus, thereby contributing to sustainable development of natural resources envisaged in MDG of the UN. This initiative is also important in the context of global warming and of climate change.

The major functions of the Centre are:

1. Conservation of water resources within the campus
2. Practicing renewable energy within the campus
3. Conducting water and energy audits
4. Waste water treatment leading to recycling and reuse
5. Planting indigenous trees of the Western Ghats in the campus
6. Advising the Construction and Management Department on environment friendly practices
7. Introducing precision farming practice

The Centre will be functioning under the guidance of Science and Engineering Departments which will nominate one faculty member each to serve in the Centre. The implementation of the plans will be carried out by the Construction and Maintenance Department.

Necessary funds will be made available by the Finance Section depending upon the requirements from time to time.


E. J. JAMES
13/06/24

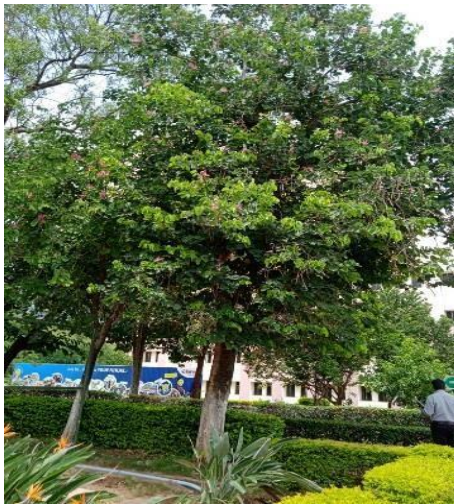
To

1. Registrar
2. Directors of Schools
3. Finance Officer
4. Chief Engineer

KITS Policy for Conservation of Natural Resources

15.3.3 Local biodiversity included in planning and development

Within the KITS campus, a majority of the plant species (approximately 85%) are either wild or native. The remaining 15% comprise ornamental plants. Notably, the campus hosts a significant number of plants that excel in producing oxygen and absorbing carbon dioxide. Two distinctive examples of these plants are the snake plant, scientifically known as *Sansevieria zeylanica*, or colloquially as the mother-in-law's tongue, and the Gerbera Daisy (*Gerbera jamesonii*). These plants possess a unique ability to generate oxygen during the night and contribute to air purification by removing various harmful gases from the atmosphere. Furthermore, the KITS campus is abundant with plants like the Areca Palm, which are highly efficient in oxygen production and carbon dioxide absorption. Other plant species include Money plant, Neem tree, Tamarind tree, *Ficus*, Bamboo, Arjun tree, Magizhambou, Marudhu, Maramalli, Nettilingam, Manja arali, Puvarasu and Pongam trees.



Plant species for air purification in KITS

15.3.4. Alien Species Impact Reduction (Policy)

In KITS, alien or invasive plant species are prevented from the first point itself to encourage the native biodiversity. No exotic plant species are permitted inside the campus premises without proper authentication and clearance from quarantine (KITS policy).

15.4 Land sensitive waste disposal

15.4.1 Water discharge guidelines and standards

KITs have installed adequate number of STPs in different locations inside the campus to treat the waste water as per the guidelines of Tamil Nadu Pollution Control Board. Three biogas plants are specifically designed to treat the wastewater from the toilets in both the Ladies' and Gents' hostels (Hebzipha & Angelina, FDR, and Bethany). This process results in the production of 114 kilograms of cooking gas daily, which is equivalent to the output of six standard commercial gas cylinders. This biogas is effectively utilized in the hostel kitchen. The residual material from the

biogas plant is directed to Sewage Treatment Plants (STPs) for further processing, after which it is repurposed for irrigation and gardening purposes.

Furthermore, the greywater originating from the kitchen facilities in the residences undergoes treatment in four separate Sewage Treatment Plants. The sludge that is derived from these STPs is repurposed as a form of organic fertilizer. The treated effluent is then recycled for use in gardening and irrigation activities across the agricultural farm, facilitated through a network of 118 outlets.



Sewage Treatment Plant in KITS





Biogas Plant in KITS

15.4.2 Policy on plastic waste reduction

KITS show keen interest to ban use of single-use plastics in the food court and shops inside the campus. The plastic materials are replaced by degradable paper cups, plates and carry bags. Plastic ban campaigns are being conducted to create awareness among the public and students to avoid plastics in daily affairs. (Policy)

15.4.3 Policy on hazardous waste disposal (Policy)

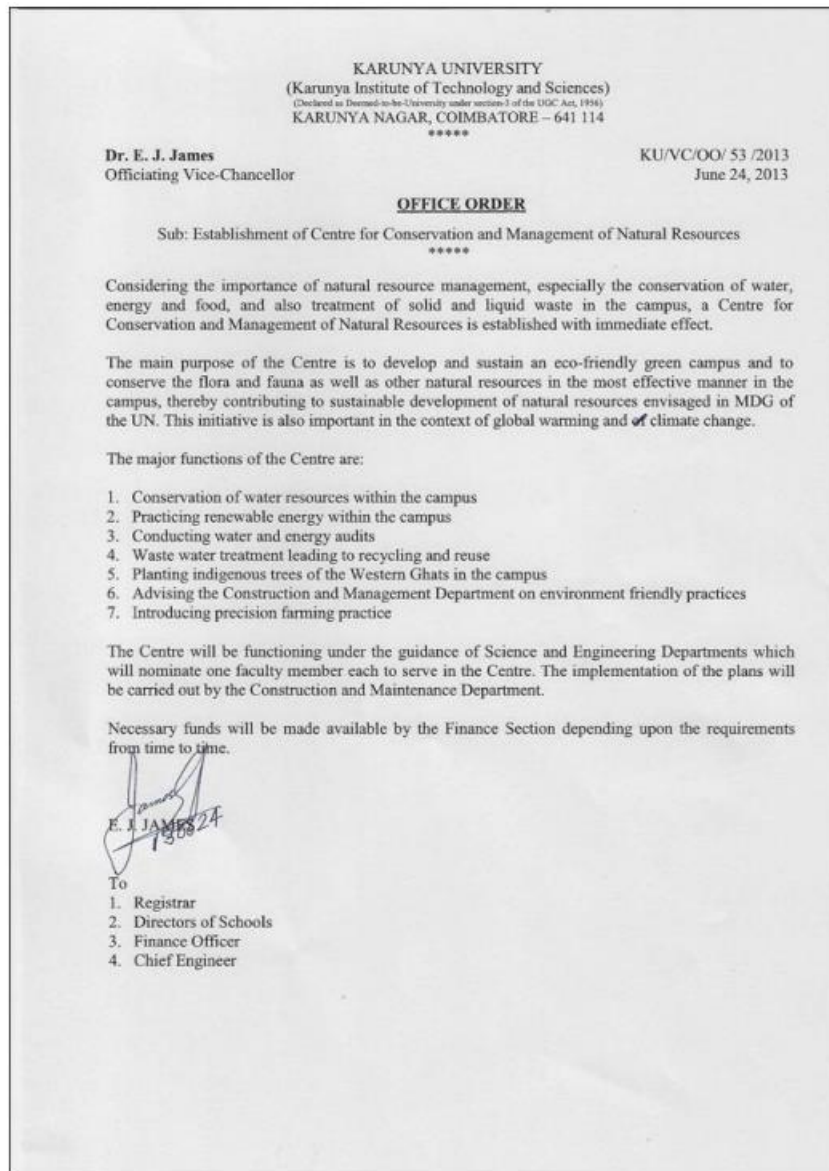
Wastes generated in and around KITS are handled in a scientific way to ensure an environment-friendly residential campus. Effective solid waste management practices are being implemented to make the campus 'Zero Garbage Zone'. The biological, chemical and recyclable wastes collected from the campus premises arising out of various activities, such as laboratory, research, farm operations, maintenance and cleaning operations at the University level are disposed-off safely following the Central and State Government guidelines for waste disposal.

Segregation and Collection of wastes generated in the campus

For the purpose of segregation of waste at source and collecting the same, "Waste Bins" are kept at designated locations in the University campus, Residences and Quarters. The wastes generated from laboratories, class rooms, administrative offices, research fields, farm and hostels are segregated as *degradable* and *non-degradable* waste. The degradable waste is composted and non-degradable is disposed of to the treatment plant of the Municipality.

The chemical wastes generated from KITS laboratories (from minimum to maximum level) are being properly disposed according to the procedure followed for laboratory waste management. Moreover, in each and every lab, posters on chemical waste disposal mechanism are displayed so that it can be adopted by the students. Degradable wastes and biological plant samples generated in the laboratories are disposed by composting. Chemical waste generated during practical classes and research analysis is in less quantity, and is diluted in water and disposed through drainage channel. The laboratories of KITS do not use

radioactive materials.



Conclusion

In the three decades of service to higher education, KITS has made significant progression in teaching learning, research and consultancy, innovation and transfer of technology, community service and value education to its valuable stakeholders. Realizing the critical importance of healthy terrestrial ecosystems for biodiversity, climate regulation, human well-being, and sustainable development, KITS emphasizes the interaction of all forms of life on land. Also KITS management underscores the need for responsible stewardship of natural resources in the western foot hills which may lead to a green campus providing a sustainable environment to the stakeholders.

SDG 16 - "Peace, Justice, and Strong Institutions"

Sustainable Development Goal 16 (SDG 16) is a cornerstone of the United Nations' global sustainability agenda, focused on promoting peaceful, just, and strong institutions. This report delves into the multifaceted role of Karunya Institute of Technology and Sciences (KITS) in advancing SDG 16, particularly through education, research, and community engagement. It highlights the ways in which institution contribute to peace, justice, and the establishment of strong institutions, providing insight into the profound impact of higher education on the global pursuit of a more equitable and just world. KITS, as a knowledge centre is uniquely positioned to play a pivotal role in advancing this mission as articulated in SDG 16.

16.1 Research on Peace and Justice: KITS is committed to fostering a research-driven environment that aligns with the United Nations SDG, thereby promoting peaceful and inclusive societies for sustainable development, providing access to justice for all, and building effective, accountable, and inclusive institutions at all levels.

Faculty members have published 10 research papers relevant to SDG 16 in Scopus Indexed Journals during 2021 to 2022. Details furnished below:

S. No.	Title	Authors	Year	Scopus Source title	Volume	Issue
1	Analysis of the health, economic and environmental impacts of COVID-19: The Bangladesh perspective	Gautam, S. Setu, S. Khan, M.G.Q. Khan, M.B.	2022	Geosystems And Geo-Environment	1	1
2	The psychology of murder concealment acts	Kamaluddin, M.R. Mahat, N.A. Saat, G.A.M. Othman, A. Anthony, I.L. Kumar, S. Wahab, S. Meyappan, S. Rathakrishnan, B. Ibrahim, F.	2021	International Journal Of Environmental Research And Public Health	18	6
3	The RAIS Device for Global Surgery: Using a Participatory Design Approach to Navigate the Translational Pathway to Clinical Use	Webb, M.M. Bridges, P. Aruparayil, N. Chugh, C. Beacon, T. Singh, T. Sawhney, S.S. Bains, L. Hall, R. Jayne, D.	2022	IEEE Journal Of Translational Engineering In Health And Medicine	10	-

		Gnanaraj, J. Mishra, A. Culmer, P.R.				
4	SENTINET: a deep sentiment analysis network for political media bias detection	Yenkikar, A. Narendra Babu, C. Jude Hemanth, D.	2022	Dyna (Spain)	97	6
5	Iot based Automatic Garbage Collection for Smart Cities	Sathveek, M. Shreemanth, C. Asish, J.S. Agalayil, H.T. Thusnavis Bella Mary, I. John Paul, J.	2022	ICDCS 2022 - 2022 6th International Conference On Devices, Circuits And Systems	-	-
6	Detection of diazepam in spiked drink using thin-layer chromatography	Kamble, A. Kennady, C.J. Badiye, A. Kapoor, N.	2022	Journal Of Planar Chromatography - Modern TLC	35	5
7	Prevention of School Shooting using Neural Networks and Computer Vision	Isaac Ritharson, P. Madhavan, G. Rajeswari, M. Brindha, D.	2022	Proceedings Of The 2022 3rd International Conference On Intelligent Computing, Instrumentation And Control Technologies: Computational Intelligence For Smart Systems, ICICICT 2022	-	-
8	Deep Learning and Sign Language Models Based Enhanced Accessibility of e-governance Services for Speech and Hearing-Impaired	Eunice, R.J. Hemanth, D.J.	2022	Communications In Computer And Information Science	1666	-
9	Simulation and Modelling of BCI Based Multi-Purpose Wheelchair for Paralysed People	Sindhuja, R. Samson Isaac, J. Vijayakumar, P. Joseph, J. Samuel, A.E.A.	2021	Journal Of Physics: Conference Series	1937	1
10	Medicalization of sexuality and sexual health: A perspective review	Goyal, R. Chandran, D. Garg, K. Mohankumar, P. Gupta, S. Gautam, R.K. Chopra, H. Dhama, K.	2022	Journal Of Experimental Biology and Agricultural Sciences	10	6

16.2 University Governance Measures:

KITS recognizes the critical role of good governance in promoting sustainable development and peace, in line with the United Nations SDG. The institute is committed to implementing governance measures that are transparent, accountable, and inclusive, fostering the principles of democracy, rule of law, and respect for human rights.

