ELECTRONICS AND INSTRUMENTATION ENGINEERING
10EN201 PROFESSIONAL ENGLISH I

Credits: 2:0:0

Course Objectives
To impart basic grammar skills with special thrust on framing sentences for day to day conversation.
To train the students in language use and help improve their vocabulary.
To train the students in reading and writing skills

Unit I
Developing basic skills in Grammar- Parts of Speech- Tense forms- Concord- Articles-Voice-Infinitives- Gerunds—Modal auxiliaries- Understanding vocabulary- Word power.

Unit II
Developing skills in basic sentence patterns- Direct and indirect speech - Homophones- Note-Making- Paragraph writing- Personal letter writing- Summarizing- Punctuations- Discourse markers.

Unit III
Error Analysis- Descriptive writing- Abbreviations- Word formations- Cohesive devices- One-word substitution- Subordinating conjunction- Co-relative conjunction- Relative pronouns-Writing short speeches.

Unit IV
Instructions- Warning- Group discussions- - Writing minutes- writing recommendations- Memo writing- Understanding biography

Unit V
Essay writing- Writing official letters- If- clauses- Technical and non- technical meaning of words- Presentational skills- Body language- Role-play

Text Book

Reference Books
**EN 214 BASIC FRENCH LANGUAGE**

**Credits: 2:0:0**

**Unit I**
Nouns and Pronouns- Personal pronouns – Verbs- Concord – Present of regular verbs – present of frequently used verbs – direct infinitive to show preferences

**Unit II**
Adjectives– Types of adjectives and usage - Adverbs – use and position of frequently used adverbs - Prepositions and Conjunctions– use of prepositions of place

**Unit III**
Interrogative Constructions – questions indicated by rising intonation – questions starting with question words - Sentence Structure

**Unit IV**
Listening Skill – Pronunciation – Contextual meaning – Listening to comprehend ideas

**Unit V**
Reading a variety of short, simple materials – Demonstrate understanding through oral and brief written responses – Writing short expressions

**Reference:**
1. The Ontario Curriculum: FSL — Extended French, Grades 1–8; French Immersion, Grades 1–8, 2001

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**EN 216 BASIC GERMAN LANGUAGE**

**Credits: 2:0:0**

**Unit I**
Introduction – Alphabets – Greetings – Countries and Languages – Pronouns – Possessive Pronouns - Verbs and their conjugations – Articles

**Unit- II**

**Unit – III**
Number system – Family – Daily routines related verbs and question verbs.

**Unit – IV**
Accusative and dative declensions of pronouns and articles – Modal verbs and their related grammatical structure.

**Unit – V**
Time and time related particles – Related vocabulary and grammar – Exercises.
**Reference Books**

1. Tangram Aktuell! (Max Hueber Verlag).
2. Pingpong (Max Hueber Verlag)

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**10EN202 PROFESSIONAL ENGLISH II**

**Credits: 2:0:0**

**Course Objectives**

- To impart skills in language use.
- To enrich the vocabulary of students.
- To enable students identify errors and frame error-free sentences
- To impart reading and writing skills

**Unit I**

Language use-Word formation-Synonyms-Antonyms- Vocabulary building- Word Power-
Abbreviations-Acronyms-homophones.

**Unit II**

Language use-Error Analysis-Impersonal passive voice-Punctuations-Verb forms-Modal
Auxiliaries- Reading Skills-Extensive Reading-Intensive Reading.

**Unit III**

Communicative Skills-Prepositional Phrases-Gerunds-Infinitives-Imperatives-Situational
speech-practice to speak fluently-Contextual use of words-Language for various communicative
functions

**Unit IV**

Speaking Skills- Phonetics-Vowels - Consonants-Stress-Intonation- Phonetic Transcription-
Correct pronunciation Identification-Speeches-Group Discussion.

**Unit V**

Writing Skills-Creative writing - Continuous writing-Description- Parts of business letters-Types
of Business letters-Formatting of Business Letters - Editing

**Text Book:**


**Reference Books**

MA244 ALGEBRA, DIFFERENTIAL CALCULUS AND ANALYTICAL GEOMETRY

Credits: 3:1:0

Unit I: Theory of Equations
Relations between coefficients and roots. Irrational and imaginary roots – symmetric functions of the roots – transformation of equations – Reciprocal equations and formation of equation whose roots are given.

Unit II: Matrices
Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of Eigen values – Cayley Hamilton theorem – Orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformation

Unit III: Three Dimensional Analytical Geometry
Direction cosines and ratios – Angle between two lines – Equation of a plane – Equation of a straight line – Co-planar lines – Shortest distance between skew lines

Unit IV: Geometrical Applications of Differential Calculus
Curvature – Cartesian and polar co-ordinates – Circle of curvature – involutes and Evolutes – Properties of envelopes – Evolutes as envelope of normals.

Unit V: Functions of Several Variables

Text Book:

Reference Books:
MA245 MULTIPLE INTEGRALS, DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Credits: 3:1:0

Unit I: Multiple Integrals
Evaluation of Multiple Integrals, Change of order of Integration, Application of Multiple Integrals to find area enclosed by plane curves and volume of solids.

Unit II: Beta and Gamma Integrals
Definition, relation connecting Beta and Gamma integrals, properties, evaluation of definite integrals in terms of Beta and Gamma functions.

Unit III: Ordinary differential Equation
Simultaneous linear equations with constant coefficients – Linear equations of higher order with constant coefficients – Homogeneous equation of Euler type – Method of variation of parameters.

Unit IV: Vector Calculus
Gradient, Divergence, Curl – Line, surface & volume integrals – Statements of Green’s, Gauss divergence and stokes’ theorems (without proof) – verification and applications.

Unit V: Laplace Transforms
Transforms of simple functions – Basic operational properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – Periodic function – Applications of Laplace transforms of solving linear ordinary differential equations upto second order with constant coefficients and simultaneous equations of first order with constant coefficients.

Text Book:

Reference Books:

PH105 APPLIED PHYSICS

Credits: 3:0:0

Unit I:
Particles and waves
Shroedinger’s wave equation (Time dependant and time independent equations)- Applications: particle in a box,

**Unit II:**
**Structure of solids**
Classification of solids-Fundamental terms of crystallography-Lattice, basis, Unit cell, Crystallographic axis, primitives-Types of crystals-Bravais Lattices, miller indices-Unit cell characteristics of Simple cubic, BCC, FCC and HCP systems.

**Nano Materials**
Preparation of Nano Materials-Bottom up, top down approaches-Properties and applications of Carbon nano tubes

**Unit III:**
**Dielectrics**
Basic Definitions-Electric field intensity, Electric flux density, Dielectric parameters- dielectric constant- Experimental determination of dielectric constant- Dipoles – Dipole moment- polar and non polar dielectrics, polarization- Types of polarization- Internal field-clausius mosotti equation-Dielectric loss- dielectric breakdown- dielectric properties.

