DEPARTMENT OF ELECTRICAL AND ELECTRONICS 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

1. Dhanavel, S.P, 2009. English and Communication Skills for Students of Science and Engineering. Orient Black Swan.

Reference Books

1. Radhakrishnan, Pillai G.et.al. Spoken English for You-Level I. Chennai: Emerald Publishers, 2000.
2. Rizvi, Ashraf M. Effective Technical Communication. New Delhi: Tata McGraw-Hill. 2005.
3. Joseph, Maya and Sundarsingh, J. ed. Communication Skills I & II. Coimbatore, Gems Publishers, 2005.

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

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

Question Words – Statements and questions – Negation – Exercises –Nouns – Singular and Plural, Imperative statements

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 (Maz hueber Verlag)

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:

1. Viswamohan, Aysha, 2008. English for Technical Communication. Tata Mc Graw-Hill.

Reference Books

1 Joseph, Maya and Sundarsingh, J. ed. Communication Skills I & II. Coimbatore, Gems Publishers, 2005.
2 Radhakrishnan, Pillai G.et.al. (2000). Spoken English for You-Level I. Chennai: Emerald Publishers.

3 Dhanavel, S.P, 2009. English and Communication Skills for Students of Science and Engineering. Orient Black Swan.

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 s – 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

Functions of two variables – Partial derivatives – Total differential – Differentiation of implicit functions – Taylor's expansion – Maxima and Minima – Constrained Maxima and Minima by Lagrange's – Multiplier method – Jacobians

Text Book:

Kandasamy.P, Thilagavathi .K and Gunavathi K., Engineering Mathematics, Volume I (6^{th} revised Edition), S Chand. & Co., New Delhi, 2003

Reference Books:

1 Kreyszig, E., "Advanced Engineering Mathematics" (8^{th} Edition), John Wiley and Sons (Asia) Pvt Ltd., Singapore, 2000

2 Grewal, B.S., "Higher Engineering Mathematics" (6^{th} Edition) Khanna Publisher, New Delhi, 2001

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:

1. Kandasamy.P, Thilagavathi .K and Gunavathi K., Engineering Mathematics volume II (6^{th} revised Edition), S. Chand & Co., New Delhi, 2003

Reference Books:

1. Kreyszig, E., "Advanced Engineering Mathematics" (8^{th} Edition), John Wiley and Sons (Asia) Pvt Ltd., Singapore, 2000
2. Grewal, B.S., "Higher Engineering Mathematics" (6^{th} Edition) Khanna Publisher, New Delhi, 2001

PH105 APPLIED PHYSICS

Credits: 3:0:0

Unit I:
Particles and waves
Planck's hypothesis- Wave nature of matter- De Broglie wave –De Broglie wavelength of electrons-properties of matter waves, Experimental verification of matter waves- Davisson and Germer experiment, G.P. Thomson's experiment, Heisenberg's uncertainty principle.

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-clausis 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

Properties of laser beam-Principle of laser-Einstein's theory of stimulated emission-Population inversion-Types of lasers-Nd :YAG, He:Ne, CO_2 and Semiconductor lasers-Application of lasers-Computer peripherals(CD-ROM)-Industrial applications –drilling and welding.

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

V. Rajendran, A Marikani – Applied physics for Engineers Tata McGraw –Hill Publishing company Ltd Third Edition

Reference Books:

1. M.N. Avadhanulu, P.G. Kshirshagar – A Text Book of Engineering Physics- S.Chand

2. R.K. Gaur, S.L. Gupta – Engineering Physics – Dhanpat Rai Publications
3. P.K. Mittal – Applied Physics – I.K. International
4. M. Arumugam- Materials Science – Anuradha Publications
5. M.R. Srinivasan- Physics for Engineers – New Age international (P) Limited Publishers.

09PH101 APPLIED PHYSICS LAB

Credits: 0:0:2

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.