Elected representation on the University's highest Governing Body

Karunya Institute of Technology and Sciences

(Deemed to be University under Sec.3 of the UGC Act, 1956)

A Christian Minority Residential Institution

Karunya Nagar, Coimbatore- 641114

Dr. Elijah Blessing, M.E., Ph.D.,
Registrar

Ref.No. KITS/IQAC/IC/4689/2021
Dated: 02.8.2021

OFFICE ORDER

Sub.: KITS - Establishment of Centre for Internal Quality Assurance Cell (IQAC) as per NAAC revised guidelines - Constitution of Internal Quality Assurance Cell - Orders issued - reg.

As per the guidelines of the National Assessment and Accreditation Council (NAAC), Internal Quality Assurance Cell for Karunya Institute of Technology and Sciences is reconstituted with the following members:

1) Chairman

1. Dr. P. Mannar Jawahar, Vice Chancellor, KITS.

2) Management Nominees

1. Dr. E.J. James, Pro Vice Chancellor (R & C)
2. Dr. Ridling Margaret Waller, Pro Vice Chancellor (QS)
3. Dr. R. Elijah Blessing, Registrar

3) Senior Administrative Officers

1. Dr. G. Prince Arul Raj, Dean - School of Engineering and Technology
2. Dr. C. Joseph Kennady, Dean - School of Sciences, Arts, Media and Management
3. Dr. Sajan Kurian, Dean - School of Agriculture and Biosciences
4. Dr. John De Britto, Controller of Examinations

4) Faculty Nominees

1. Dr. E. Grace Mary Kanaga, Computer Science and Engineering
2. Dr. D. Raveena Judie Dolly, Electronics and Communication Engineering
3. Dr. S.J. Vijay, Mechanical Engineering
4. Dr. S. Vincent Sam Jebadurai, Civil Engineering
5. Dr. P. Evanzalin Ebenanjar, Mathematics
6. Dr. J. Jenkin Winston, Electronics and Communication Engineering
7. Dr. M. Wilson Kumar, Mechanical Engineering

5) Nominee from the Local Society/ Trust, Students and Alumni

1. Dr. S. Devaraj Arumainayagam, HoD- Statistics, Govt. Arts College, Cbe.
Res.: Karunya Nagar, Coimbatore - from Local Society
2. Ms. Angeline Grace, URK18CS090 - Student Nominee
3. Ms. A. Josephine Atchaya, PRK20EC1007 - Student Nominee
4. Mr. Kevin Enoch, URK18CE003 - Student Nominee
5. Mr. J. Samuel John Peter, PRK20MS1005 - Student Nominee

6) Nominee from the Employer / Industrialists / Stakeholders

1. Dr. P. Jeyasingh, Chief Operating Officer, Jasmin Infotech, Chennai - Employer
2. Dr. L.S. Jeyagopal, Managing Director, Mithran Structures, Coimbatore - Industrialist
3. Dr. P. Sweety Jose, EEE, Dept. of PSG College of Tech, Alumna

7) Senior Teacher from IQAC

1. Dr. D. Tensing, Director - Quality Assurance and Accreditation

B

To


REGISTRAR

All the Members Concerned

- Copy to:
- 1) The Vice Chancellor
 - 2) The Pro-Vice Chancellors
 - 3) The Deans / Directors / HoDs

16.2.2 - Students' Union

Student Council and its activities for institutional development and student welfare.

Considering the importance of student participation in governance and their input for modifying and improving the overall academic and administrative processes, KITS has evolved a three-tier system consisting of a student panel of class representatives, student-mentor forum, and student assemblies.

- All class representatives constitute the Student Council. The student panel representatives meet at least once a month and provide suggestions and recommendations to the Heads of Department. The members of different panels meet twice or thrice a year and give their feedback to the management on academic, administrative and student welfare matters, which are taken up by the management on a priority basis. Apart from the executive officials of KITS, the Chancellor interacts with the student representatives once a semester and guides the officials to take action on their suggestions.
- The student committees manage important activities related to international exchange programme under IAESTE, innovation event–*MindKraft*, and other social, environmental and cultural clubs under extension activities and sport events.
- The student committees also play a major role in the halls of residences where they are actively involved in decisions pertaining to hostel events, study, food, amenities and hostel upkeep.
- These students organize special program conducted during the morning assemblies, which are attended by the entire student community.

Indicators of student involvement in institution-building and their welfare are listed below:

1. As members and coordinators in Curriculum Development Cell and Entrepreneurship Cell, their input for introduction of new and add-on courses leading to invention, innovation and incubation is well received.
2. Recommendations from students to conduct courses in cutting-edge areas by academicians from reputed universities abroad were considered favourably leading to the introduction of 3 credit courses from Technical University of Berlin and Old Dominion University (USA)
3. More than 300 students from KITS had undertaken internships / mini projects in reputed international universities / industries and 165 students from across Continents pursued their internship at KITS under IAESTE, which is managed by the student coordinators designated as Heads, Managers and Team Leaders
4. Three student groups, namely, KarunyaHacks (Technical Team), KarunyaKreatives (Design Team) and E-Cell Karunya (Entrepreneurship Team) organize Hackathons and programs on startups.
5. Suggestions from student's sports committee to upgrade sports facilities such as courts, stadiums and gymnasiums were implemented.
6. Involvement of students in the planning and implementation of skill development programmes and placement activities leading to better placement opportunities.

- Some of the student welfare activities include scholarships and fee concessions to deserving students, 'earn while you learn' opportunities, seed money for project work, international internships, incubation and start-up facilities, amenities such as uninterrupted water supply, electricity and wi-fi, digital library, state-of-art laboratories, hospital for healthcare within the campus, outdoor and indoor stadiums and gymnasiums.
- For every 15 students, there is a mentor who convenes meetings once a fortnight to address the mentee's concerns and problems. If required, the students are referred to counsellors. There is a platform 'tellus@karunya.edu' to address their grievances.

16.2.3 Identify and engage with local stakeholders.

Policy on participation of local stakeholders as experts for CDC, CCC, BoS and Academic Council (AC)

translational teaching process. Quality Improvement Programs in reputed institutions are offered to faculty members.

4. Policy Statement on Curriculum Development

4.1 Curriculum Development Bodies: The four tier academic system shall consist of a Curriculum Consultative Committee (CCC), Curriculum Development Committee (CDC), Board of Studies (BoS) and Academic Council (AC) to formulate, scrutinize, finalize and approve the curricula considering the latest guidelines of statutory and accreditation requirements. This will take into consideration the advancements in the Programs or Courses, innovations in teaching and learning process and the requirements of the stakeholders or employers.

4.1.1 Curriculum Consultative Committee (CCC): Comprises of industrial experts, eminent scientists and engineers from R&D institutions and other relevant organizations to serve as a Think-tank to provide a broader framework for Curriculum development. The Committee constituted department-wise shall meet twice in an academic year under the chairmanship of the Dean of the School.

4.1.2 Curriculum Development Committee (CDC): Comprises of the Dean of the School, Professors, Associate Professors, senior Assistant Professors and two student representatives of the Department with the Head of the Department as the Chairman. While formulating the syllabi for interdisciplinary or trans-disciplinary Courses, the faculty members with specializations in those areas from other Departments shall be co-opted. The CDC shall meet twice every year before the meetings of BoS for drafting curricula and syllabi and prepare the agenda for discussion at BoS. The advancements in each area should be reviewed at the CDC and the guidelines of UGC and other government statutory bodies concerned be referred to at the meetings.

4.1.3 Board of Studies (BoS): Comprised of Professors, Associate Professors, senior Assistant Professors from the Department and other relevant Departments (wherever inter-disciplinary or trans-disciplinary areas are covered) and six eminent external members – three of them to be present in person and three others to be available on online platforms. The constitution of six of the external members shall be: two members each from industry, academia and alumni. The major functions of the BoS are to decide on: the new Programs/Courses and activities, the criteria on credit allocation, the relevance of the objectives/outcomes /topics/case studies/ design/products/ reference materials to be included, the relevance of the program/ course/syllabi from the point of view of the advancements in the area and the guidelines of statutory bodies. The BoS shall decide on the core and elective subjects to be taught according to the guidelines of the statutory bodies and the practices followed in reputed academic institutions in India and abroad. The discussions and deliberations at the BoS are expected to be crucial in introducing the advancements in the area in the curricula and deciding the objectives and outcomes of Courses considering the Blooms taxonomy and the six levels of learning. Also, BoS shall endeavor to ensure successful functioning of the interactive mode of teaching and learning, making the process more practical, skill based and product oriented.

4.1.4 Academic Council (AC): Is constituted following the guidelines of UGC/MHRD with the Vice Chancellor as Chairman. The AC shall have 15 eminent external members – five each from academia, industry and alumni. Care shall be taken to give coverage to most of the branches and disciplines represented in KITS. Inter-disciplinary experts with wide experience also can be included as external members within the stipulated number. Apart from the external members, the Pro Vice

16.2.4 Participatory bodies for stakeholder engagement.

KITS engage stakeholders in Board of Management, Finance Committee, Planning and Monitoring Board, Academic Council, Board of Studies, and Internal Quality Assurance Cell for participating in University decision making.

KITS understands the pivotal role that stakeholder engagement plays in shaping the institution's trajectory and impact. Recognizing the importance of inclusive decision-making and collaborative partnerships, KITS has established participatory bodies such as dedicated to engaging with stakeholders from various sectors. These bodies serve as platforms for dialogue, cooperation, and collective decision-making, ensuring that diverse perspectives are considered in the institution's governance and strategic initiatives.

KITS students are attached with Farm Science Centre (KVK) under RAWE to undergo eight weeks of village attachment with farmers.

Participatory Bodies – Krishi Vigyam Kendra



Karunya Institute of Technology and Sciences
(Declared as Deemed-to-be University under sec. 3 of the UGC Act 1956)
MoE, UGC & AICTE Approved; NAAC Accredited A++; ICAR Accredited
Karunya Nagar, Coimbatore - 641114, Tamil Nadu, India.
School of Agriculture and Biosciences

KITS/DEAN/LET/01/2023
July 17, 2023

To

The Senior Scientist & Head
Krishi Vigyan Kendra,
PO. Vivekanandapuram,
Karamadai Block, Coimbatore

Sir/Madam,

Sub: Attachment of Students with Farm Science Centre (KVK) under RAWE for B.Sc (Hons.)Agricultural students–Requested-Reg

As you are aware, ours is an ICAR-accredited educational institution offering B.Sc. (Hons.) Agriculture programme following ICAR curriculum and recently accredited with the highest grade of NAAC A++. We gratefully acknowledge the technical relationship that we have envisaged through a MoU signed recently. We are thankful for the technical help that your team rendered to our agri-RAWE students during the last few years.