**Semiconductors:** Classification of solids on the basis of band theory- Conductors, Insulators and semiconductors. Classification of semiconductors-Intrinsic and Extrinsic semiconductors - Solar cells-Light emitting diodes-Liquid crystal display

**Unit IV**
**Lasers**

**Fibre optics:** Principle of optical fibre-Propagation in optical fibres-Acceptance angle- Numerical aperture-Structure of optical fibres-Fibre optic materials-Classification of optical fibres-Applications-Optical fibres for communication-Fibre optic sensors-Temperature sensor

**Unit V**
**Acoustics**
Classification of sound, Characteristic of musical sound-Loudness- Weber and Fechner’s law-Decibel- Absorption coefficient- Reverberation time- Sabine’s formula (growth and decay), Factors affecting acoustics of buildings and their remedies

**Ultrasonics-classification:** of ultrasonic waves-properties of ultrasonic waves- ultrasonic production- Magnetostriction and piezoelectric methods, Acoustic grating, SONAR, NDT, applications in medicine and industry

**Recommended Text Book**

**Reference Books:**
Course Objective:

- To train engineering students on basis of measurements and the instruments
- To give practical training on basic Physics experiments which are useful to engineers
- To equip the students with practical knowledge in electronic, optics, and heat experiments

Course outcome:
Demonstrate the practical skill on measurements and instrumentation techniques of some Physics experiments.

List of experiments:

1. Rigidity Modulus of the wire - Torsional Pendulum
2. Young’s Modulus of a beam - Non-uniform bending
3. Thermal Conductivity of a bad conductor-Lee’s Disc
4. Radius of curvature of a lens – Newton’s Rings
5. Refractive Index of Prism-Spectrometer
6. Wavelength of mercury source- Spectrometer Grating method
7. Coefficient of Viscosity of a liquid by Poiseullie’s method
8. Frequency determination of a tuning fork- Melde’s string
9. Particle size measurement-Laser diffraction method
10. Discharge of a capacitor
11. Thickness of a glass plate- Single optic lever
12. Characteristics of Zener diode
13. Efficiency of Solar cell
14. Ultrasonic interferometer

HoD can choose any 10 experiments from the above list at the beginning of the course in each Semester.

Credits: 0:0:2
• Greater emphasis through on the role of reference frames in Newton’s laws, force laws
• A clear analysis of the concepts of Heat, Energy and laws of Thermodynamics (quantitatively).
• To provide the understanding of concepts of electricity and magnetism.

Course Outcome:
Student understands the classical portions of the Electricity and Magnetism and special momentum to Electromagnetic introduction

Unit I: Particle Dynamics

Unit II: Heat And Thermodynamics
Heat And Work, The First, Second and Third laws Of Thermodynamics, Some Applications

Unit III: Magnetism

Unit IV: Electrostatics
Electric Field And Electric Intensity, Electrostatic Potential, Gauss’s Theorem, Applications Of Gauss’s Theorem, Mechanical Force Experienced By Unit Area Of A Charged Field, Electrostatic Potential At A Point Due To A Dipole

Unit V: Electromagnetic Induction

Text Books:
2. Electricity & Magnetism, Brijlal & Subramaniam S. Chand and Co 2004

Reference Books:
1. University Physics, Sears and Zemansky –Pearson Addison Wesly, 2007
2. Fundamentals of Physics, an introductory course, David G. Martindale, Robert W. Heath, D.C. Heath, Canada, 1987
4. Electricity and Magnetism, William C. Robertson, NSTA press, 2005
CH106 APPLIED CHEMISTRY

Credits: 3:0:0

Unit I: High Polymers

Unit II: Water Technology

Unit III: Fuels and Combustion

Unit IV: Electrochemistry
Types of corrosion – Wet or electrochemical corrosion – Types – factors influencing corrosion – Corrosion control methods

Unit V: Emerging Trends in Chemistry
Basics of Nanotechnology - Nanomaterials – Types: Nanowires, Nanotubes – Applications
Chemical aspects of Biotechnology – Fermentation – Manufacture of ethyl alcohol and acetic acid by fermentation – Deamination
Fundamentals of Semiconductor Technology – Semiconductor materials – Basic fabrication steps – oxidation – photolithography and etching – diffusion and ion implantation - metallization
Text Book:

Reference Books:
1. S. Glasstone and D. Lewis – “Elements of Physical Chemistry”, McMillan Co. of India Ltd., 2002

09CH104 – APPLIED CHEMISTRY LAB

Credits: 0:0:2

Objectives:
1. To understand the principles of estimation in acidimetry, alkalimetry and permanagnometry titrations
2. To understand gravimetric principles involved in complexometric titration
3. To understand the principles of potentiometry, conductometry and pH measurements
4. To understand the principles of spectrophotometry and flame photometry

List of Experiments:
1. Estimation of Hydrochloric acid
2. Estimation of Sodium Hydroxide
3. Estimation Fe^{2+} ions
4. Estimation of total, permanent and temporary hardness of Water Sample
5. Estimation of alkalinity in water sample
6. Estimation of dissolved oxygen
7. Estimation of Iron in water sample by spectrophotometry
8. pH measuremnts for acid – alkali titration
9. Conductometric estimation of an acid
10. Potentiometric estimation of Fe^{2+} Ions
11. Determination of single electrode potential by potentiometry
12. Determination of rate of corrosion of mild steel by by weight loss method
13. Estimation of sodium present in water by flame photometry
Reference Books


09CH201 – ENVIRONMENTAL STUDIES

Credits: 3:0:0

Objectives:
1. To acquire the knowledge of environmental studies, it’s need & importance
2. To understand the concept, structure and function of different ecosystems
3. To know about pollution problems and green technology
4. To develop a sense of responsibility about the role of students in fostering the idea of learning to live in harmony with nature

Unit I - Natural resources, ecosystems and biodiversity

Unit II – Air pollution and global issues

Unit III – Issues related to other environmental pollution aspects and green technology
Water pollution - sources – characteristics – BOD, COD - pollutants and their effects – heavy metal pollution – inorganic and organic pollutants control methods - Advanced waste water treatment techniques - Basic aspects of soil pollution - marine pollution - noise pollution - thermal pollution - nuclear hazards - Causes, effects and control measures - solid waste management: causes, effects and control measures of urban and industrial solid wastes Green chemistry and green technology – principles of sustainable and green chemistry - miscelle templated silica as catalyst in green chemistry – biocatalysis – bioproduction of
Unit IV – Environmental Legislation

Unit V - social issues and the environment

Text books:

Reference Books:

09ME101 BASIC MECHANICAL ENGINEERING
Credits: 2:0:0
Objective:
To provide knowledge about IC Engines, External combustion Engines, boilers, power plants, metal forming, metal joining, machining process and materials. To understand about CAD and modern design softwares in the mechanical engineering.
UNIT - I

UNIT - II

UNIT - III

UNIT – IV

UNIT – V

Text Books:

Reference Books:

09EC218 BASIC ELECTRONICS

Credits: 3:0:0

Objective: To know the basics about semiconductor, integrated circuits and communication system.