10PH201 - ENGINEERING PHYSICS

Credits: 2:0:0

Course Objectives:

- To help to prepare the Engineering students, a stronger foundation in the classical physics and Dynamics of particles

- 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

Classical Mechanics, Newton's First Law, Force, Mass, Newton's Second Law, Newton's Third Law Of Motion, System Of Mechanical Units, The Force laws, Weight And Mass, Static Procedure For Measuring Forces, Applications Of Newton's' Laws Of Motion

Unit II Heat And Thermodynamics

Heat- A Form Of Energy, Quantity Of Heat And Specific Heat, Molar Heat Capacity Of Solids, - Heat Conduction, The Mechanical Equivalent Of Heat
Heat And Work, The First, Second and Third laws Of Thermodynamics, Some Applications

Unit III : Magnetism

Coulomb's Law, Magnetic Potential, Tangent Law, Magnetic Induction, Permeability And Susceptibility, Magnetic Properties Of Materials I-H & B-H Curves, Properties Of Para, Dia and Ferro Magnetic Materials, Measurement Of Magnetic Moment—Stern & Gerlach Experiment

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

Faraday's Laws Of Electro-Magnetic Induction, Lenz's Law, Fleming's Right Hand Rule, Self Induction, Mutual Induction, Transformer, Practical Applications Of Electromagnetic Induction- Earth Inductor, Dynamo.

Text Books:

1. Fundamentals of Physics, Robert Resnick & David Halliday, Wiley Eastern Publishing Limited 2007
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
3. Fundamentals of Electrostatics, Joseph M. Crowley, 1986
4. Electricity and Magnetism, William C. Robertson, NSTA press, 2005

5. Heat and thermodynamics by M.S.Yadav, Anmol Publications Pvt. Ltd, 2002

CH106 APPLIED CHEMISTRY

Credits: 3:0:0

Unit I: High Polymers

Classification – Functionality of polymer – Mechanism (Free radical, ionic and zeigler – Nutta) – polymerization – Plastics – Thermoplastics and Thermosetting plastics – Compounding and fabrication of plastics – Important thermoplastic resins – Polythene (P.E.) – Polyvinyl Chloride (P.V.C.) – Important thermosetting plastic resins – Phenolic resin and Silicone resin – Industrial polymers – Nylons – Epoxy resin – Polyester resin – Applications of polymers – Conducting polymers – Semi conducting Polymers

Unit II: Water Technology

Sources of water – Hardness of water – Units of hardness – Estimation of hardness – EDTA method and alkalinity method – Softening of hard water – Lime soda process – Zeolite process – Demineralisation or Ion exchange process – Scale and sludge formation in boilers – Internal conditioning – Boiler crrosion – Caustic embrittlement – Desalination – Water for drinking purpose

Unit III: Fuels and Combustion

Fuels and Classifications - gross and net calorific values - Proximate and ultimate analyses of coal – Significances – Characteristics of metallurgical coke – manufacture by Otto – Hoffman method – Synthetic petrol – Bergius process – Fischer – Tropsch's process – Knocking – Octane number – Improvement of anti knocking characteristics – Cetane number, gaseous fuels – an elementary treatment of Water gas, producer gas and CNG (definition only) – An introduction to Non-conventional Sources of Energy – Biomass – Biogas – Bio fuels (Bio-diesel and Bio-ethanol) - Theoretical calculation of calorific values (Dulong's formula) – Simple problems – Calculation of minimum air requirements – Simple problems – Flue gas analysis – Orsat's apparatus

Unit IV: Electrochemistry

Electrode potential – Measurement of electrode potential – Nernst equation for electrode potential – Electrochemical Series – Electrochemical cell or Voltaic cell – Concentration cell – Primary Cell– Leclanche cell - Secondary batteries – alkaline batteries – Lead acid, and Li batteries – An introduction to Fuel Cell, $H_2 – O_2$ Fuel Cell – Applications

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:

1. P.C. Jain and Monika Jain, "Engineering Chemistry", Dhanpat Rai Publishing Co. (P) Ltd., 15th Edition, 2006

Reference Books:

1. S. Glasstone and D. Lewis – "Elements of Physical Chemistry", McMillan Co. of India Ltd., 2002
2. P.L.Soni, O.P. Dharmarsha and U.N. Dash – "Text Book of Physical Chemistry" Sulthan Chand & Sons, New Delhi, 2001
3. J C Kuriakose,and J Rajaram, "Chemistry in Engineering and Technology", Tata Mcraw-Hill Publications Co. Ltd., New Delhi, 1996
4. V.R. Gowrikar, N.V.Viswanathan and Jaydev Sreedhar, "Polymer Science", New Age International Pvt. Ltd., New Delhi, 2000.
5. Garry S. May and Simon M. Sze, "Fundamentals of Semiconductor Fabrication", Jonh Wiley & Sons, Inc., 2004, Chapter – I
6. C. Daniel Yesudian and D.G. Harris Samuel, "Materials Science & Metallurgy", Scitech Publishers, 2004
7. Charles P. Poole Jr. and Frank J. Ownes, "Introduction to Nanotechnology", Wiley Publishers, 2003