Now again, as part of the ICAR course curriculum, B.Sc. (Hons.) Agriculture students have to undergo 8 weeks of village attachment with farmers from 21st July to 20th September 2023 and a maximum of 5 weeks of KVK / NGO / Research Station attachment from 21st September to 28th October 2023 at your KVK under Rural Agriculture Work Experience (RAWE).

Now again, as part of the ICAR course curriculum, B.Sc. (Hons.) Agriculture students have to undergo 8 weeks of village attachment with farmers from 21st July to 20th September 2023 and a maximum of 5 weeks of KVK / NGO / Research Station attachment from 21st September to 28th October 2023 at your KVK under Rural Agriculture Work Experience (RAWE).

As per our arrangements, we would like to place our 83 RAWE students (List enclosed) at your KVK for studying farmers and farms. We hereby request you to engage the students in your activities as part of the programmes of KVK. Towards this endeavour, you may provide the students with some tasks with farmers/others to perform to advance your mandate.

We remain grateful for your co-operation and support.

A line of confirmation for the same would be helpful.



Prof. Dr. Sajan Kurien
DEAN

Encl: RAWE students details





30.9.2024

தமிழ்நாடு திமிலநாடு



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சா.ப.அ. முகவிரககான்
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காண்டாபுத்தூர் (கா.வ. கட்டுநாடு)
உரிம எண்: 16482/உ.1/95

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MoU) is made and executed on this 15th day of February 2023, at Gobichettipalayam.

Between

Karunya Institute of Technology and Sciences, Karunya Nagar, Coimbatore-641114, having its registered office at Karunya Nagar, Coimbatore - 641114 represented by Prof. Dr. R. Elijah Blessing, Registrar, hereinafter referred to as "SAS- KITS" which expression wherever it occurs, shall mean and include the representatives, administrators, successors in interest, assign etc.

and

ICAR- Krish Vigyan Kendra, MYRADA which operates under the policy guidelines of Indian Council of Agricultural Research having its District office at Gopichattipalayam taluk, Erode district hereinafter referred to as "ICAR, KVK-Gobichettipalayam" and represented by Dr P Alagesan, Senior Scientist and Head, which expression wherever it occurs, shall mean and include the representatives, administrators, successors in interest, assign etc.

WHEREAS SAS – KITS (established under Sec.3 of the UGC Act, 1956) is catering to the academic excellence, research in solving human problems in the area related to Water, Food,

Health & Sustainable Energy and community outreach needs of the region and possesses the state of the art equipment and laboratory facilities besides highly qualified and skilled personnel.

WHEREAS the KVK, hosted by (Name) Trust, hereinafter referred to as ICAR, KVK- **Gobichettipalayam** is a Farm Science Centre having operational jurisdiction in Erode district, which is functioning as the knowledge and resource centre of agricultural technology with excellent infrastructure, scientific personnel and dedicated towards extension activities in the efficient fields of Agriculture and Rural Development.

WHEREAS SAS – KITS and ICAR, KVK- **Gobichettipalayam** are desirous of collaborating with each other in Student Teaching and Extension Education focusing, among others, various components of the STUDENT READY Programme of village attachment, KVK / NGO attachment, research station, Agro Industry attachment and training on any another subject such as Crop Management, Plant Protection, Soil Water Management, Farm Mechanization, Secondary Agriculture, Organic Farming and Horticulture involving innovative technologies in Agriculture like Soil and Water Management, Farm Mechanisation, Secondary Agriculture, Organic farming etc.

AND WHEREAS both SAS – KITS and ICAR, KVK- **Gobichettipalayam** are desirous of synergizing their capabilities by working in close cooperation in areas of topical relevance and through exchange of expertise and facilities.

NOW THEREFORE both SAS - KITS and ICAR, KVK- **Gobichettipalayam** have agreed and enter into this Memorandum of Understanding (MoU) with more specific terms of reference as explained in the succeeding paragraphs.

OBJECTIVES AND SCOPE OF THE MoU

The following are the general objectives proposed under this Memorandum of Understanding:

1. The purpose of this Memorandum of Undertaking (hereinafter "MoU") is to set out the general outline for potential future collaboration and cooperation between the parties in the identified mutual cooperation for the training of students of SAS - KITS.
2. The parties intend this MoU as a general structure under which detailed project specific agreements may be signed in future, subject to all required authorisations, approvals and procedures of each party regarding such projects.
3. The parties wish to cooperate in the core fields of training of students for RAWE, not only limited to specific domain of outreach that have been established and developed but also in such other areas as precision farming, biological control, micro-irrigation, plant biotechnology and water and waste water use.
4. It is hereby clarified that all of the aforementioned forms of collaboration are subject to written and signed contract in which the full terms of each collaboration shall be set, provided that both parties wish to enter into operation, subject to all required authorization, approval and procedures of each party, as required by their respective Institution/Organization. Further, such agreements shall be drafted so as not to contradict this MoU.
5. A core team will be identified by SAS - KITS for each of any new joint venture in the identified area.

6. Whereas in the case of all new initiatives budget/financial requirement will be committed based on the fund availability in respective institution, case to case.
7. To enrich the academic exercise with on farms educational experience of undergraduate and postgraduate students of agriculture through exchange of expertise, access to infrastructural facilities, field interventions and events.
8. To have first hand expression of Transfer of Technology to the farmers and other stakeholders mutual exchange of technical Knowhow and Do-how, expertise and promotion of joint participation in farm interventions.
9. It is further clarified that the parties acknowledge and accept that this MoU does not in itself constitute and shall not be construed as any type of collaboration, grant or commitment to license any intellectual property rights, technologies, know-how or materials. Any such license, right of use, utilisation of the aforesaid will be subject to a separate written and signed agreement between parties as detailed above.
10. To deter any manner of doubt, nothing in this MoU shall prevent either party from negotiating; concluding and/or fulfilling right of use or constitute any type of collaboration or cooperation regarding any of its technologies with any other entity.
11. All matters, queries, disputes or differences, whatsoever, arising between the parties touching the construction, meaning, operation or effect of this MoU or out of or relating to this MoU or breach thereof shall be mutually discussed between the parties and settled.
12. However institutional cost as per KVK procedure will be paid by the student/SAS- KITS as per the programme proposed (Training Program)

SPECIFIC AREAS OF COOPERATION

In order to fulfil the aforementioned objectives, the parties adhere to the following joint activities as envisaged below.

1. In student Education Domain:

- i. Mutual access to expertise, farmers' fields/project villages for Rural Agricultural Work Experience (RAWEX) of undergraduate students.
- ii. Mutual access to expertise for undergraduate students for Experiential Learning Programme (ELP) as envisaged in the ICAR Vth Deans Committee and any subsequent modifications to this effect by ICAR thereafter.
- iii. Mutual access to expertise, guest lectures and guidance in preparation of farm planning, demonstration of farmers practices, maintenance of farm record.

2. In Extension and Transfer of Technology Domain:

- i. Joint participation in agricultural knowledge dissemination interventions (Eg: Farmers' Mela, Exhibitions, Demonstration).
- ii. Sharing the expertise of resource persons for Transfer of Technology interventions like trainings to farmers and other agricultural stakeholders as agreed upon in a case by case basis.
- iii. Hands on exposure of students to collaborative projects in Extension and Capacity Building of farmers, rural women and other rural stakeholders.

3. In Support of farmers and farm science.

- i. Soil and plant analysis can be carried out using laboratory facilities at Karunya Institute of Technology and Sciences for screening the issue in soil and plant samples for nutrient deficiency of pest/disease infestation. The result will be useful for diagnosis and further advising farmers on improving productivity and making farm profits.
- ii. Scientific interpretation can be done by experts in Karunya Institute of Technology and Sciences that can be used by KVK scientists for improving advisory services.
- iii. Analytical and advisory services can be made in food processing and technology in support of secondary agriculture and entrepreneurs.
- iv. However, Institutional cost as per the existing cost fixed and is in operation for analysis will be paid by the concerned farmer/KVK as per the programme proposed "(Training Programs


GENERAL TERMS AND CONDITIONS

The following general terms and conditions of this MoU are applicable to both SAS – KITS and ICAR, KVK, - Gobichettipalayam:

- i. The undertaking of each programme of activity will be subject to availability of funds and for which material content will be obtained as and when the requirements arise and as mutually agreed upon.
- ii. The validity of this MoU is initially for a period of five years from the date of its signing, and can be extended for a defined period based on mutual consent.
- iii. The progress of the collaborative work will be reviewed periodically by a review board, which shall consist of the two faculty staff each from SAS – KITS and ICAR, KVK- Gobichettipalayam
- iv. All documents related to mutual works envisaged under this MoU on the projects and any publication arising out of the works should have joint ownership and with

prior approval from their competent authorities under the overall provisions of this MoU.

- v. Both SAS - KITS and ICAR, KVK- Gobichettipalayam will share available library and laboratory facilities and residential facilities subject to availability.
- vi. In case of any dispute in the interpretation of this MoU or any point not covered in this MoU , the matter shall be referred to the joint consideration of The Registrar – SAS - KITS and The concerned authority, ICAR, KVK- Gobichettipalayam
- vii. Either Party may terminate this MoU with 3 months notice in Advance on either side.

<p>For and on behalf of : Karunya Institute of Technology and Sciences, Karunya Nagar, Coimbatore -641114.</p> <p>Name: <i>R. R. Blessing</i> Prof. Dr. R. Elijah Blessing, M.E., Ph.D. Designation : Registrar Seal :</p> <p>Date :15/02/2023</p>	<p>For and on behalf of : ICAR, Krishi Vigyan Kendra, Gobichettipalayam</p> <p><i>P. H. Suresh</i> Name : Dr. P. Alagesan Designation : Senior Scientist & Head Seal :</p>  <p>Date :15/02/2023</p>
<p>Key Contact Person:</p> <p><i>Sajan Kurian</i> Dr. Sajan Kurian, M.Sc.(Hort), Ph.D., Professor & Dean School of Agricultural Sciences Karunya Institute of Technology and Sciences (Declared as Deemed to be University) Karunya Nagar, Coimbatore - 641114</p>	<p>Key Contact Person:</p> <p><i>P. H. Suresh</i> Dr P Alagesan, Head Krishi Vigyan Kendra, 272 Perumal Nagar, Pudukkottai Road, Kalingiyam Post, Gobichettipalayam Taluk -638453</p>



सत्यमेव जयते

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Government of Karnataka

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 Description : MEMORANDUM OF UNDERSTANDING
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 (Zero)
 First Party : KARUNYA UNIVERSITY
 Second Party : BIGHAAT AGRO PRIVATE LIMITED
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via Sree Charan Srinivasa Co-operative Bank Ltd

Authorised Signatory



Please write or type below this line

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MoU) is made and executed on 28th December 2022, at Coimbatore.

Between

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Statutory Alert:

1. The authenticity of this Stamp certificate should be verified at www.storstamp.com or using e-Stamp Mobile App of Stock Holding.
2. Any discrepancy in the details on the Certificate and its duplicate on the website / Mobile App renders it invalid.
3. The onus of checking the legitimacy is on the users of the certificate.
4. In case of any discrepancy please inform the Competent Authority.

AND WHEREAS both SAS – KITS and BigHaat Agro Pvt Ltd. are desirous of synergizing their capabilities by working in close cooperation in areas of topical relevance and through exchange of expertise and facilities.