Outcome: Students will get overview about the basics of electronics.
UNIT I
Introduction to Semiconductor
Covalent bond – N type & P type semiconductor – conduction in semiconductor – semiconductor devices: diode, transistor, FET, MOSFET, UJT.

UNIT II
Integrated Circuits

UNIT III
Digital Systems
Number system – Boolean algebra – logic gates –truth table - combinational circuit -4 x 1 multiplexer – 1 x 4 demultiplexer - digital computer principles.

UNIT IV
Communication
Basic block of communication system – need for modulation – Derivation of AM and FM signal - Amplitude and Frequency Modulation (Balanced modulator and varactor diode modulator)- Demodulation(AM diode detector and balanced slope detector.

UNIT V
Communication systems
Block diagram of AM and FM transmitter - Superheterodyne receiver – satellite communication – Fibre optic communication

Text Book

Reference Books

09EE101 BASIC ELECTRICAL ENGINEERING

Credits: 3:0:0
Course Objectives
• To impart the basic knowledge about the Electric and Magnetic circuits.
• To inculcate the understanding about the AC fundamentals.
• To understand the working of various Electrical Machines.
• To know about various measuring instruments and house wiring.
Unit I: DC CIRCUITS

Unit II: MAGNETIC CIRCUITS

Unit III: AC FUNDAMENTALS

Unit IV: ELECTRICAL MACHINES
Working principle, operation and application of DC Generator, DC Motor, Transformer, Three Phase Induction motor ,Single phase Induction motor, Alternator. (Quantitative approach)

Unit V: MEASURING INSTRUMENTS AND HOUSE WIRING
Wiring materials and accessories – Types of wiring – Fluorescent lamp wiring – stair case wiring – basic principles of earthing – layout for a residential building.

Course Outcome
After the completion of the course, the student should be able
• To predict the behavior of any electrical and magnetic circuits.
• To identify the type of electrical machine used for that particular application.
• To wire any circuit depending upon the requirement.

Text Book

Reference Books
CS101 PROGRAMMING IN C

Credits: 4:0:0

Unit I
Introductory Concepts - Introduction to Computers - What is a Computer – Block Diagram of Computer – Computer Characteristics – Hardware vs Software – How to Develop a Program – Modes of Operation – Types of Programming Languages – Introduction to C – Desirable Program Characteristics - Introduction to C Programming - The C Character Set – Writing First Program in C - Identifiers and Keywords – A More Useful C Program – Entering the Program into the Computer – Compiling and Executing the Program - Data Types – Constants – Variables and Arrays – Declarations – Expressions – Statements – Symbolic Constants (Chapters 1,2)

Unit II

Unit III

Unit IV

Unit V
Additional Features of C – Enumerations – Command Line Parameters (Chapters 11, 12, 14.1, 14.2)

Text Book:

09CS217 PROGRAMMING IN C LAB

Credits: 0:0:2
1. Write a Program to find the Palindrome.
2. Write a Program using switch statement with the multiple cases (Fibonacci Series, Factorial for the Given Number, Armstrong Number or Not, Prime or Not)
3. Sorting of Numbers Using Arrays
4. Printing 10 Numbers both in Ascending and Descending.
5. Pyramid
7. Counting Number of Characters, Number and Special Characters In Given String.
8. Student Record Using Structure.
9. Print Multiplication Table In Reverse Order Using For, While Do While.
11. Data Files
12. Data Files.

12 Experiments will be notified by the HOD from time to time. A tentative list is mentioned above.

MA246 COMPLEX ANALYSIS, STATISTICS AND Z-TRANSFORMS

Credits: 3:1:0

Unit I: Analytic Functions
Cauchy Riemann equations – Properties of analytic functions – Determination of harmonic conjugate – Milne – Thomson’s method – Conformal mappings \( w = z + a, \, az, \, 1/z, \, z^2 \), and bilinear transformation.

Unit II: Complex Integration
Cauchy’s theorem – Statement and application of Cauchy’s integral formulae – Taylor’s and Laurent’s expansions – Singularities – Classification – Residues – Cauchy’s residue theorem – Contour integration – Circular and semi Circular contours (excluding poles on real axis)

Unit III: Statistics
Moments, skewness and kurtosis (based on moments only) – Linear correlation-coefficient of correlation – rank correlation and regression lines – Theoretical Distributions – Binomial – Poisson – Normal.
Unit IV: Testing of hypothesis
Tests based on large samples - Small samples: t mean and difference of means – $\chi^2$ test for goodness of fit and attributes and F - distribution.

Unit V: Z – Transforms
Z-transforms of standard functions, inverse Z-transform (Partial fraction expansions and residues), properties of Z-transform, Solution of difference equations.

Text Book:

Reference books:

10EI201 CIRCUIT ANALYSIS & NETWORKS
Credits: 3:1:0

Course Objective:
- To introduce the concept of circuit elements, lumped circuits, circuit laws and reduction.
- To study the transient response of series and parallel A.C. circuits.
- To study the concept of coupled circuits and two port networks.

Course Outcome:
- Analyze simple DC circuits.
- Find Thevenin and Norton equivalents of circuits.
- Analyze AC steady-state responses and transient response of resistance, inductance and capacitance in terms of impedance.
- Analyze two port networks.

Unit I: Basic Circuit Concepts

Unit II: Network Theorems and transformations
Voltage and current source transformations – Star and delta Transformations – Superposition, Thevenin – Norton – Millman’s and Maximum Power Transfer Theorems – Statement and Applications
Unit III: Response of Electric Circuits

Unit IV: Coupled Circuits

Unit V: Two Port Networks and Filters

Text Books:

Reference Books:

10EN203 ADVANCED ENGLISH

Credits: 2:0:0
Course Objective

- To make the learners aware of the importance of correct English both in writing and speaking contexts
- To enable the learners to acquire the additional skills required to perfect their language competency

UNIT I
Role of Language in Communication- Basics of Communication – Types and Barriers — Comparison of Oral and Written Communication – Error Analysis in English grammar
UNIT II

Body Language and Communication in English – Types of Non-verbal Communication – Oral Presentation Exercises – Telephone Conversation – Communication Errors in English

UNIT III

Role of English in interviews - interview techniques – question types – interpersonal communication – vocabulary for specific interview situations

UNIT IV

Business letters: Enquiry letter, Quotation letter, Purchase letter & Sales letter – Sales advertisement – headline writing - overcoming errors in sentence construction

UNIT V


Text book:

Reference Books:

09E1220 ELECTRICAL MACHINES

Credits: 3:1:0

Course Objective:
To expose the students to the concepts of various types of electrical machines and applications of electrical machines.