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

1. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, "Vogel's text book of quantitative chemical analysis", ELBS, 6th Edition, Longman, Singapore publishers, Singapore, 2004
2. I.M. Kolthoff and E.B. Sandell, "Quantitative Chemical Analysis" MacMillan, Chennai, 1980
3. S.K. Bhasin and S.K. Sudha Rani, "Laboratory Manual on Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., 2003

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

Environment - Definition, scope and importance – Forest resources: Use and overexploitation, Water resources: Use and over-utilization, dams-benefits and problems – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – Land resources: land degradation – Role of an individual in conservation of natural resources Ecosystem – Structure and function – Ecological succession – Introduction to various ecosystems. Biodiversity – Definition and types – Threats to Biodiversity in India and its impacts – Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit II – Air pollution and global issues

Air pollution - Introduction – atmospheric constituents – Chemical reaction in the atmosphere – air pollutants – classification – effects on human, animal, plant, property and environment – control methods for particulates and gaseous pollutants – control of pollutants from automobiles – Burning of plastics – PCBs and their impact - Green house gases – Photochemical reaction – green house effects - climate change - global warming and its effects – international climate conventions, protocols and perspectives – technology and policy options for GHG emission mitigation - acid rain, ozone layer depletion and solutions

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

catalysts in industries – basics of clean energy technology for the future – fuel cells, wind power, solar power

Unit IV – Environmental Legislation

Pollution controls acts – environment protection act – water pollution act – air pollution act – wildlife (protection) act, 1972 – forest (conservation) act, 1980 – polluter pays principle – precautionary principle – Issues in pollution control enforcement and public awareness – issues of environment – public awareness

Unit V - social issues and the environment

From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management - Population growth, variation among nations – Population explosion – Environment and human health – Role of Information Technology in Environment and human health – Family welfare programme – HIV / AIDS – women and child welfare – Disaster management: floods, earthquake, cyclone and landslides

Text books:

1. Deeksha Dave and S.S. Katewa, "Textbook of Environmental studies", Cengage Learning, 2008
2. 2.Deswal S and Deswal A,'A basic course in Environmental studies', Dhanpat Rai & Co, First edition, Delhi, 2004
3. Kurian Joseph and Nagendran R, 'Essentials of Environmental studies', Pearson Education Pvt ltd., First edition, Delhi, 2004
4. 4. Santhosh Kumar Garg, Rajeswari Garg and Ranjani Garg, 'Environmental Science and Ecological Studies', Khanna Publishers, Second Edition, New Delhi, 2007.

Reference Books:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', Pearson Education Pvt. Ltd., Second Edition, 2004.
2. Tivedi R.K., 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media., 1998
3. Cunningham, W.P.Cooper, T.H.Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
4. Wager K.D., 'Environmental Management,' W.B. Saunders Co., Philadelphia, USA, 1998.
5. James Clark & Duncan Macquarie, "Green Chemistry & Technology", Blackwell publishing, 2002

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

Engine-External combustion engine – Working of Steam Engine – Steam Turbine – Impulse turbine & reaction turbine – Boilers fire tube and water tube boiler – Cochran boiler – Babcock & Wilcox boiler – Internal Combustion Engine – Working of petrol and Diesel Engine – Difference between two stroke and four stroke engines.

UNIT - II

Conventional power plants – Hydro, Thermal, Nuclear power plants – Diesel and Gas Turbine power plants; Non-conventional power plants – Solar, wind and tidal power plants – Geothermal power plant – Ocean Thermal Energy conversion power plant.

UNIT - III

Load – Types of load –stress and strain – Types of stresses and strains –Stress strain curve of ductile materials- Introduction of Mechanical Engineering Software Packages.