NOW THEREFORE both SAS - KITS and BigHaat Agro Pvt Ltd. have agreed and enter into this Memorandum of Understanding (MoU) with more specific terms of reference as explained in the succeeding paragraphs.

OBJECTIVES AND SCOPE OF THE MoU

The following are the general objectives proposed under this Memorandum of Understanding:

1. The purpose of this Memorandum of Undertaking (hereinafter "MoU") is to set out the general outline for potential future collaboration and cooperation between the parties in the identified mutual cooperation for the training of students of SAS - KITS.
2. The parties intend this MoU as a general structure under which detailed project specific agreements may be signed in future, subject to all required authorisations, approvals and procedures of each party regarding such projects.
3. It is hereby clarified that all of the aforementioned forms of collaboration are subject to written and signed contract in which the full terms of each collaboration shall be set, provided that both parties wish to enter into operation, subject to all required authorization, approval and procedures of each party, as required by their respective Institution/Organization. Further, such agreements shall be drafted so as not to contradict this MoU.
4. A core team will be identified by SAS - KITS for each of any new joint venture in the identified area.
5. Whereas in the case of all new initiatives including financial cost will be settled with mutual discussion and consent.
6. It is further clarified that the parties acknowledge and accept that this MoU does not in itself constitute and shall not be construed as any type of collaboration, grant or commitment to license any intellectual property rights, technologies, know-how or materials. Any such license, right of use, utilisation of the aforesaid will be subject to a separate written and signed agreement between parties as detailed above.
7. To deter any manner of doubt, nothing in this MoU shall prevent either party from negotiating, concluding and/or fulfilling right of use or constitute any type

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of collaboration or cooperation regarding any of its technologies with any other entity.

8. All matters, queries, disputes or differences, whatsoever, arising between the parties touching the construction, meaning, operation or effect of this MoU or out of or relating to this MoU or breach thereof shall be mutually discussed between the parties and settled or settled through arbitration in accordance with the relevant Arbitration Act in force at such time. The Arbitration will be in English and Place of arbitration would be in Bangalore. In all matters concerning this MoU, requiring judicial intervention, Bangalore alone will have jurisdiction”

SPECIFIC AREAS OF COOPERATION

In order to fulfil the aforementioned objectives, the parties adhere to the following joint activities as envisaged below.

1.1 COMMITMENT FROM THE COMPANY:

- i. The company commits to provide learning opportunities to students, by way of introduction to various programmes as curated by the Company more particularly described in Schedule A to this MOU.
- ii. The Company Commits to aid and assist the students in providing various networking and employment related opportunities to students who chose to be a part of the Company's programme.
- iii. The Company commits to ensure the efforts of the students are encouraged and the students participating in the programme are reasonably compensated in monetary terms.

1.2 COMMITMENT FROM THE UNIVERSITY:

- i. The university commits to nominate its academically strong students for the programme to ensure mutual success of the collaboration.
- ii. The University commits to, use resources, including its professors for reviewing the material, content created by the Students as a part of the programme to ensure that the content created by the Students is accurate and depicts a reasonably accurate representation of the subject.
- iii. The University commits to permit its students to participate in the programme created by the Company and create a separate knowledge pool exclusively to be used by the Company.

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GENERAL TERMS AND CONDITIONS

The following general terms and conditions of this MoU are applicable to both SAS – KITS and BigHaat Agro Pvt Ltd.:

- i. The validity of this MoU is initially for a period of one year from the date of its signing, and can be extended for a defined period based on mutual consent.
- ii. The progress of the collaborative work will be reviewed periodically by a review board, which shall consist of members as per the nature of the engagement from SAS – KITS and BigHaat
- iii. All documents related to mutual works envisaged under this MoU on the projects and any publication arising out of the works should have joint ownership and with prior approval from their competent authorities under the overall provisions of this MoU.
- iv. In case of any dispute in the interpretation of this MoU or any point not covered in this MoU, the matter shall be referred to the joint consideration of The Registrar – SAS - KITS and legal representatives from BigHaat.
- v. Either Party may terminate this MoU with 1 month notice in Advance on either side.

INTELLECTUAL PROPERTY RIGHTS:

Each party shall continue to own the intellectual property developed prior to or independently of this Memorandum of Understanding. All rights, titles and interests in and to the material used by Company in the provision of the Services of this Agreement shall exclusively belong to Company or its licensors ["Company Proprietary Material"). Any and all Intellectual Property Rights with respect to the Services and the Company Proprietary Material and all modifications, improvements, enhancements, or derivative works made thereto shall always belong to the Company or its licensors and the University shall not be entitled to claim any rights therein.

EXCLUSIVITY:

The parties agree that they are not bound exclusively by this memorandum and will be at liberty to enter into any other agreements or arrangements with any third party without reference to the other party in this MOU on the similar programme.

2/2/20



CONFIDENTIALITY:

- i. During the term of this MOU, each Party may disclose to the other its Confidential Information. Confidential Information shall mean all information marked "Confidential" or under any similar legend indicating the confidentiality of the information or information which by its nature is confidential, except such information as is (a) previously known to the receiving party at the time of disclosure, or (b) independently developed by or for the receiving party and not derived from the Confidential Information supplied by the disclosing party or the participation of individuals who have had access to Confidential Information of the other, (c) disclosed to the receiving party by a third party without an obligation of confidentiality or (d) in or subsequently comes into the public domain [other than as a result of a breach of this MOU]; (e) required to be disclosed by the receiving party by law, regulation, court order or other legal process.
- ii. The receiving party shall hold such Confidential Information in strict confidence perpetually for the disclosing party and shall not use it except in furtherance of the relationship set forth in this MOU, or except as it may be authorized by the disclosing party in writing. The receiving party shall further be responsible for the compliance of the foregoing by its employees or agents. Upon the disclosing party's written request at any time, or following the completion or termination of this MOU, the receiving party shall promptly return to the disclosing party, or destroy, all Confidential Information of the disclosing party provided under or in connection with this Agreement including all copies, portions and summaries thereof.

RELATIONSHIP OF THE PARTIES:

Neither this MOU, nor any activities described herein, shall be construed as creating a partnership, joint venture, franchise, agency or other such relationship. Neither party is authorized, in any manner, to make any commitment on behalf of or to bind the other Party.







LIMITATION OF LIABILITY:

Neither party shall be liable for any indirect, incidental, special or consequential damages, or damages for loss of profits, revenue, data or use, incurred by either party or any third party in connection with this MOU or the subject matter of this MOU, whether in an action in contract

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or tort or any other legal theory, even if the party has been advised of this possibility of such damages.

<p>For and on behalf of : Karunya Institute of Technology and Sciences, Karunya Nagar, Coimbatore -641114.</p> <p> Name: Prof. Dr. R. Elijah Blessing, M.E., Ph.D.</p> <p>Designation: Registrar  Seal:  Karunya Institute of Technology and Sciences (Deemed to be University) Karunya Nagar, Coimbatore-641114</p> <p>Date : 28th December, 2022</p>	<p>For and on behalf of : BigHaat Agro Pvt Ltd.</p> <p> Name: Jitesh Shah</p> <p>Designation: Chief Operating Officer</p> <p>Seal: </p> <p>Date : 28th December, 2022</p>
<p>Key Contact Person:  Dr. Sajan Kurien, M.Sc (Hort), Ph.D., Professor & Dean School of Agricultural Sciences Karunya Institute of Technology and Sciences (Declared as Deemed to be University) Karunya Nagar, Coimbatore - 641114</p>	<p>Key Contact Person: Name – Arun Raghu Designation – Head of Marketing, BigHaat Agro Pvt Ltd.</p>

SCHEDULE A: Scope of Work

Student Assessment Program:

Students will be eligible to various rewards and recognitions based on their performance as detailed below:

Level	Output Results Per Student (Per Week)		Targets Per Student (Per Social Post)
Beginner	3 Articles	(500-600 Words)	50 Engagement/Post + 10 Link Clicks/Post
	5 Responses	(Kisan Vedika App)	-
Achievers	3 Articles	(1000-2800 Words)	75 Engagement/Post +
	1 Video	Shoot Based Video	20 Link Clicks/Post
	10 Responses	(Kisan Vedika App)	-
Ace Performers	6 Articles	(1000-2800 Words)	150 Engagement/Post +
	1 Video	Shoot Based Video	50 Link Clicks/Post
	1 Live Tutorial	Live Tutorials	-
	20 Responses	(Kisan Vedika App)	-

Based on the level of performance, the students will be eligible for the following rewards and recognition

Level	Rewards

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Beginner	Participation Certificates
Achievers	Eligible for unpaid internships
	Job Networking Opportunities
	BigHaat Certificate of Appreciation
Ace Performers	Eligible for paid internships
	Job Networking Opportunities
	BigHaat Assessment Certificates
	Monthly Stipulated Stipend

Handwritten mark in green ink.



16.2.5 University principles on corruption and bribery.

KITS has well defined policies and principles to address corruption and bribery, as these activities are not only illegal but also undermine the integrity of academic institutions. The Institute adheres to ethical standards and codes of conduct to ensure a fair and transparent academic environment.

Anti-Corruption and Bribery Policy of the Institute

Anti-Corruption and Bribery Policy

A. Introduction

Karunya Institution of Technology and Sciences (KITS) is committed to conducting its operations fairly, honestly and openly; to the highest standards of integrity; and in accordance with relevant legislation. KITS has zero tolerance on Bribery and Corruption, and believes the fight against Bribery and Corruption is in the broader interests of business and civil society. The Institution is concerned to protect its operations and reputation and its stakeholders, staff and students from the detriment associated with Bribery and other corrupt activity. It is therefore committed to preventing Bribery and Corruption/Fraud by its staff and any third party acting for or on behalf of the Institution.

B. Definitions

Bribery and Corruption are complex legal concepts and the definitions are given in schedule 1. For the purposes of this Policy, bribery and corruption have been treated as separate offences, but it should be recognised that there are circumstances in which they overlap.

C. KITS Approach to Bribery and Corruption

1. KITS will take appropriate action to prevent Bribery and all forms of Corruption in the campus.
2. No KITS employee or associated person shall seek a financial or other advantage for the KITS through Bribery. No KITS employee or associated person shall offer, promise, give, request, agree to receive or accept a Bribe for any purpose.
3. The payment or acceptance of facilitation payments or any other "kickback" by KITS employees and associated persons is unacceptable.
4. KITS has zero tolerance to Corruption within its operations, and KITS employees and associated persons must not engage in any form of Corruption with regard to activity carried out on behalf of the KITS.
5. KITS employees who suspect that Bribery or Corruption have occurred are required to report such instances internally, through the channels described in schedule 2. The KITS will appropriately investigate, record, and report all suspected instances of Bribery and Corruption in accordance with the procedures set out in schedule 2.
6. Bribery and Corruption by **KITS** employees will be treated as a serious disciplinary offence resulting, potentially, in suspension, dismissal and legal action.

7. Excessive or lavish gifts or hospitality in relation to business transactions or arrangements with donors might constitute Bribery. No KITS employee or associated person shall give or receive gifts or hospitality otherwise than in accordance with the Financial Regulations.
8. KITS takes measures to prevent Bribery and Corruption by agents or other third parties performing services for or on behalf of the KITS; and will take appropriate action should it discover that they are engaging in such acts.

D. Implementation

Responsibility for implementation of this policy lies with The Registrar and Finance Officer.