Course Outcome:
To impart knowledge on
- Constructional details, principle of operation, Performance, starters and speed control of DC Machines
- Constructional details, principle of operation of Transformers.
- Constructional details, principle of operation of AC Machines
- Constructional details, principle of operation of Special Machines.
- Utilization of electrical Energy.
Unit I: DC MACHINES

Unit II: TRANSFORMERS

Unit III: INDUCTION & SYNCHRONOUS MACHINES
Induction Motor:
Synchronous Motor:
Construction and principle of operation – EMF equation–V curves – Synchronization.

Unit IV: SPECIAL MACHINES

Unit V: UTILIZATION OF ELECTRICAL ENERGY
Electric heating-Methods of heating, Welding Generator, Electric traction-traction motors and control, Recent trends in Electric traction

Text Books

Reference Books
EI260 ELECTRICAL MEASUREMENTS & INSTRUMENTS

Credits 4:0:0

Unit I
DIFFERENT TYPES OF AMMETERS AND VOLTMETERS

Unit II
WATTMETERS AND ENERGY METERS

Unit III
POTENTIOMETERS AND INSTRUMENT TRANSFORMERS

Unit IV
RESISTANCE MEASUREMENT

Unit V
IMPEDANCE MEASUREMENT

References
10EI202 ELECTRONIC CIRCUITS

Credits: 4:0:0

Course Objective:
- To familiarize the student with the analysis and design of basic transistor amplifier circuits, feedback amplifiers, wave shaping and multi vibrator circuits

Course Outcome:
- Analyze the different types of diodes, operation and its characteristics
- Design and analyze the DC bias circuitry of BJT and FET
- Design circuits using the transistors, diodes and oscillators

Unit I: Diode Circuits
Diode as a Circuit Element - Load line – Piecewise Linear Diode model - Clipping circuits- Rectifiers – Half Wave and Full Wave Rectifiers - Average and RMS Value – Ripple Factor- Regulation –Rectification efficiency – Transformer Utility Factor –Capacitor Filters - Ripple factor and regulation

Unit II: Analysis of Transistor Circuits
Load line analysis –Transistor hybrid model – Analysis of transistor amplifier using h parameters – Emitter follower – Millers Theorem – Cascading Transistor amplifier

Unit III: Transistor Circuits as Amplifier
Analysis of transistors at low – medium frequencies - RC coupled amplifier - DC amplifiers – Class A/B/C – Single ended and Push Pull - Class AB amplifier

Unit IV: FET Circuits
FET small signal model – Low frequency common source and common drain amplifiers – Biasing FET amplifiers – Low FET (NMOS) – BIFET Amplifiers

Unit V: Feedback Amplifiers and Oscillators
Basic concepts of feedback amplifiers – Effect of negative feedback on input, output resistances, gain, stability, distortion and bandwidth – Voltage and current feedback circuits - Barkhausen criteria – RC and LC oscillators - Multivibrators- Bistable – Monostable and Astable

Text Books:

Reference Books:
1. David A Bell, ‘Electronic Devices and Circuits’, Prentice hall of India, New Delhi, 2008
10VE201 VALUE EDUCATION

Credits: 2:0:0

Course Objectives:

1. To give an understanding of life in all its complexities and to provide practical opportunities and mold students to meet the needs of the people.
2. To sharpen the capacity of the student in enabling them to make right moral and ethical choices,
3. To develop professionals with social concern reaching out to the nation as leaders and serving the needy with divine grace and power.

UNIT-I

Introduction: Vision and Mission of Karunya. Value Education, Purpose and priority areas of Value Education. Importance of Values in Life – what is a Value system? Types of values, Value inculcation process, Clarifying values - Importance of Values in Life – what is a Value system? What kinds of values need to be inculcated eg. Ethical, moral and spiritual instead of materialistic values, value inculcation, trend of values such as a permissive culture. Character Building – advantages of good character, importance of trust, honesty, integrity, morality, and reliability as qualities of a good character. Building Relationship – Objectives, Ways to improve relationship, Issues that hinder relationship, Tools for effective relationship.

UNIT- II


UNIT-III


Attitude – Definition, types, factors and steps to build positive attitude, benefits of positive attitude and consequences of negative attitude. Self-Esteem – Definition, Types, Characteristics of high and low self-esteem, Causes of low self-esteem and steps to build high self-esteem.

UNIT – IV

UNIT – V
Sin and Temptation – Nature and Sources of sin, Ways to overcome temptation. Inner Life
Integrity – Understanding Personality, Self-centered and God-centered Personality, Integrity in
of Blessings, Greatness of Friendship, Purity in thought, Love and Compassion. Peace and
Harmony – Individual Peace, Seven Steps to individual peace, Promoting World peace, Unity in
diversity.

Reference Books:
   Education.

10VE202 VALUE EDUCATION

Credits: 2:0:0

Course Objectives:

1. To give an understanding of life in all its complexities and to provide practical
   opportunities and mold students to meet the needs of the people.
2. To sharpen the capacity of the student in enabling them to make right moral and ethical
   choices,
3. To develop professionals with social concern reaching out to the nation as leaders and
   serving the needy with divine grace and power.

UNIT-I
Introduction: Vision and Mission of Karunya. Value Education, Purpose and priority areas of
Value Education. Importance of Values in Life – what is a Value system? Types of values, Value
inculcation process, Clarifying values Importance of Values in Life – what is a Value system?
What kinds of values need to be inculcated eg. Ethical, moral and spiritual instead of
materialistic values, value inculcation, trend of values such as a permissive culture. Character
Building – Advantages of good character, Importance of trust, honesty, integrity, morality, and
reliability as qualities of a good character. Building Relationship – Objectives, Ways to
improve relationship, Issues that hinder relationship, Tools for effective relationship

UNIT- II
Personality Development– Definition, Types and ways to improve Personal effectiveness.
Purpose and philosophy of Life – Learning the purpose driven life, Decision making skills,
Introspection, Moralization of Desires. Leadership – Qualities of a good leader, Types and
Principles. Communication – Principles and Types, advantages and disadvantages to
communication. Communication skills
UNIT-III

UNIT – IV

UNIT – V

Reference Books:

EI 264 ELECTRON DEVICES LABORATORY
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time

EI 263 ELECTRICAL MACHINES LABORATORY
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time

MA247 FOURIER SERIES, TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS
Credits: 3:1:0
Unit I: Fourier series
Euler’s formula – Dirichlet’s conditions convergence statement only – change of interval odd and even functions. Half range series – RMS value, Parseval’s formula – complex form of Fourier series – harmonic analysis.

Unit II: Partial Differential Equations
Formation of equations by elimination of arbitrary constants and arbitrary functions – solution of equations – general, particular and complete integrals – Lagrange’s linear equation – standard type of first order equations – second order and higher order equations with constant coefficients, homogeneous and nonhomogeneous equations.