UNIT – IV

Metal casting and forming process – Introduction – advantages of casting – patterns – molding – melting of cast iron – forging. Metal joining Process: Introduction - welding – arc welding, gas welding

UNIT –V

Metal machining: Lathe – Drilling machine – Milling machine – Shaping machine.
Basic Engineering Materials: Properties of materials – ferrous metals and alloys – Nonferrous metals and alloys.

Text Books:

1. S.R.J.Shantha Kumar, "Basic Mechanical Engineering", HiTech Publications,2001.
2. G. Shunmagam, "Basic Mechanical Engineering", Tata McGraw Hill, 2001.

Reference Books:

1. I.E. Paul Degarmo, J.T. Black, Ronald A. Kosher, "Material and Processes in Manufacturing", 8th Edition, John Wiley and sons, inc., 1999.
2. Dr. O.P. Khanna, "A Text Book of Materials Sciences and Metallurgy", Dhanpat Rai & Sons, Delhi, 2001.
3. V.Remesh Babu, "A Text Book on Basic Civil Engineering", Anuradha Agencies,2000
4.K.Venugopal,V.Prabhuraja," Basic Mechanical Engineering", Anuradha Agencies,2000

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

IC: OP-amp – introduction-Ideal characteristics-inverting and non-inverting amplifier –adder subtractor-differentiator-integrator- Monolithic IC fabrication techniques.

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

Muthusubramanian ,R, Salivahanan S, Muraleedharan Ka , "Basic Electrical Electronics & Computer Engineering "Tata Mc.Graw Hill, 2005

Reference Books

1. Robert Boylestad, "Electronic Devices & Circuit Theory", Eigth Edition, PHI,2002.
2. Anokh Singh, "Principles of Communication Engineering" S.Chand Co., 2001
3. V.K.Metha."Principles of Electronics",Chand Publications,2008.

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

Standard symbols – Units & Abbreviations – Circuit Elements – Current and Voltage Sources – Ohm's and Kirchhoff's law – Resistive circuits – Series and Parallel reduction – Voltage and Current Division – Source transformation – Star Delta Transformation

Unit II: MAGNETIC CIRCUITS

Magnetic flux- flux density – reluctance – permeance-magnetic effect of electric circuit-Law of Electromagnetic induction – induced emf – self and mutual inductance – coupling co-efficient – inductance in series and parallel, Magnetic Materials.

Unit III: AC FUNDAMENTALS

Sources of Electrical Energy – Thermal, Hydro and Nuclear power generating station – Transmission of Electric Power – Introduction to Alternating Quantities – Average and RMS 6.7 values – Circuit Elements – Series and Parallel Combinations – Phasor representation – Introduction to three phase system.

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

Classification of Instruments – Essential features of Indicating Instrument – Deflecting, Controlling and Damping Mechanism - Moving Coil instrument – Moving Iron Instrument – Induction type Instruments – examples.

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

Muraleedharan K. A, Muthusubramanian R & Salivahanan S, "Basic Electrical, Electronics & Computer Engineering", Tata McGraw Hill Limited, New Delhi, 2006.

Reference Books

1. Chakrabarti .A, Sudipta nath and Chandan Kumar, "Basic Electrical Engineering", Tata Mc Graw Hill Limited, New Delhi, 1st edition, 2009.
2. Edward Hughes, "Electrical Technology", ELBS, 6th edition, 2002.
3. Mittle. V.N., "Basic Electrical and Electronics Engineering", Tata McGraw Hill Edition, New Delhi, 1st edition, 2007.
4. Openshaw Taylor .E, "Utilization of Electrical Energy in SI Units", Orient Longman limited, New Delhi, 2007.