9. The commitment by the KITS to preventing Bribery and Corruption shall be clearly and regularly communicated to staff and associated persons by the Registrar or others nominated by the Registrar. For this purpose Audit and Scrutiny Committee has approved the Standards expected of KITS employees and associated persons.
10. The nature and extent of the risks relating to Bribery and Corruption to which the KITS is exposed shall be regularly and appropriately assessed and appropriate procedures to prevent Bribery and Corruption, including proportionate preventative and detective internal controls, and effective reporting procedures shall be implemented to reflect the outcomes of the risk assessments.
11. Where risk assessments indicate a significant risk that Bribery and/or Corruption might occur in relation to a particular transaction, third party or territory, appropriate due diligence shall be conducted prior to proceeding with the relevant transaction.
12. This Policy shall be available to every KITS employee and the KITS shall arrange specific training for those deemed most likely to encounter Bribery and Corruption.
13. KITS's procedures to prevent Bribery and Corruption shall be monitored and reviewed and, where appropriate, amended to reflect legal requirements and in the light of any instances of Bribery and Corruption.

E. Implementation Responsibilities

14. The Registrar shall have the following responsibilities for :

14.1. to maintain a register of the incidents of Bribery and Corruption that are reported to him or her and to investigate further and to report such incidents in accordance with the procedures set out in schedule 2;

14.2. to compile an annual report for the *Audit and Scrutiny Committee* on the implementation of this Policy including the outcomes of any relevant risk assessments and due diligence and any

incidents of reported Bribery and Corruption, thereby contributing to the monitoring and review of this Policy; and to recommend any changes to this Policy which, may from time to time, become appropriate;

14.3. to ensure that any standard KITS documents and procedures (including procurement terms and procedures, fundraising documentation, and terms and conditions of employment) reflect the requirements of this Policy;

14.4. to coordinate the KITS's response to any investigation or charge under Anti-Bribery or Corruption legislation;

14.5. to ensure that procedures are in place to communicate the Standards to all staff and any relevant associated persons and to deliver appropriate training to them

14.6. to oversee the compilation of specific Bribery and Corruption risk assessments and the conduct of appropriate due diligence into significant transactions with a view to assessing Bribery and Corruption risks and taking appropriate action to mitigate them; and

14.7. to monitor the effectiveness and review the implementation of this Policy, regularly considering its suitability, adequacy and effectiveness.

The Registrar may delegate these responsibilities to named individuals as he or she deemed fit.

Schedule 1 – Interpretation

Associated person – a person, company or other legal entity that performs services for or on behalf of the KITS and which may include for example agents, subsidiaries and sub-contractors of the KITS, recipients of grants from the KITS, partners in joint ventures or collaborative working arrangements of any kind and suppliers of fundraising, professional or other services to the KITS.

Bribery – (a) offering, promising, giving, requesting, or accepting a financial or other advantage in circumstances occurring inside or outside the Country which are intended to induce or reward **improper** performance of a function or activity that :

- is of a public nature, performed in the course of a person's employment, connected with a business or trade, or performed on behalf of a body of people; and
- a reasonable person in the Country would expect to be performed in good faith, impartially or in accordance with a position of trust;

(b) offering, promising or giving a financial or other advantage to a public official outside the Country (or somebody else nominated by that official) intending to influence the official in the performance of their official functions in order to obtain or retain business or a business advantage.

Facilitation payments - payments intended to secure or expedite routine or necessary Government action. A **facilitation payment** includes a payment to a public official to do their job properly as well as payment to do their job improperly.

Corruption - an act or omission, made with the intent of making a financial gain, or causing a financial loss, or exposing another to the risk of a financial loss, in which a person:

- dishonestly makes a false representation; or
- dishonestly fails to disclose information which he or she is under a legal duty to disclose; or
- occupies a position in which he or she is expected to safeguard, or not act against, the interests of another person and;
 - dishonestly abuses that position; and
 - intends, by means of that abuse of that position to make a gain for himself or herself or another, or- to cause loss to another or to expose another to the risk of loss.

Improper - (a) a failure to perform a function or activity in good faith, impartially or in accordance with a position of trust; or (b) not performing the function at all. In deciding whether a function or activity has been performed **improperly** outside India, any local custom or practice must be disregarded unless it is permitted or required by the written law of the country in which it is performed.

Schedule 2: Investigation, Recording and Reporting of Bribery and Corruption

Making a disclosure

1. Members of staff, or students or other individuals who reasonably suspect Bribery or Corruption in the KITS, should report their concerns as soon as possible to the Finance Officer or the Registrar, providing a brief description of the alleged irregularity, the loss or potential loss involved, and any evidence supporting the allegations or irregularity or identifying the individual or individuals responsible.
2. Any report will be treated as a disclosure under the KITS's Policy and as such will be brought to the attention of the Registrar, who will decide on the procedure to be adopted.
3. Although Bribery and Corruption can overlap, for clarity, references to both offences have been included within this procedure.

Bribery and Corruption Review Committee (BCRC)

4. Where concerns are to be taken forward under this policy, they will be considered by a Bribery and Corruption Review Committee (BCRC) comprising:
 - i) Registrar; Convener
 - ii) Finance Officer; Member
 - iii) Finance Manager; Member and
 - iv) Special Investigation Officer as appointed by the Registrar.
5. The BCRC will decide on such further steps as are necessary
 - 5.1. to investigate the complaints
 - 5.2. to notify the Police and other relevant authorities;

- 5.3. to control damage and further loss;
- 5.4. to comply with any requirements of the KITS's insurance cover;
- 5.5. to establish and secure evidence necessary for criminal and disciplinary action;
- 5.6. to recover losses;
- 5.7. to ensure that appropriate action is taken against those responsible; and
- 5.8. to communicate with internal personnel and outside organisations with a need to know and in particular consider
- 5.9 to notify the appropriate funding body under the terms of any grant to which the allegations relate; and
- 5.10 to ensure that the relevant legal measures are undertaken

6. In any case where immediate action is required, the Registrar / Finance Officer may take necessary steps and report to the BCRC on the actions taken.

7. The investigator will keep the BCRC informed as to the progress of the investigation and will complete the investigation in as timely a manner as is reasonably possible. And the Registrar in consultation with the Audit and Scrutiny Committee will recommend appropriate course of disciplinary action to the Vice Chancellor.

Suspension

8. Any individual who is suspected of Bribery or Corruption may be suspended immediately pending a full investigation by the constituted Committee.

Confidentiality

9. All persons concerned with the investigation must treat the information in strict confidence. Where necessary, information will be transmitted in confidence to relevant regulatory bodies. An unwarranted breach of confidence may be the subject of disciplinary action.

Insurance

10. In the case of insured claims, the Audit and Scrutiny Committee will ensure that any requirements of the insurance cover are observed.

Interim reporting

11. The BCRC will notify the Vice-Chancellor and the Chairman of the Audit and Scrutiny Committee that a matter has been reported under this policy and will provide such further and confidential interim reports as to the progress of the investigation as are deemed necessary. Such reports may be oral or written as appropriate.

12 Recovery of losses

12.1. The Audit and Scrutiny Committee will quantify the amount of any loss. The Finance Officer will take advice from Legal Services and the Insurance Office and may recommend civil action to recover outstanding losses in those cases where there is a reasonable prospect of success.

12.2. In cases of substantial loss, consideration may also be given to an application for an order to freeze the suspect's assets pending completion of the investigation.

Final report

13. The final report, which will be provided in strict confidence to the Vice-Chancellor by the Chairman of the Audit and Scrutiny Committee, will contain:

13.1. a description of the allegations and the steps taken to investigate them;

13.2. a conclusion as to whether the allegations made had substance and if so the extent of any loss and any other adverse impact on the KITS;

13.3. a description of any steps taken in relation to the individual or individuals concerned together with recommendations as to any disciplinary action;

13.4. the steps taken to mitigate any losses to the KITS;

13.5. the measures taken to avoid a recurrence; and

Records

14. The Registrar shall maintain a Register of all cases of Bribery or Corruption which are reported within the KITS (except the Press, which maintains its own records), including those where there was found to be no case to answer.

15. The Registrar shall specify the following, in relation to each case of Bribery or Corruption:

- i. what the suspected or actual incident was;
- ii. whether the incident was suspected or actual;
- iii. when the suspected or actual incident occurred
- iv. what the actual and potential impact of the incident on the KITS might be;
- v. what inquiries were made and/or action was taken, including any reports to other regulators or the police;
- vi. how any decision to terminate the investigation of the incident was made, and why;
- vii. what policies and procedures were in place that apply to the incident, whether they were followed, and if not, why; and
- viii. whether policies and procedures need to be introduced or revised, and if so, how and by when.

Communication to the complainant

16. The complainant will be informed in broad terms of the outcome of the investigation, having due regard to the confidentiality of information relating to the individual or individuals accused and others identified in the report.

16.2.6 Academic Freedom Policy

Academic freedom is a fundamental principle in higher education that safeguards the intellectual independence and freedom of expression of scholars, researchers, and students within an academic institution. KITS establishes clear policies and guidelines to uphold and protect academic freedom, ensuring an environment where individuals can engage in free inquiry, critical thinking, and the pursuit of knowledge without undue external interference.

Policy on Teaching and Learning Process

3.1 Road Map 1: Innovative Approach

Karunya shall review the curricula, provide time and space for innovation in education, encourage multidisciplinary activities and motivate the students to reflect and integrate their learning.

- **Strategy:** The strategy includes trans-disciplinary studies and activities; knowledge application in new contexts; broadening of expertise; appropriate assessment procedures.
- **Input:** The Institute will facilitate expertise for the statutory academic bodies and support innovative ventures including skill, design, programme and product development and review undergraduate and postgraduate curricula from time to time.

3.2 Road Map 2: Novel Methods & Techniques

KITS shall introduce new methods and techniques to create an active learning and teaching environment covering all programs keeping of from traditional classroom lecture sessions and moving towards interactive digital learning.

- **Strategy:** Students will be supported in research projects and product development by their active involvement and contribution individually and collectively as a team.
- **Inputs:** Expertise in identified areas will be made available. The space in the campus including the farm and facilities will be provided for interactive sessions, labs, incubation and start-ups as per the requirements of the departments/ programs. Assessment, evaluation and auditing facilities will also made available as per the requirements. The best practices in other reputed institutions of higher learning will be benchmarked and adopted if found appropriate.

3.3 Road Map 3: Academic Ecosystem

The Institute shall nurture a community with different backgrounds and cultures and evolve a unique culture for Karunya that fully recognizes the values of diversity and inclusivity.

- **Strategy:** The creation of a congenial ecosystem is essential to inculcate a sense of community, and a concerted effort will be made to evolve a unique Karunya culture. The strategies will cover inclusive learning, encouraging innovation and student involvement for positive change. Such an approach will evolve a tradition where teaching and research go hand in hand.

- **Inputs:** These changes may call for quality improvement of faculty and staff; awarding scholarships and grants to students; augmenting student services to achieve the targets by establishing equality, inclusivity and diversity among the campus community.

3.4 Road Map 4: Technology Enabled Teaching & Learning

In line with modern institutions of higher learning, KITS shall transform into a hub of digital learning and teaching, using the latest technological advancements to deliver a globally accepted education experience.

- **Strategy:** Digital learning leads to: (i) Experience - enhancing the learning experience of the students; (ii) Innovation - developing creative and effective technology to help in interactive teaching and sense of community feeling among the students and faculty; (iii) Extension: uplifting Karunya as a global leader in digital learning by providing online courses which are open and accessible in solving the challenges faced by humanity.
- **Inputs:** KITS will provide a Digital Learning Hub and Different Platforms for enhancing digital learning. The policies with regard to these are given in the document. _____

3.5 Road Map 5: Student Partnership

Karunya shall endeavour to place the students at the centre of curriculum development and pedagogic evolution, taking into cognizance the fact that partnership with students is the key to the fulfilment of outcomes.