Unit III: One-Dimensional Wave Equations and Heat Equation
One dimensional wave equation – transverse vibration of finite elastic string with fixed ends – boundary and initial value problems – Fourier series solution. One dimensional heat equation – steady and unsteady states, boundary and initial value problems – Fourier series solution. (Proofs and derivations not needed)

Unit IV: Two Dimensional Heat Equation
Two dimensional heat equations – steady state heat flow in two dimensions – Laplace Equations in Cartesian and polar co ordinates Fourier series solution. (Proofs and derivations not needed)

Unit V: Fourier transforms

Text Books:

Reference Books:

EC284 DIGITAL ELECTRONICS

Credits: 3:1:0

Unit I: Number Systems & Boolean Algebra
Unit II: Combinational Logic Design

Unit III: Counters & Registers

Unit IV: Synchronous Sequential Logic Design
Basic models of sequential machines – concept of state table – state diagram – state reduction through partitioning & implementation of synchronous sequential circuits

Unit V: Digital Logic Families
LOGIC FAMILIES: RTL, DTL, TTL families, schottky – clamped TTL, Emitter Coupled (ECL), Integrated Injection Logic (IIL), MOS inverters, CMOS inverters, comparison of performance of various logic families.

Text Book

Reference Books

10E1204 SIGNALS AND SYSTEMS

Credit: 4: 0: 0

Course Objective:
- Coverage of continuous and discrete-time signals and systems, their properties and representations and methods that are necessary for the analysis of continuous and discrete-time signals and systems.
- Knowledge of time-domain representation and analysis concepts as they relate to difference equations, impulse response and convolution, etc.
- Knowledge of frequency-domain representation and analysis concepts using Fourier Analysis tools, Z-transform
- Concepts of the sampling process
• Mathematical and computational skills needed in application areas like communication, signal processing and control, which will be taught in other courses.

Course Outcome:
• Characterize and analyze the properties of CT and DT signals and systems
• Analyze CT and DT systems in Time domain using convolution
• Represent CT and DT systems in the Frequency domain using Fourier Analysis tools like CTFS, CTFT, DTFS and DTFT.
• Conceptualize the effects of sampling a CT signal
• Analyze CT and DT systems using Laplace transforms and Z Transforms.

Unit I: Introduction- Continuous and Discrete Time Signals and Systems
Continuous Time (CT) signals – CT signal operations – Discrete Time(DT) signals – Representation of DT signals by impulses – DT signal operations – CT and DT systems – Properties of the systems – Linear Time Invariant(LTI) and Linear Shift Invariant(LSI) systems

Unit II: Time Domain Representation of Continuous and Discrete Time Systems
Continuous and Discrete Convolutions – CT system representations by differential equations – DT System representations by difference equations

Unit III: Frequency Domain representation of CT systems

Unit IV: Frequency Domain representation of DT systems

Unit V: Transform Operations of CT and DT Signals and Systems
Review of Laplace Transforms-Z transform and its properties – Inverse Z transform – Solution of Difference equations – Analysis of LSI systems using Z transform

Text Books:
Reference Books:

10EI205 CONTROL SYSTEMS

Credits: 3: 1:0

Course Objective

- To teach the fundamental concepts of Control systems and mathematical modeling of the system
- To study the concept of time response and frequency response of the system
- To teach the basics of stability analysis of the system

Course Outcome:

- Represent the mathematical model of a system
- Determine the response of different order systems for various step inputs
- Analyse the stability of the system

Unit I: Introduction
Systems and their representation: Basic structure of control system, Open loop and Closed loop systems- Electrical analogy of physical systems-transfer function- Block diagram representation- Block diagram reduction technique-Signal Flow graph and Mason’s formula

Unit II: Components of Control System
Components of Automatic Control systems - Potentiometer - Synchros - Controllers- Tachogenerator - AC and DC servo motor- Stepper motors - Gyroscope

Unit III: Time Domain Analysis
Types of test inputs-Response of first and second order system-Time domain specifications- type and order of a system-response with P, PI, PD, and PID controllers-steady state error-static error and generalized Error coefficients- correlation between static and dynamic error coefficients
Unit IV: Frequency Domain Analysis
Frequency response- Frequency domain specifications –correlation between time and frequency response- Lead, lag and lead-lag compensators-Frequency response plots- Bode and Nyquist plots- Polar plot- Nichol’s chart and M and N circles

Unit V: Stability Analysis
Concepts of stability: Characteristic equation- location of roots in s-plane for stability-asymptotic stability and relative stability- Routh-Hurwitz stability criterion-Root locus techniques

Text Books:

Reference Books:
3. B.S Manke, ”Linear Control Systems,” Hanna Publications, Delhi 2002

10EI203 SENSORS AND TRANSDUCERS

Credits: 4:0:0

Course Objective:
• To gain knowledge about the measuring instruments and the methods of measurement and the use of different transducers

Course Outcome:
• To get the basic idea of measurements and the errors associated with measurement.
• To differentiate between the types of transducers available
• To gain information about the function of various measuring instruments and using them

Unit I: Science of Measurement
Measurements - Measurement systems - Methods of Measurements - Direct and Indirect Methods- Generalized Measurement System- Classification of Instruments - Deflection and Null Type- Characteristics of Instruments - Static and Dynamic-Calibration of instruments – Errors in measurement

Unit II: Classification and Characteristics of Transducer
Primary sensing elements - Mechanical Devices and Primary detectors – Transducer – Definition, Classification of Transducer –Characteristics and choice of transducer – Factors
influencing choice of transducer – Mathematical model of transducer- I and II order- Response to step – impulse – ramp and sinusoidal inputs

Unit III: Resistive and Inductive Transducers
Inductance Transducer: Basic principle – Linear variable differential transformer - RVDT-
Synchro – Induction potentiometer-variable reluctance accelerometer-microsyn. Torque measurement on rotating shafts – shaft power measurement (dynamometers)

Unit IV: Transducers based on Capacitance and other Transducers
Capacitance Transducer – Basic principle- transducers using change in area of plates - distance between plates- variation of dielectric constants-frequency response - Piezoelectric transducer-
Basic principle, Mode of operation - properties of piezoelectric crystals-loading effect, Magnetostrictive Transducer- Hall effect transducer

Unit V: Digital and other Miscellaneous sensors

Text Books:

Reference Book:

EE261 C++ AND DATA STRUCTURES
Credits: 3:0:0

Unit I: Introduction to Data Structures
Linked list, Single linked list, Doubly linked list, Circular Linked list, Stack, Queue, Trees

Unit II: Sorting and Searching Techniques
Sorting, Bubble sort, Insertion Sort, Selection Sort, Quick Sort, Heap Sort, Merge Sort.
Searching, Binary Tree Search, Linear Search, Binary Search.

Unit III: Objects and Classes
A Simple class, C++ objects as physical objects, C++ Objects and Data types, Object as function argument, constructors, as function argument, Overloaded Constructors, Copy Constructors, Returning objects from functions, structures and classes, Static class data, const and classes, Arrays and Strings.
Unit IV: Operator Overloading
Overloading Unary and Binary Operator, data conversion, and Pitfalls, Inheritance: derived class and base class, derived class constructors, Overloading member functions, class hierarchies, public and private inheritance, level of inheritance, multiple inheritance. Pointers: address and pointers, pointers and arrays, pointer and c-type strings, new and delete operator, pointers to pointer.