5. Delton T. Horn, Abraham Pallas, “Basic Electricity and Electronics”, McGraw-Hill Limited, Europe, 1993

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

Operators and Expressions - Arithmetic Operators – Unary Operators – Relational and Logical Operators – Assignment Operators – The Conditional Operator – Library Functions – Data Input and Output **–** Preliminaries - Single Character Input & Output – Entering Input Data – More About scanf Function - Writing Output Data – More About printf Function – The Gets and Puts Functions – Interactive Programming – Preparing and Running a Complete C Program **–** Planning a C Program- Writing a C Program – Error Diagnostics – Debugging Techniques (Chapters 3-5)

Unit III

Control Statements – Preliminaries - Branching – Looping – More Looping – Still More Looping - Nested Control Structures – The switch, break, continue, comma statements – The Goto Statement – Functions Defining a Function – Accessing a Function – Function Prototypes – Passing Arguments to a Function – Recursion (Chapters 6,7)

Unit IV

Program Structure - Storage Classes – Automatic Variables – External Variables – Static Variables – Multifile Programs – More About Library Functions Arrays: Defining an Array – Processing an Array – Passing Arrays to Functions – Multidimensional Arrays – Arrays and Strings- Pointers - Fundamentals – Pointer Declarations – Passing Pointers to Functions – Pointers and One-Dimensional Arrays – Dynamic Memory Allocation - Operations on Pointers – Pointers and Multidimensional Arrays – Arrays of Pointers – Passing Functions to other Functions (Chapters 8-10)

Unit V

Structures & Unions - Defining a Structure – Processing a Structure – User-Defined Data Types – Structures and Pointers – Passing Structures to Functions – Self Referential Structures – Unions. Data Files – Why Files - Opening and Closing a Data File – Reading and Writing a Data File – Processing a Data File – Unformatted Data Files – Concept of Binary Files -

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

Text Book:
Byron S. Gottfried, Programming with C, Second Edition, 1996 (Indian Adapted Edition 2006), Tata McGraw Hill, ISBN 0-07-059369-8.

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
6. Customer Account Locator.
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.
10. Matrix Addition, Multiplication Using Functions.
11. Data Files
12. Data Files.

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

MA 246 COMPLEX ANALYSIS, STATISTICS AND Z-TRANSFORMS

Credit: 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 – χ^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:

1. Kandasamy, Thilagavathi .K and Gunavathi K., Engineering Mathematics volume II and III (6^{th} revised Edition), S. Chand & Co., New Delhi, 2003

Reference books:

1. Kreyszig, E., "Advanced Engineering Mathematics" (8^{th} Edition), John Wiley and Sons (Asia) Pvt Ltd., Singapore, 2000
2. Grewal, B.S., "Higher Engineering Mathematics" (6^{th} Edition) Khanna Publisher, New Delhi, 2001

10EE201 ELECTRIC CIRCUITS AND NETWORKS

Credit: 3:1:0

Course Objective:

This Course will provide the students to

1. Develop an understanding of the fundamental elements of electric circuits.
2. Develop the ability to apply the basic theorems to analyze a DC and AC electric circuit.
3. Use mathematical methods such as Laplace and Fourier transforms and some linear algebra techniques and differential equations to solve circuits problems
4. Synthesize a network with stable condition.

Course Outcome:

At the end of this course, the student should be able to

1. Analyze simple circuits applying Ohm's and Kirchhoff's laws
2. Analyze first-order, second order response of RL, RC and RLC circuits.
3. Demonstrate the network parameters of a transmission cable.
4. Design any non linear network, filters and attenuators for an application

Unit I: Circuit Analysis

System of Units-Electrical Quantities-Circuit elements-Independent and Dependent sources-Ohm's Law-Kirchhoff's Laws-Analysis of circuits using Kirchhoff's law, Source transformation, Wye-Delta transformation - Network graph - tree and cut sets - Cut set and tie set schedule- dual network - Matrix representation and solution of AC and DC networks, Node and Loop basis analysis of AC and DC.

Unit II: Network Theorems

Superposition, Reciprocity, Substitution, Thevenin, Norton, and Maximum Power Transfer Theorems - Problems

Unit III: Transient Response of Electric Circuits

Transient Concepts – Singularity functions-unit step, unit impulse-transient response of simple RL, RC and RLC series and parallel circuits for step input and sinusoidal excitation-Laplace transform application to the solution of RL, RC & RLC circuits: initial and final value theorem and applications – Concept of complex frequency – Driving point and transfer impedances – Poles and zeros of network function.

Unit IV: Coupled Circuits and Three Phase Circuits

Coupled circuits – coefficient of coupling – self and mutual inductances – analysis of coupled circuits – single and double tuned coupled circuits – Three phase circuits – balanced circuits - star and delta connected loads - phase sequence - unbalanced circuits - solution of unbalanced star and delta connected loads – power measurement by two wattmeter method.