- **Strategy:** Student engagement brings about positive changes, thereby contributing to the educational experience of themselves and their peers as co-creators of teaching innovations. Their engagement will develop novel ways of innovative partnership leading to a new culture which will make campus activities vibrant.
- **Inputs:** KITS will provide a platform to develop a new scheme for student and faculty partnership. Students and research scholars will be given opportunities to translate research output into curriculum development for effective learning. _____

3.6 Road Map 6 : Education and Beyond

Teaching Learning Process should lead to career development either through job opportunities, entrepreneurship or higher education. Recognising the importance of this factor, Karunya has scaled up its skill development process in its teaching pedagogy, leading to coveted core placements and best of higher education opportunities.

Strategy: Product, Process and Program oriented Courses have been designed in consultation with Industry captains and other relevant stakeholders. Infrastructure facilities have been upgraded to cater to the requirements.

Inputs: Incubation and innovation cells, entrepreneurship and start-up units are being established to motivate student involvement leading to product development. Faculty members are offered Fellowship for industry internship in upskilling themselves for

translational teaching process. Quality Improvement Programs in reputed institutions are offered to faculty members.

4.2.2. Classification of Courses

In the context of interactive teaching and learning process highlighted in 2.2.1 the Courses taught are classified into the following 10 categories.

1. Core and Elective Courses - Technology Driven Courses, Courses related to water, food, healthcare and sustainable energy (thrust areas of KITS) and cross cutting issues
2. Practical Courses - fabrication, field tests in science and engineering, case studies, survey, field data collection in management and development of farm machinery, post harvesting technology, irrigation and precision farming in agriculture
3. Theory cum Practical Integrated Courses (Design, Programming and Laboratory testing)
4. Analytical Courses
5. Skill Development Courses
6. Value Added Courses
7. Research and Project Based Courses
8. Product and Entrepreneurship Oriented Courses
9. Service Learning Courses
10. Massive Open Online Courses (MOOC)

4.4 Industry and Field Exposure

4.4.1 Industrial Visit: The students shall visit reputed industries, business houses, R&D institutions and farms relevant to their program in consultation with the Head of the Department for which a total of one credit shall be given in an academic year. The visit shall be planned in advance and the students shall submit a report and present a seminar after the visit. A credit of 0.5 shall be given based on the report and the seminar. Such activities are also expected to provide the students with the communication and organizing skills apart from exposing them to the challenges in their profession and science & technology. This shall be applicable to all UG and PG students.

4.4.2 Industry Internship: Training and internship in industry, farms, R&D institutions and business houses for relevant Programs during the summer and winter vacation shall be mandatory. The Heads and faculty members shall contact the appropriate agencies and provide opportunities for the professional growth of their students through training and internship. The approach is expected to develop skills and knowledge about products and best practices which would help students in their

placement. The students shall be given one credit for a training/ internship of 10 or more days and two credits for 20 or more days.

4.5 Project Work and Product Development

4.5.1 Minor Project: Students shall be encouraged to take up a minor project in every semester and present it in a seminar specifically conducted for the purpose. The project work and seminar performance shall be reflected in the internal marks given to the student in that specific or related subject area. A paper based on the minor-project of PG students can be published in journals and those of UG students either in a conference or a journal depending on the quality of work. The entire group exercise shall be interactive and participation of faculty members ensured. These projects shall be related to the technology missions of Karunya. All UG and PG students can be part of this minor-project mission.

4.5.2 Major Project: The quality of projects taken up by the final year UG and PG students shall be of high quality and products and papers shall emanate from them, which can be patented or published. The faculty and students shall do these works in an interactive mode so that quality publications can be made which will help in the career development and improve the ranking of the Institution. The students shall be given 12 credits for the final year full semester project.

4.5.3 Product Development: In addition to the above projects emphasis is given for development of products in the focal areas of the University through the activities of CCAC and the parent Department for minimum of 6 or 4 credits for UG Programs and 2 credits for PG Programs. This shall be accomplished individually or by groups of not more than four students. The product will be assessed on the basis of its utility and commercial potential.

5. Interactive Learning and Inculcation of Creativity

5.1 Hackathons and Interactive Workshops: Hackathons shall be conducted class-wise and department-wise, especially on topics of interest to the Program and also in the focal areas of the Institute. Besides, common hackathon sessions shall be conducted frequently by the faculty and staff attached to the central facility. Interactive workshops shall be conducted every week for students by the scientists and faculty members attached to the different Centers of Excellence and their laboratory facilities be made available to the students.

5.2 Guest Lectures and Collaborative Courses

5.2.1 Departments shall organize online/offline guest lectures and virtual labs by collaborating with other institutions of higher education, industries and alumni of KITS. A minimum of one such program shall be organized every week apart from giving opportunity for the student community to interact with experts in their area, who are invited to the campus exclusively for this purpose. This is expected to help students in placement and higher studies.

5.2.2 The academicians from reputed universities in India and abroad as well as experts from industries and alumni shall be invited to conduct online courses in an interactive mode and visit the Institute once in a semester to interact with the student community. A minimum of one Course in advanced areas shall be conducted by academicians or experts from reputed institutions abroad so as

to give an exposure to the student community the methods of teaching followed in those countries. The tests and evaluation can be done online by these academicians and experts.

5.3 Summer Training and Project Work Abroad: The students shall be encouraged to go abroad for summer or winter training and also for internship, research, training and project work abroad. This shall enable the students to make use of the opportunities opened by KITS in reputed universities abroad and also make full use of the opportunity provided under IAESTE Program. Appropriate credits shall be given to the students depending on the program offered, namely training, internship, project work, etc.

5.4 Incubation, Patenting and Start-up Initiatives

5.4.1 Recognizing the need for creative thinking and the importance of innovation, invention and product and process development, KITS encourages incubation, patent filing, product development and start-ups by students.

5.4.2 Each department shall encourage a minimum of five groups of students to initiate incubation in each semester with the support of faculty members. The common facilities, laboratories, infrastructure in the departments and Centres of excellence shall be optimally utilized to achieve this target. The policies of Karunya facilitates incubation initiatives of students.

5.4.3 Each department shall encourage development and filing of patents by the student community within the framework of the policies available and the support extended by KITS. It is envisaged that a minimum of five patents will be filed by the students of each department in a semester, especially based on the product oriented Courses being taught.

5.4.4 The faculty and student community of each department shall initiate a minimum of three start-up ventures in each semester. The policy framework in this regard provides support to all those involved in these activities.

5.5 Training for Competitive Examinations and Placement: Students who desire to take up any one or a maximum of two of the competitive examinations such as GATE, GMAT, SAT, TANCET, TOFEL, IAS, NDA, IMA will be provided necessary training and can earn one non-academic credit each upon completion of the Course.

MEMBERS OF THE BOARD OF MANAGEMENT (2021-22)

S. No	Name of the Member	Designation
1	Dr. P. Mannar Jawahar Vice Chancellor Karunya Institute of Technology and Sciences Karunya Nagar, Coimbatore 641 114	Chairperson
2	Dr. Ridling Margaret Waller Pro Vice Chancellor (QS) Karunya Institute of Technology and Sciences Karunya Nagar, Coimbatore 641 114	Member
3	Rev. Fr. Dr. Ignasimuthu S. J. Former Vice Chancellor University of Madras and Bharathiar University St. Xavier's College Palayamcottai, Tirunelveli - 627 002	Member (Nominee of Chancellor)
4	Mr. P. Michael Vetha Siromony, IAS No.716, Purva Grandbay Marine Drive, Ernakulam, Kerala 682031	Member (Nominee of Chancellor)
5	Dr. A. Francis Julian Senior Advocate – Supreme Court of India D-24, Gul Mohar, New Delhi – 110 049	Member (Nominee of Chancellor)


6	Dr. Rajendra B. Lal Vice-Chancellor Sam Higginbottom Institute of Agriculture, Technology and Sciences, Agricultural Institute, Allahabad - 211 002	Member (Nominee of MHRD)
7	Mr. Samuel Paul Dhinakaran Trustee - KERT Angel Villa,7, Jeevaratnam Nagar Adayar, Chennai - 600 020	Member (Nominee of KERT)
8	Dr. D. George Washington Director, Knowledge Data Center Anna University, Guindy, Chennai – 600 025	Member (Nominee of KERT)
9	Dr. James J. Gnanadoss Chairman, Sir Robert Stanes Educational Institutions 35, Kamatchi Nagar, IOB Colony Bharathiar University P.O., Coimbatore - 641 046	Member (Nominee of KERT)
10	Dr. Indra Rajasingh Professor & Dean School of Advanced Sciences Vellore Institute of Technology, Chennai - 600 127	Member (Nominee of KERT)
11	Dr. E. J. James Pro vice Chancellor (RC) Karunya Institute of Technology and Sciences Karunya Nagar, Coimbatore 641 114	Member (Dean's Category)
12	Dr. G. Prince Arulraj Dean (E&T) Karunya Institute of Technology and Sciences Karunya Nagar, Coimbatore 641 114	Member (Dean's Category)
13	Prof. Dr. S. J. Kingsley (Former Professor Loyola College) 147/4, Pallavi Apartments, F- Block, 8th Street Anna Nagar East ,Chennai – 600 102	Member (Professor's Category)
14	Dr. D. Tensing Director (QAA), Professor /Civil Engineering Karunya Institute of Technology and Sciences Karunya Nagar, Coimbatore 641 114	Member (Professor's Category)
15	Dr. R. Elijah Blessing Registrar Karunya Institute of Technology and Sciences Karunya Nagar, Coimbatore 641 114	Member Secretary

16.2.7 Publish financial data.



KITS is having a transparent policy about publishing the financial data.

KARUNYA EDUCATIONAL AND RESEARCH TRUST KARUNYA INSTITUTE AND TECHNOLOGY OF SCIENCE KARUNYA NAGAR, COIMBATORE - 641114			
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2022			
Expenditure	Rs.	Income	Rs.
To Establishment Charges	50,04,11,883	By Course Fees	1,29,58,82,622
Admission, Affiliation & Accreditation	2,45,12,946	Bank Interest Received	7,35,34,313
Examination Fees	85,31,144	Research Project Revenue	75,50,735
Research and Development	3,11,84,646	Staff Quarters Collection	58,29,168
Academic Auxillary Fees	1,38,90,653	Other Income (GST)	1,82,01,047
Awards & Scholarship	9,39,29,683		
Academic Expenses	6,61,90,893		
Campus Maintenance	12,69,49,006		
Bank & Finance Charges	1,06,937		
Electricity Charges	2,61,87,222		
Printing & Stationery	38,94,840		
Hospitality	21,03,343		
Audit fees, Legal & Professional Fees	30,33,631		
Administrative Expenses	25,31,357		
Telephone & Internet Expenses	14,13,285		
Postage & Courier	15,17,605		
Lease Rent Charges	1,27,44,000		
Travelling & Conveyance	17,17,867		
Vehicle Maintenance	58,52,294		
Advertisement & Promotional Expenses	9,71,14,112		
Depreciation	6,93,54,667		
Excess of Income over Expenditure	30,78,25,871		
	<u>1,40,09,97,886</u>		<u>1,40,09,97,886</u>

Place : Chennai
Date : 29-09-2022




Trustee
G.L.E. Ernest

Trustee
Thangasamy Ananth

For SELVAM & SUKU
Chartered Accountants
F.R.No.003701S



S.KALYANASUNDARAM
Partner
M.No.219042

16.3.1 Provide expert advice to government.

GOVERNMENT OF TAMILNADU WATER RESOURCES DEPARTMENT	
From Er. A.MUTHAIYA, B.E., Engineer-in-Chief & Chief Engineer (General), WRD, Chepauk, Chennai – 600 005.	To The Chairman, HLTC / Joint Chief Engineer, WRD, Plan Formulation, Chepauk, Chennai – 600 005.

Letter No. S7(4)/68804(Misc) /OT3/2003 Dated 07.06.2023

Sir,

Sub: Water Summit India (WSI 2022) Coimbatore Declaration – reg.