Unit V: Virtual Functions
Virtual functions, Friend functions, Static functions, this pointer. Streams and files: stream classes, stream errors, disk file I/O with streams, file pointers, error handling in file I/O. Templates and exception: function templates, class templates, exceptions.

Text Books

Reference Books

EI 265 MEASUREMENTS LABORATORY
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time

EI 266 SENSORS AND TRANSDUCERS LABORATORY
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time

10EI208 PROCESS DYNAMICS AND CONTROL
Credits: 4:0:0

Course Objective:

- To equip the students with the knowledge of modelling a physical process
- To design Various control schemes
- To apply the control system in various processes
Course Outcome:

- Students will be able to model a physical process.
- Students will have the knowledge of various controller designs, and methods of controller tuning.
- Students will be exposed to various complex control schemes, characteristics and application of control valves.

Unit I: Process dynamics

Unit II: Basic control actions

Unit III: Optimum controller settings
Controller tuning Methods: Evaluation criteria - IAE, ISE, ITAE. Process reaction curve method,-Ziegler –Nichol’s tuning- damped oscillation method- Closed loop response of I & II order systems with and without valve -measuring element dynamics

Unit IV: Final control elements
Pneumatic control valves- construction details- types- plug characteristics- Valve sizing- Selection of control valves- Inherent and installed valve characteristics- Cavitation and flashing in control valves- Valve actuators and positioners

Unit V: Advanced control system
Cascade control- ratio control- feed forward control- Split range and selective control-Multivariable process control- interaction of control loops - Case Studies: Distillation column-boiler drum level control- Heat Exchanger and chemical reactor control

Text Books:

Reference Books:

EI 262 DIGITAL SIGNAL PROCESSING

Credits: 3:1:0

Unit I Introduction
Concepts of signal processing - typical applications - advantages of digital signal processing compared with analog processing.

Unit II Finite Impulse Response Digital Filters

Unit III: Infinite Impulse Response Digital Filters
Review of classical analog filters-Butterworth, Chebyshev and Elliptic filters–Transformation of analog filters into equivalent digital filters using impulse invariant method and Bilinear Z transform method-Realization of stuctures of IIR filters-Direct, cascade, parallel forms

Unit IV Introduction to programmable DSPs
Multiplier and Multiplier Accumulator Unit – Modified Bus Structure and memory Access in P-DSPs – Multiple Access Memory – Multiported memory – VLIW Architecture – Pipelining - Special addressing modes – P-DSPs with RISC and CISC processors

Unit V Architecture of TMS 320C5X
Introduction – Architecture of TMS320C5X – On-chip peripherals – Instruction set of TMS320C5X – Simple Programs

Text Books
Reference Books
3. Texas Instruments Manuel for TMS320C5XProcessor.

10EI206 SIGNAL CONDITIONING CIRCUITS

Credits: 3:1:0

Course Objective:
- To understand the basic concepts in the design of electronic circuits using linear integrated circuits and their applications in the processing of analog signals.

Course Outcome:
- Explain the general properties of an operational amplifier and design different feedback circuit
- Design different amplifier circuits
- Discuss the operation of multiplier and voltage regulator circuits
- Discuss the operation and applications of PLL

Unit I Operational Amplifier
Operational amplifier-ideal op-amp- op amp internal circuit - DC characteristics –bias- offset – frequency-slew rate - AC characteristics- frequency compensation techniques-Non inverting and inverting amplifier - differential amplifier with active loads-current sources

Unit II Operation Amplifier and Applications:

Unit III Amplifiers and Filters
Buffer amplifier - Use of op-amp with capacitive displacement transducer - charge amplifier - instrumentation amplifier - isolation amplifier - filters - Low pass - High pass - Band Pass - Band reject filter - First order and second order transformations - state variable filter - switched capacitor filter

Unit IV Voltage Regulators and Multipliers
Series op amp regulator- IC voltage regulator - 723 general-purpose regulators - Precision Reference Regulator - Four quadrant multiplier & its applications - frequency doubling - phase angle detection
Unit V  PLL
Basic principle - phase detector and comparator - analog and digital - voltage controlled oscillator - Monolithic PLL - Application of PLL as - frequency multiplication & division- frequency translation – AM – FM – FSK modulation and demodulation

Text Books

Reference Books

10E1214 COMMUNICATION ENGINEERING

Credits: 4:0:0

Course Objective:
- To equip students with various issues related to analog and digital communication such as modulation, Demodulation, Noise handling, Data conversion and Multiplexing

Course Outcome:
- Students will be familiar with the techniques involved in the transfer of information in the field of Radio communication
- Students will be able to detect and correct the errors that occur due to noise during transmission
- Students will be able to understand the concepts of Facsimile, Television, Cellular and Satellite Communication

Unit I: Radio Communication Systems

Unit II: Transmitters and Receivers
AM and FM transmitters and receivers – AM and FM modulators and demodulators – Comparison of AM, FM and PM – Noise –Sources and Types of noise -Effects of noise in AM and FM systems

Unit III: Digital Communication Systems
Unit IV: Data Transmission
Twisted pair and coaxial cables – Fiber optics – Sources and detectors – Fiber optic Complete system –A/D and D/A converters- Error detection and correction – Multiplexing introduction – TDM & FDM

Unit V: Facsimile & Television
Facsimile- Modem functions – RS232 operation - TV signals – TV receivers – Color TV-Radar concepts- Basic concepts of Satellite communication and cellular communication

Text Books:
3.Wayne Tomasi, “Electronic communication systems”, Prentice Hall of India LTD, New Delhi, 2004

Reference Books:
5. Anokh Singh, “Principles of Communication Engineering”, S.Chand and Company Ltd., Delhi,

10E1209 INDUSTRIAL INSTRUMENTATION
Credits: 4: 0: 0

Course Objective:
• To equip the students with the basic knowledge of Pressure, Temperature, flow, level, density and viscosity measurements.
• To understand the construction and working of measuring instruments.

Course Outcome:
• The student will be equip with the basic knowledge of Pressure, Temperature, flow, level, density and viscosity measurements.
• The student knows to calibrate the various instruments also he knows to apply the instrument in various fields.