Unit V: Two Port Networks and Filters

Driving point and transfer impedance/admittance - voltage and current ratios of two port networks - admittance, impedance, hybrid, transmission and image parameters for two port networks – impedance matching – equivalent π and T networks – passive filters as a two port network – characteristics of ideal filter – low pass and high pass filters.

Text Books:

1. Navhi and Edminister J A, " Theory and Problems of Electric circuits" Tata McGraw- Hill Publishing Company Limited, New Delhi, 2007.
2. Sudhakar , Shyammohan S Palli, "Circuits and Networks – Analysis and Synthesis", Tata McGraw- Hill Publishing Company Limited, New Delhi, 2007.

Reference Books

1. Charles K Alexander and Mathew N O Sadiku, "Fundamentals of Electric Circuits", Tata Mc Graw -Hill Publishing Company Limited, New Delhi, 2007.
2. Jack E Kemmerly, Steven M Durbin and William H Hayt Jr, "Engineering Circuit Analysis", Tata Mc Graw- Hill Publishing Company Limited, New Delhi, 2006.
3. Sivanandam.S.N., "Electric Circuit Analysis", Vikas Publishing House Private Limited, New Delhi, 2001.

EE247 ELECTRON DEVICES

Credits 3:1:0

Unit I: P-N Junction Diode

V-I characteristics - Static and Dynamic resistance, Temperature dependence of characteristics, diffusion and transition capacitances, Diode as a circuit element, small signal and large signal models. Elementary applications - Clippers and clampers, Diode switching times, PN junction diode ratings. Breakdown phenomena in diodes - Zener diodes. Metal - semiconductor junction - Schottky barrier diodes.

Unit II: Bipolar Junction Transistor (Bjt)
Physical behaviour of a BJT – Ebers - Moll model, large signal current gains, Modes of transistor operation - Common Base, Common Emitter and Common Collector configurations, Input and output characteristics, Early effect, regions of operation, AC and DC load lines - Need for stability of Q-Point, Bias stability – fixed bias, collector to base bias, self bias. Transistor switching times - Transistor as a switch and an amplifier, High frequency effects, BJT ratings. Introduction to photo transistors.

Unit III: Junction Field Effect Transistor (Jfet)
JFET operation - V-I characteristics, transfer characteristics, regions of operation. DC analysis - JFET biasing. Small signal JFET model, JFET as a switch, Voltage variable resistor and an amplifier.

Unit IV: Metal Oxide Semiconductor Field Effect Transistor (Mosfet)
Constructional details - Operation of Enhancement and Depletion type MOSFETs , V-I characteristics, Transfer characteristics, analytic expression for drain current, Comparison of PMOS and NMOS devices - MOSFET biasing, MOSFET as a switch, resistor and amplifier, Introduction to CMOS devices.

Unit V: Integrated Circuit (Ic) Fabrication
Monolithic IC technology - Planar processes, Epitaxial growth, Oxidation, Photolithography, Diffusion, Ion implantation, Metallization. BJT fabrication - need for buried layer, Junction and Dielectric isolation, Fabrication of PNP multiple emitter transistors, Monolithic diodes, Fabrication of FETs, NMOS enhancement and depletion MOSFETs, Self isolation, CMOS technology. Monolithic IC Resistors: sheet resistance - Diffused, Ion implanted, Epitaxial, pinch, MOS and thin film resistors, Monolithic IC capacitors - Junction, MOS and thin film capacitors, IC packaging, Micro-electronic circuit layout.

Text Books

1. Millman J and Grabiel A, "Microelectronics", Tata McGraw-Hill Publishing Company Limited, New Delhi, 3rd Edition, 2000.
2. Boylestead L R and Nashelsky L, "Electronic Devices and Circuit Theory", Pearson Education India Series, New Delhi, 9th Edition, 2006.

Reference Books:

1 Adel S Sedra and Kenneth C Smith, "Microelectronic Circuits", Oxford University Press, London, 4th Edition, 1998.
2 Thomas L. Floyd, "Electronic Devices", Pearson Education India Series, New Delhi, 7th Edition, 2007.
3 David A Bell, "Electronic Devices and Circuits", Prentice Hall of India, New Delhi, 4th Edition 2000.