Ref: 1. Government Letter No. 4399623 / W1 / 2023-1,
Dated: 06.04.2023.

2. Dr.E.J.James, Pro - Vice Chancellor, Karunya Institute of
Technology and Sciences, Letter No KITS/PVC/LET/2022,
Dated 30.09.2022.

3. The Engineer-in-Chief & Chief Engineer (General), WRD
Proceedings No.S7(8)/OT7/HLTC/2023 Dated 25.01.2023.

In the reference 1st cited, the Government have enclosed a copy of the Water Summit India (WSI 2022) Coimbatore Declaration held on 17.09.2022 at Karunya Institute of Technology and Sciences vide reference 2nd cited and requested to take necessary action.

In the reference 2nd cited, Dr. E.J.James, Pro Vice Chancellor has stated that Water Summit-India (WSI 2022) was organized at Coimbatore by Karunya Institute of Technology and Sciences (Deemed University), Coimbatore in that renowned scientists, academicians, administrators and experts have participated and came out with the Coimbatore Declaration, a Vision Document highlighting the future course of action in Water Resources Management and development in the country. It is also stated that the need for such a summit to formulate a Vision Document for the future Water Resources development and Management in the country was recognized considering the issues such as Over-exploitation of fresh water sources, especially groundwater, Quality of Water Sources, Water stress, Scarcity, Impact of climate variation and change, Degradation of ecosystems and limitations associated with Water Governance and Stakeholder participants.

In the reference 3rd cited, a High Level Technical Committee was constituted for scrutinizing the announcement scheme Water Vision 2047 under the Chairmanship of Joint Chief Engineer, WRD, Plan Formulation.

In this regard, the Chairman, HLTC / Joint Chief Engineer, WRD, Plan Formulation is requested to refer the vision document of Water Summit India (WSI 2022) Coimbatore Declaration and consider suitable ideas if any, while preparing the Tamil Nadu Water vision 2047.

Encl: Copy of references cited. (w.e)

Rajaguru
for Engineer-in-Chief &
Chief Engineer (General), WRD
07/06/2023

Copy presented to the Additional Chief Secretary, WRD, Water Resources Department, Secretariat, Chennai- 9 for information.

16.3.2 Policy and lawmakers outreach and education.

KITS faculty members are actively involved in donating law books to the prison inmates of Coimbatore through the Deputy Inspector General of Prisons.





DEPARTMENT OF PRISONS AND CORRECTIONAL SERVICES

G.SHANMUGA SUNDAARAM, M.A.,
Deputy Inspector General of Prisons,
Coimbatore Range, Coimbatore.

M. URMILA , B.A.,
Superintendent of Prisons,
Central Prison, Coimbatore.

CERTIFICATE OF APPRECIATION

Dear Sir / Madam,

Your Service is highly appreciated for having donated 240 books to the Prisons & Correctional Service Department for the benefit of prisoners as part of their reformation. I thank you on behalf of our Director General of Prisons and Correctional Services, staff and prisoners. Kindly extend your co-operation in our future endeavours.

(M. Urmila)
Superintendent of Prisons,
Central Prison, Coimbatore.

(G. Shanmuga sundaram)
Deputy Inspector General of Prisons,
Coimbatore Range, Coimbatore.

To,
Dr. G. Nisha Malini,
No. 22, Lakshmi Nagar,
Roja Street (west),
Thondamuthur Road,
Coimbatore - 641046.

16.3.3 Participation in government research

From
Dr. K.S. Palanisamy, I.A.S.,
Director
Directorate of Rural Development
and Panchayat Raj,
Saidapet, Chennai-15

To
The Pro-Vice Chancellor,
Karunya Institute of Technology and
Sciences,
Karunya Nagar,
Coimbatore-641114.

Lr. No. 90268/2017/MGNREGS-II-1 Dated. 12.05.2020

Sir,

Sub: RD&PR Department – Mahatma Gandhi NREGS – Conducting Time and Motion study for the State of Tamil Nadu – Detailed Project proposal Submitted for Conducting TMS from Karunya Institute of Technology and Sciences – Approved – Reg

- Ref:
1. Joint Secretary, MGNREGA Letter No: J-11017/36/2017 MGNREGA – RE – VII (359092), MORD dated: 30.11.2017
 2. This office Letter Roc. No. 90268/2017/MGNREGS.2.1, Dated. 12.11.2019, 28.02.2020.
 3. Dr. E.J. James, Pro. Vice Chancellor, Karunya Institute of Technology and Sciences, (Declared as Deemed to be University), Karunya Nagar, Coimbatore -641114 letter dated 11.03.2020.
 4. Dr. E.J. James, Pro. Vice Chancellor, Karunya Institute of Technology and Sciences, (Declared as Deemed to be University), Karunya Nagar, Coimbatore -641114 letter dated 16.04.2020.

I invite your attention to the references cited.

As per the GoI instructions in the reference 1st cited, Karunya University, Coimbatore have been requested to send the detailed Budget Proposal for conducting Time and Motion Study under MGNREGS vide this office letter 2nd cited.

In the reference 3rd cited, you have sent the detailed project proposal for Conducting TMS under MGNREGS.

As per the request, the Final revised Budget of Rs. 51,95,300 for conducting Time and Motion Study under MGNREGS in respect of TamilNadu has been received from Karunya Institute of Technology and Science, Coimbatore vide reference 4th cited.

It is to inform that, the budget proposal of Rs.51,95,300/- for conducting Time and Motion Study under Mahatma Gandhi NREGS for Tamil Nadu state from Karunya Institute of Technology and Science, Coimbatore has been approved. The Time and Motion Study under Mahatma Gandhi NREGS has to be done by following guidelines and Templates for Time and Motion study issued by MoRD, Government of India.

You are requested to start the process after signing Memorandum of Understanding. The Memorandum of Understanding has to be signed within a week of the receipt of this letter.

sd/- K.S. Palanisamy,
Director

Dr. Meenu Meenal
for Director 13/5/20

6
13/5/20

16.3.4 Neutral platform to discuss issues.

At our institution, we understand the significance of ensuring fair and transparent employment practices. To maintain these standards, we have established a structured and impartial appeal process for employees who may have concerns or grievances related to their employment. In this process, the Institute has a platform through email tellus@karunya.edu wherein the employees to raise any appeal which will be sorted out and the reply given within 24 hours.



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved

NAAC A++ Accredited

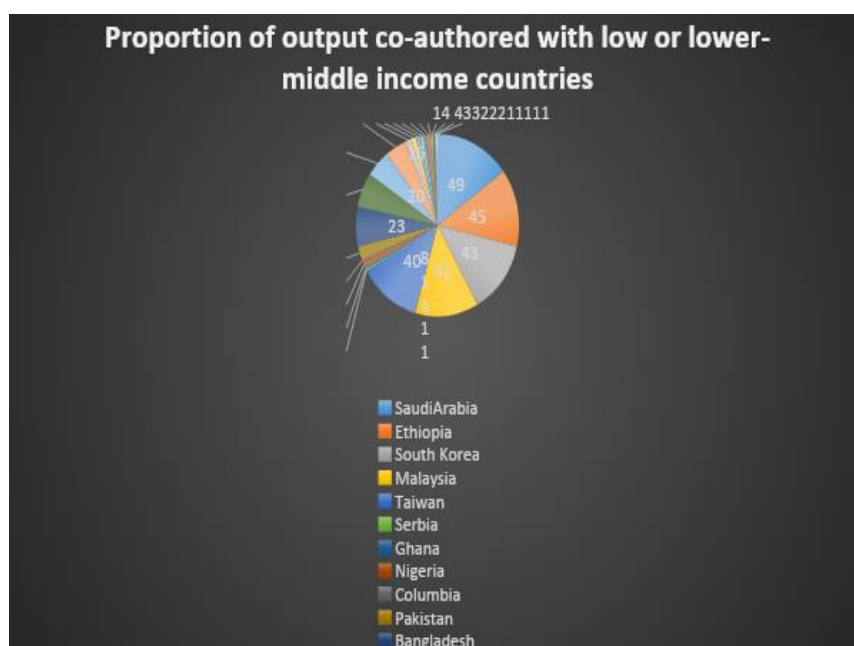
SDG17 Partnerships for the Goals

The vision of Karunya, which means ‘Compassion’, is to be an institution with social concern to address the problems of humanity through technical education, research and development, products, patents and extension. Our mission is to find solutions to human problems in areas relating to Water, Food, Health Care and Energy through scientific, social and technological research as well as policy formulation.

The raison d’être of SDG17 is to promote global partnership for sustainable development and meet the other 16 SDGs. It requires partnerships between governments, the private sector and civil society. The 2030 agenda of SDG17 is universal and calls for action by all countries – developed and developing – to ensure no one is left behind. A quote by Mother Theresa embodies the vision of SDG17: "None of us, including me, ever do great things, but we can all do small things, with great love, and together we can do something wonderful." That is the spirit imbibed by Karunya Institute of Technology and Sciences (KITS) in executing the vision of SDG17.

17.1.1 Proportion (in terms of number) of output co-authored with low or lower-middle income countries

All the KITS publications are mapped against the SDGs and during the assessment period, a total of 1007 papers were published that were related to the first 16 SDGs. **A significant proportion of these papers were co-authored with researchers from low or lower-middle income countries, further enhancing the global partnership to achieve the SDGs.**



17.1.2 Partnership for Development and Dissemination of Information

Dissemination of information by publication of research in journals and conferences is a key aspect of partnership. All the KITS publications are mapped against the 16-SDGs and during the assessment period, a total of 1007 papers were published that were related to the first 16 SDGs. The details of all the publications are available in the following link

Distribution of Publication based on SDGs

SDG	Number of SCOPUS indexed/WoS Publications
SDG 1	27
SDG 2	46
SDG 3	100
SDG 4	63
SDG 5	430
SDG 6	108
SDG 7	191
SDG 8	32
SDG 9	177
SDG 10	10
SDG 11	105
SDG 12	76
SDG 13	60
SDG 14	15
SDG 15	21
SDG 16	10
Total	1471

17.2.1 Relations to support the goals - Partnerships for Policy Development

KITS has been in the forefront in advisory roles for water resources in Tamilnadu and Kerala over the years in various committees and has made significant contributions to flood relief activities, wetland development, drinking water schemes, waste water treatment in rural areas etc. KITS is a member of the committee that drafted the Kerala State Water Policy.

In 2022, Dr. E J James, Pro Vice Chancellor served as the Chair of the Working Group on “River Basin Planning: Roadmap for governance and administration. River Basin Planning committees (RBPCs) in India are inter-governmental bodies that are responsible for planning and managing the water resources of a river basin. RBPCs are typically composed of representatives from the central government, state governments and local bodies. They include representatives from other stakeholders, such as water users, environmental groups and academicians where Karunya University is partnering.

- KITS also conducted the Water Summit on 17th September 2022, the recommendations of which have been incorporated in the Water Vision 2047 Document released by Government of Tamilnadu. The Water Summit helped in developing specific recommendations for policy action on water conservation, overexploitation of fresh water sources, quality deterioration, water stress, scarcity and quality, impact of climate change in water resources, limitations in water governance and stake holder participation. By bringing together experts from different fields, Water Summit generated effective solutions to water challenges recommending a policy document to government of Tamilnadu. KITS collaborated with an NGO DHAN Foundation that works for environmental upliftment and social development in this initiative.
- KITS is a member of the Kerala Planning Board Technical Committee for Major and Medium projects, specifically to discuss the DPR on a link canal in the Idamalayar irrigation project.
- KITS is also a member of the Kerala Planning Board Working Group on Drinking Water and Sewerage.
- KITS is also an expert member of the State Wetland Authority of Kerala (SWAK)
- KITS is a Member of the Central Water Commission's (CWC) Research Committee on Surface Water (RCSW), which is an advisory body that provides guidance and support to the CWC on research and development related to surface water. The RCSW is composed of experts from CWC, other government agencies, academia, and the private sector and KITS played a significant role in the various deliberations of this committee.