Unit I: Pressure Measurement
Pressure measurement basics, standards- Manometers – Elastic elements- Electrical methods using strain gauge-High pressure measurement-Vacuum gauges - Mcleod gauge - Thermal conductivity gauges -Ionization gauge selection and application – Capacitance Pressure measurement- Piezo-electric - Calibration of Pressure gauge using Dead Weight Tester
Unit II: Flow Measurement

Unit III: Temperature Measurement
Temperature standards - fixed points -filled-system thermometers - Bimetallic thermometer- Resistance temperature detector (RTD) - principle and types - construction requirements for industry - measuring circuits- Thermistors - Thermocouple - Cold junction compensation- IC temperature sensors - Radiation pyrometer- Optical Pyrometer -Sensor selection- calibration and application

Unit IV: Level Measurement
Visual techniques - float level devices- displacer level detectors- rotating paddle switches- diaphragm - Air purge system and differential pressure detectors - resistance - capacitance and RF probes - radiation - conductivity - field effect - thermal – ultrasonic - microwave - radar and vibrating type level sensors – Solid level measurement - Sensor selection - calibration and application

Unit V: Viscosity and Density Measurement

Text Books:

Reference Books:

EI261 ELECTRONIC INSTRUMENTATION

Credits: 4:0:0

Unit I Electronic Analog Meter:
**Unit II Analog Instruments:**

**Unit III Digital Instruments:**

**Unit IV Digital Measurement:**

**Unit V Digital Displays:**

**Text Books**

**Reference Books**

**EI 267 CONTROL SYSTEMS LABORATORY**
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time

**EI 268 SIGNAL CONDITIONING CIRCUITS LABORATORY**
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time
Credits: 4: 0: 0

Course Objective:
To equip the students with relevant knowledge about the functions of a central processing unit on a single integrated circuit (IC)

Course Outcome:
- Adequate knowledge about functions of a microprocessor and microcontroller.
- Details of instructions used in microprocessor and microcontroller for the execution of program.
- Exposure in the applications of the processor in interfacing of LED, Keyboard, stepper motor.
- To write the assembly language program by using different instructions.

UNIT I: ARCHITECTURE OF 8085

UNIT II: PROGRAMMING OF 8085
Instruction formats – Addressing modes – Instruction set – Need for assembly language programmes.

UNIT III: I/O INTERFACING

UNIT IV: INTERRUPTS AND DMA

UNIT V: INTEL 8051 MICROCONTROLLER
8051 PERIPHERAL FUNCTIONS: 8051 interrupt structures – Timer and serial functions – Parallel port features: Modes of operations – Power control, features – Interfacing of 8051 – Typical applications – MCS 51 family features 8031/8051/8751
Text Books
4. The 8051 Microcontroller Architecture, Programming & Applications II Edition
Kenneth J Ayala PRI ISBN 81-900828-4-1, 2005

Reference Books

10EI213 DIGITAL CONTROL SYSTEMS

Credits: 3:1:0

Course Objective:
- To equip the students with the basic knowledge of A/D and D/A conversion
- To understand the basics of Z-Transform
- To study the stability analysis of digital control system
- To equip the basic knowledge of digital process control design

Course Outcome:
- Students will have the basic knowledge of A/D and D/A conversion
- Students will have the knowledge of Z-Transform
- Students will have knowledge of digital process control design

Unit I: Sample Theory and Converters
Review of Sample theory - Shannon's sampling theorems - Sampled Data Control system, Digital to Analog conversion – Analog to Digital conversion- Ramp type A/D-Dual slope A/D- Successive approximation A/D - A/D & D/A converters - Reconstruction - Zero Order Hold

Unit II: System Response
Review of Z and Inverse Z transform - Response of sampled data systems to step and ramp inputs - Steady state errors - Z domain equivalent- Modified Z transform

Unit III: Function Realisation
Pulse transformation function by direct, cascade and parallel realization - Sampled data model for continuous system - Controllability and observability- Design of state feedback and output feedback control
Unit IV: Stability of Digital Control Systems
Stability studies - Bilinear transformation - Jury's stability test - Digital quantization. State sequences for sampled data systems - solutions

Unit V: Digital Process Control Design
Digital PID algorithm - Positional and incremental forms - Dead-beat algorithm- Dahlin's and Kalman's algorithms - Ringing - Implementation of control algorithms using microcontroller – Block diagram study of digital implementation.

Text Books:

Reference Books:

10MS202 BUSINESS ENVIRONMENT

Credits: 2:0:0

Objectives
To understand the overall business environment and evaluate its various components in business decision making.

Learning Outcome:
The course helps the students to familiarise with the nature of business environment and its components. The course contents facilitate the students to develop conceptual framework of business environment and generate interest in international business.


Unit IV - Financial system – monetary and fiscal policies – credit market – money market and capital market- nature and constituents –industrial financing institutions (an overview).
Unit V - Global environment – WTO – multinational corporations – export and import policy –
foreign exchange FERA and FEMA - corporate governance – social responsibility and business.

Text Books
  1. Francis Cherunilam, Business Environment- Text and Cases, Himalaya Publishing
     House, New Delhi (latest Edition)
     edition)

10EI211 BIOMEDICAL INSTRUMENTATION

Credits: 4: 0:0

Course Objective:

- With widespread use and requirements of medical instruments, this course gives
  knowledge of the principle of operation and design of biomedical instruments.
- It attempts to render a broad and modern account of biomedical instruments.
- It gives the introductory idea about human physiology system which is very important
  with respect to design consideration

Course Outcome:

- Students will have a clear knowledge about human physiology system.
- They will have knowledge of the principle operation and design and the background
  knowledge of biomedical instruments and specific applications of biomedical engineering

Unit I: Anatomy & Physiology of human body
The cell & its electrical activity- principle physiological system: Cardiovascular - Nervous
system - Respiratory system- Muscular system - Origin of bioelectric signal - Bioelectric signals:
ECG- EMG – ECG - EOG and their characteristics

Unit II: Measurement of Physiological Parameters
Physiological transducers - Measurement of Blood pressure - Blood flow - Cardiac output
measurement - heart rate - respiration rate - measurement of lung volume - Oximeters -
Audiometer

Unit III: Therapeutic and Surgical Equipments, Patient safety
Electro Surgical unit: short wave & microwave diathermy - Laser surgical unit-Defibrillators,
pacemaker - heart-lung machine – Dialyses - Anesthesia machine – Ventilators - Nerve
stimulators - Total artificial heart (TAH). Patient Safety: Electric Shock Hazards - Leakage
Current

Unit IV: Clinical Laboratory Instruments
Clinical Flame photometer - spectrophotometer – Colorimeter- chromatography- Automated
Biochemical analysis system - Blood Gas Analyzer: Blood pH Measurement- Measurement of
Blood pCO2- Blood pO2 Measurement- Blood Cell Counters: Types and Methods of cell counting

**Unit V: Imaging technique & Telemetry**


**Text Books:**

**Reference Books:**

**09MS209 MANAGERIAL SKILLS**

**Credits: 2:0:0**

**Unit: I – (5 hrs)**

**Creativity** - Basic concepts – Mental Abilities - Barriers to creativity – Convergent and Divergent thinking - Improving creativity – Creative Problem Solving methods – Steps to creative problem solving- Games on Creativity

**Unit: II – (6 hrs)**


**Unit III – (7 hrs)**

**Team Building & Conflict Management** - Groups and Teams – Teams basics – Stages of Team building – Forming, Storming, Norming, Performing, Adjourning – Characteristics of effective teams – **Conflicts** - Positive and Negative effects of conflict – Types and stages of conflict – Conflict Management styles - Role plays
Unit IV – (7 hrs)
Group Discussion & Personal Interview

Unit IV – (5hrs)

Practical Sessions:
1. Resume writing, Group Discussion, & Interview.