17.2.2 Relations to Support the Goals – Cross-Sectoral Dialogue / Conferences

KITS conducted an International Conference on Integrated Water Resources Management - Prospects and Challenges in December 8 to 10, 2022. The focus was to provide an opportunity to learn about the latest developments in IWRM research and practice, to network with experts from around the world, and to identify opportunities for collaboration. The conference contributed to the advancement of knowledge and understanding of IWRM, and developed innovative solutions to water challenges.

KITS participated in the India Water Week 2022 that discussed the Water Security for Sustainable Development with equity, specifically on the strategies for Demand and Supply Management

East Kolkata Wetlands (EKW) is a complex of natural and human-made wetlands located on the eastern fringes of the city of Kolkata, India covering an area of 12,500 hectares and includes a variety of wetland habitats. KITS has published a document for the management of EKW and published a paper along with the Central Water Commission in the Journal of Hydraulics. Since the EKW is facing a number of challenges, including pollution, encroachment, and climate change, the published document help in conservative measures.

KITS has made available 50 acres of land for dedicated joint research on Eucalyptus germplasm to Institute of Forest Genetics and Tree Breeding (IFGTB) - a national institute founded in April 1988 under the Indian Council of Forestry Research and Education (ICFRE),

an autonomous council under the Ministry of Environment and Forests, Government of India. The institute identifies and evolves varieties of species used in afforestation and social forestry that contributes to the national goal of achieving a growth of 3 to 4 cubic meters of biomass per ha per year.

KITS being a leader in water resources has engaged with SUEZ-India Water Management Solution in assisting them in developing appropriate solutions for the implementation of 24x7 water supply on a Build, Transfer and Operate (BTO) basis, to ensure safe urban water supply. The Coimbatore Corporation signed a deal with the Suez Group in January 2018 to upgrade, operate and maintain the existing water supply system in Coimbatore City. In this connection, a water R&D laboratory was established on campus jointly with Suez.

17.2.3 Relations to support the goals - Global Partnership for Data Collection and Process Development

Karunya is a collaborator in The AERONET (AErosol RObotic NETwork) program which is a federation of ground-based remote sensing aerosol networks established by NASA and PHOTONS (PHOtométrie pour le Traitement Opérationnel de Normalisation Satellitaire; Univ. of Lille 1, CNES, and CNRS-INSU) and is greatly expanded by networks (e.g., RIMA, AeroSpan, AEROCAN, NEON, and CARSNET) and collaborators from national agencies, institutes, universities, individual scientists, and partners. For more than 25 years, the project has provided long-term, continuous, and readily accessible public domain database of aerosol optical, microphysical and radiative properties for aerosol research and characterization, validation of satellite retrievals, and synergism with other databases. The network imposes standardization of instruments, calibration, processing and distribution.

NASA GODDARD SPACE FLIGHT CENTER + Visit NASA.gov

AERONET

AEROSOL ROBOTIC NETWORK

+ AEROSOL OPTICAL DEPTH
+ AEROSOL INVERSIONS
+ SOLAR FLUX
+ OCEAN COLOR
+ MARITIME AEROSOL

Web Site Feature AERONET Data Synergy Tool - Access Earth Science data sets for AERONET sites

-Home

Home

+ AEROSOL/FLUX NETWORKS

+ CAMPAIGNS

+ COLLABORATORS

+ DATA

+ LOGISTICS

+ NASA PROJECTS

+ OPERATIONS

+ PUBLICATIONS

+ SITE INFORMATION

+ STAFF

+ SYSTEM DESCRIPTION

The AERONET (Aerosol Robotic Network) program is a federation of ground-based remote sensing aerosol networks established by NASA and PHOTONS (PHOtométrie pour le Traitement Opérationnel de Normalisation Satellitaire; Univ. of Lille 1, CNES, and CNRS-INSU) and is greatly expanded by networks (e.g., RIMA, AeroSpan, AEROCAN, NEON, and CARSNET) and collaborators from national agencies, institutes, universities, individual scientists, and partners. For more than 25 years, the project has provided long-term, continuous, and readily accessible public domain database of aerosol optical, microphysical and radiative properties for aerosol research and characterization, validation of satellite retrievals, and synergism with other databases. The network imposes standardization of instruments, calibration, processing and distribution.

AERONET collaboration provides globally distributed observations of spectral aerosol optical depth (AOD), inversion products, and precipitable water in diverse aerosol regimes. Version 3 AOD data are computed for three data quality levels: Level 1.0 (unscreened), Level 1.5 (cloud-screened and quality-controlled), and Level 2.0 (quality-assured). Inversions, precipitable water, and other AOD-dependent products are derived from these levels and may implement additional quality checks.

The AERONET - Ocean Color (AERONET-OC) is another component of the AERONET program, provides the additional capability of measuring the radiance emerging from the sea (i.e., normalized water-leaving radiance) with sun-photometers installed on offshore platforms like lighthouses, oceanographic and oil towers. Similarly, the Maritime Aerosol Network (MAN) component of the AERONET program provides ship-borne aerosol optical depth measurements from the Microtops II sun photometers. These instruments have been deployed periodically on ships of opportunity and research vessels to monitor aerosol properties over the World's Oceans. The Solar Radiation Network (SolRad-Net) provides high-frequency solar flux measurements and is collocated with AERONET sites.

The processing algorithms have evolved from Version 1.0 to Version 2.0 and now Version 3.0. The Version 3 databases are available from the AERONET and PHOTONS web sites. Version 2 data may be downloaded from the web site through 2018 and thereafter upon special request. New AERONET products will be released as new measurement techniques and algorithms are adopted and validated by the AERONET research community. The AERONET website also provides AERONET-related news, a description of research and operational activities, data visualization, web services, related Earth Science links, and an AERONET staff directory.

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AERONET DATA ACCESS

DATA SYNERGY TOOL

+ Data Display

AEROSOL OPTICAL DEPTH (V3)- SOLAR

+ Data Display

+ Download Tool

+ Download All Sites

+ Climatology Tables

+ Web Service

AEROSOL INVERSIONS (V3)

+ Data Display

+ Download Tool

+ Download All Sites

+ Web Service

The KITS water resources research team developed a review document on strategies for sediment traps in hydropower projects of Himalayan Region. A patent on water purification was filed along with Cape Breton University, Canada on this domain.

Another example of international collaboration and research is a joint patent filed by Karunya with Zuckerberg Institute for Water Research, Ben-Gurion University of the Negev, Israel. This patent was related to a biosynthesis of Isopropyl myristate using bacteria and method of purifying arsenic contaminated water using the prepared Isopropyl myristate.

17.2.4 Relations to support the goals - International Collaboration and Research

KITS has evolved Project Management Action Plan for conserving Point Calimere Ramsar site from an eco-hydrological point of view a Point Calimere is a wetland site designated to be of International importance under the Ramsar Convention, also known as "The Convention on Wetlands", an international environmental treaty signed on 2 February 1971 in Ramsar, Iran, under the auspices of UNESCO.

KITS together with "Padasekhara" committee is an active participant and advisor in the Eco-hydrological analysis and water management of the "Kol" wetlands, which is also a Ramsar site in Kerala. The output from this assessment would be beneficial for farmers and for enhancing the biodiversity in the ecosystem.

Dr. E J James, Pro Vice Chancellor, KITS is a member of the Governing Body of the Wetlands International South Asia Society.

17.2.5 Relations to support the goals – Collaboration with NGOs

17.2.5.1 Work on Health in the Community

KITS has a Centre for Community Academia and Collaborations (CCAC), headed by a Director. This centre handles all community engagements. KITS recognizes the importance of community engagement and actively participates in initiatives that contribute to the health and wellbeing of the local community. These outreach programs often involve student volunteering programs, which provide students with opportunities to make a positive impact on the community while gaining valuable experience.

The thrust areas of KITS being health care, water, food, and energy, an awareness program on the importance of hand wash was organized for the local communities in villages of Pachanampathy, Perumalkoilpathy, Valayankutai Government Primary School and in Seengapathy Government Residential School. The children were provided with a hygiene kit each consisting of soap, comb, coconut oil and nail cutter.

As there are vulnerable communities living near KITS, (CCAC) renders a helping hand on behalf of the institution. The CCAC division is running 14 free Tuition Centers in the 14 vulnerable areas, 220 students of the downtrodden and tribal communities were benefitted and received school kits, white board sets, mats, and playing kits.

CCAC has organized free medical and vision check camp for local communities residing in Siruvani hills of the Western Ghats. CCAC of KITS in collaboration with Vasan eye care hospitals organized the camp for the needy people at Sadvayal Community Hall, where more than 100 individuals benefitted.

In addition, our university promotes and organizes sports events, fitness classes, and recreational activities to the community. We acknowledge the importance of healthy aging and actively support programs that enhance the wellbeing of older adults.

KITS has partnered with 4 global, 8 national, and 10 local institutions to address community-specific health needs as collaborations with local, national, and global health institutions play a pivotal role in enhancing public health. These collaborations involve hospitals, research and

educational institutions, and government bodies working together to achieve common health goals.

KITS, in collaboration with and SEESHA an NGO working towards empowering underprivileged communities, has formed local partnerships with entities like the Primary Health Centre in Pooluvapatti, KG Hospital, and the Forest Department in Coimbatore, focusing on senior care, local healthcare, eye and dental care. These initiatives cover a wide range of programmes and activities such as an Anti-Child Labour Day campaign, awareness programs on hygiene and cleanliness, free COVID vaccination camps, medical camps, sports events for differently-abled individuals, and panel discussions on various health issues. Academic institutions like Bishop Appasamy College, Sri Krishna College of Arts, Kumaraguru College of Arts & Science College, and Nehru Arts & Science College have also joined hands with our institution to provide internships for their social work students.

17.2.5.2 Work on Education and Skill Development in the Community

KITS through the Center for Community Academia Collaborations and the Division of Civil Engineering jointly organized a skill development program on field practices in Masonry and bar bending for rural youth as Skill development is a national agenda for the Government of India being implemented through the National Skill Development Corporation (NSDC) a not-for-profit public limited company set up by Ministry of Finance as Public Private Partnership (PPP) model. 10 economically marginalized youths participated in the training in line with this national mission.

On a national scale, KITS has signed MOUs with Shibin Nutraceuticals Private Limited, Parry Agro Industries Ltd., Cyrix Healthcare, Jubilee Mission Medical College and Research Institute, Siemens Healthcare Private Limited, and Salzer Electronics Limited, showcasing their commitment to healthcare research and innovation. Through these partnerships with government and non-governmental organizations, KITS offers workshops, seminars, awareness campaigns, vaccine and immunization drives that provide valuable education and resources.

Venturing into the global arena, KITS has established collaborations with institutions such as Cape Breton University in Canada and Vilnius University in Lithuania, emphasizing international academic exchange and research. Further global partnerships have been formed with renowned institutions in the United States, including Harvard Medical School and Boston Child Hospital, Old Dominion University, and Ashcure Pharma S.R.L. in partnership with Regpak Biopharma Consulting, highlighting the university's global vision in advancing healthcare and technology worldwide.

Summary

Alone to go fast, but together to go far has been a guiding principle of KITS' activities to realize our mission and that is the spirit embodied in SDG 17 – Partnership for the Goals. The aforesaid activities show that the Karunya vision and mission is in complete alignment with SDGs encompassing, long-standing goals and one is reminded of the lines by Robert Frost

The woods are lovely, dark and deep.
But I have promises to keep,

And miles to go before I sleep,
And miles to go before I sleep

But a sure beginning is a necessary precursor to achieving a goal...and Karunya is well on its way.