Recommended Text Book

Reference Books:
3. Jerald Greenberg, Robert A. Baron / Carol A. Sales / Frances A. Owen / Verlag (1999) Behaviour in Organizations; Pearson Education

09E1223 MICROPROCESSORS AND MICRO CONTROLLERS LABORATORY
Credit: 0:0:1

10 experiments will be notified by the HOD from time to time

EI 270 COMPUTER BASED PROCESS CONTROL LABORATORY
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time

09E1226 NETWORKS & PROTOCOLS FOR INSTRUMENTATION & CONTROL
Credits: 4:0:0

Course Objective:
To equip the students with relevant knowledge about network that allows computers to communicate with each other and share resources and information.
**Course Outcome:**
- Adequate knowledge about protocols and standards of OSI model.
- Details of different interface standards.
- Exposure in the industrial protocol.
- Clear idea about the network topologies, internetworking connections.

**UNIT I: INTRODUCTION AND BASIC PRINCIPLES**
Protocols, physical standards, modern instrumentation, Bits, Bytes and characters, Communication principles, Communication modes. Synchronous and Asynchronous systems, Transmission Characteristics, Data Coding, UART.

**UNIT II: SERIAL COMMUNICATION STANDARDS:**
Standards organizations, Serial data communications interface standards, Balanced and unbalanced transmission lines, RS232, 422, 423, 449, 485 interface standard, Troubleshooting, The 20mA current loop, Serial interface converters, Interface to printers, IEEE 488, USB.

**UNIT III: INTRODUCTION TO PROTOCOLS**
Flow control Protocols, BSC Protocols, HDLC, SDLC, Data communication for Instrumentation and Control, Individual OSI layers, OSI Analogy-example

**UNIT IV: INDUSTRIAL PROTOCOLS**

**UNIT V: LOCAL AREA NETWORKS:**

**Text Book.**

**Reference Books:**

**10E1210 LOGIC AND Distributed Control Systems**

**Credits: 4:0:0**

**Course Objective**
- To study the fundamentals of Data Acquisition system
- To teach the concept of PLC and the Programming using Ladder Diagram
• To understand the basics of DCS and communication standards

Course Outcome

• Students will have the knowledge of data acquisition System
• Students will be able to write Programs using ladder diagrams
• Students will have the knowledge of DCS and communication standards

Unit I  Review of Computers in Process Control
Data loggers – Data Acquisition Systems (DAS) – Direct Digital Control (DDC) – Supervisory Control and Data Acquisition Systems (SCADA) – sampling considerations – Functional block diagram of computer control systems

Unit II  Programmable Logic Controller(PLC) Basics
Definition – overview of PLC systems- input/output modules- power supplies and isolators-General PLC programming procedures-programming on-off inputs/ outputs-Auxiliary commands and functions- PLC Basic Functions- register basics- timer functions- counter functions

Unit III  PLC Intermediate Functions
PLC intermediate functions: Arithmetic functions - comparison functions - Skip and MCR functions - data move systems. PLC Advanced intermediate functions: Utilizing digital bits-sequencer functions- matrix functions- PLC Advanced functions: Alternate programming languages- analog PLC operation- networking of PLC- PID functions-PLC installation-troubleshooting and maintenance- Design of interlocks and alarms using PLC

Unit IV  Introduction to (DCS)
Distributed Control Systems (DCS): Definition - Local Control Unit (LCU) architecture - LCU languages - LCU - Process interfacing issues - communication facilities - redundancy concept

Unit V: Communication standards

Text Books:

Reference Books:

10E1212 NEURAL NETWORKS AND FUZZY LOGIC CONTROL

Credits: 4:0:0

Course Objective:
- To cater the knowledge of Neural Networks and Fuzzy Logic Control and use these for controlling real time systems.

Course Outcome:
- To expose the students to the concepts of feed forward neural networks.
- To provide adequate knowledge about feedback neural networks.
- To teach about the concept of fuzziness involved in various systems. To provide adequate knowledge about fuzzy set theory.
- To provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
- To provide adequate knowledge of application of fuzzy logic control to real time systems.

Unit I: Architectures

Unit II: Neural Networks For Control
Feedback networks – Discrete time hop field networks – Schemes of neuro-control, identification and control of dynamical systems-case studies (Inverted Pendulum, Articulation Control)

Unit III: Fuzzy Systems
Classical sets – Fuzzy sets – Fuzzy relations – Fuzzification – Defuzzification – Fuzzy rules

Unit IV: Fuzzy Logic Control

Unit V: Application of FLC
Fuzzy logic control – Inverted pendulum – Image processing – Home heating system – Blood pressure during anesthesia – Introduction to neuro fuzzy controller

Text Books:

10MS201 ENGINEERING PROJECT COSTING

Credits: 2:1:0

Objective:
The basic objective of the course is to give an insight about the importance of costing and to create necessary cost awareness to the students which adds to their knowledge a focused approach /path in the present highly competitive globalised arena. This paper provides the necessary inputs particularly for students pursuing Engineering courses and imbibe knowledge on project cost analysis etc

Learning Outcome:
At the end of the course the students will able to know and apply the cost concepts in real life projects. Project costing knowledge gives the students a practical and foreseeing insight in his area of employment. It enables them to have an awareness on cost consciousness and helps them to take cost effective decisions.

UNIT-1 : INTRODUCTION: Costing –Scope, Objectives, Advantages, Limitations, Role of Costing in WTO Objections against costing, steps in installation of cost accounting system in business, Characteristics of an ideal costing system

UNIT-2: CONCEPTS: Cost concepts- cost classification-Elements of cost- simple Cost sheet - Unit costing, Service costing - Project Cost Estimate - Application - Tender-Calculation of Machine hour rate

UNIT-3: APPLICATIONS: Job costing-Objectives, merits, limitations, Application - Process costing- application, abnormal loss, abnormal gain- - Simple break even analysis- Inventory control in projects-

UNIT-4: PROJECT COST MANAGEMENT: Key project parties-Managing risk in private infrastructure project-Project related activities-PPP (Public private partnership in infrastructure projects-outline Facet of project analysis –Key issues in major investment decisions –statement of analysis of cost variation

UNIT-5: PROJECT INVESTMENT BUDGETING:- Objectives, common weaknesses-techniques(NPV, Payback, ARR, Profitability index)-Project disparities and conflict in ranking- Project control and Performance Analysis - Decision making.
Text Books:

Reference Book:

EI 271 DIGITAL CONTROL LABORATORY
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time

EI 272 DIGITAL SIGNAL PROCESSING LABORATORY
Credit: 0:0:1
10 experiments will be notified by the HOD from time to time