EE248 ELECTROMAGNETIC FIELDS

Credits 3:1:0

Unit I General Principles

Review of vector algebra-Coordinate systems-Rectangular, Cylindrical and Spherical Coordinate Systems- Coordinate transformation-Differential Line, Surface and Volume Elements-Line, Surface and Volume Integrals- Gradient, Divergence and Curl Operators-Divergence Theorem-Stokes' Theorem.

Unit II Electrostatic Fields

Field concept – Charge Distributions – Coulomb's Law –Electric Field Intensity- Determination of Electric Field due to Discrete, Line, Surface and Volume Charges- Electric Potential-Relationship between Electric Field Intensity and Electric Potential– Potential due to Electrical Dipole-Potential due to an Infinite Uniformly Charged Line- Electric Flux and Flux Density-Gauss' Law- Relation Between Electric Flux and Electric Field Intensity- Electrostatic Energy-Laplace's and Poisson's Equations – Dielectrics –Capacitance-Boundary Conditions at the Interface of Two Dielectrics.

Unit III Magnetostatic Fields

Current density – Magnetic Flux –Magnetic Flux Density- Magnetic Field Intensity – Relationship between Magnetic Field Intensity and Magnetic Flux density- Biot-Savart Law – Determination of Magnetic Field due to Infinitely Long Straight Conductor, Circular Current Loop and Rectangular Current Loop- Ampere's Law – Determination of Magnetic Field due to a Co-axial Cable using Ampere's Law- Force and Torque in Magnetic Field- Boundary Conditions at the Interface of Two Magnetic Materials-Self and Mutual Inductances-Inductance of a Solenoid and a Toroid.

Unit IV Etromagnetic fields

Displacement current – Eddy current -Faraday's Law – Lenz's Law – Transformer and Motional emfs, Maxwell's Equations.

Unit V Electromagnetic Waves

Generation – Propagation of Waves in Dielectrics – Conductors and Transmission lines – Skin effect.-Power and the Poynting Vector.

Text Books

1 Joseph. A.Edminister, "Theory and Problems of Electro Magnetics", 2nd Edition, Schaum's Outline Series, Tata Mc Graw- Hill Publishing Company Limited, New Delhi, 2005.

2. William H.Hayt Jr., John A.Buck, "Engineering Electro Magnetics", Tata McGraw-Hill Publishing Company Limited, New Delhi, 3rd Edition,2007.

References

1. Matthew N.O. Sadiku, "Elements of Electromagnetics', Oxford University Press, London, 3 rd Edition 2005.

2. Gangadhar, K.A., "Field Theory", Khanna Publishers Limited, New Delhi, 15th Edition, Third Reprint 2004.

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

1. Robert Lafore, "Object Oriented Programming in C++", Third Edition, Galgotia Publsihers, Pune 1999.
2. Jean-Paul Tremblay and Paul G Sorenson, "An Introduction to Data Structures with Applications", Mc Graw- Hill Publishing Company Limited, New Delhi, 2nd Edition, 1994

Reference Books:

1. Herbert Schmidt, " C++, The Complete Reference" , Mc Graw-Hill Publishing Company Limited, New Delhi, 3rd Edition, 1999
2. Sartaj Sahni, "Data Structures, Algorithms and Applications in C++", Mc Graw-Hill Publishing Company Limited, New York, 3rd Edition, 1998.

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

Email messages - Circular - Memo – Minutes – Report writing: types and features – proposal writing – resume: planning and writing

Text book:

1 Soundararaj, Francis. Speaking and writing for effective business communication. Macmillan: new Delhi, 2007.

Reference Books:

1 Mohan, Krishna & Banerji, Meera. Developing Communication Skills. Macmillan: New Delhi, 2009
2 Raman, Meenakshi and Sharma, Sangeeta. Technical Communication: Principles and Practice. OUP: New Delhi, 2004
3 Pal, Rajendra & Korlahalli, J.S. Essentials of Business Communication. New Delhi: Sultan Chand & Sons: New Delhi, 2005

EE262 MEASUREMENTS AND INSTRUMENTATION

Credits 3:0:0

Unit I: Standards and Indicating Instruments

SI units – units for charge, voltage, current, power, energy, flux. Standards – brief Introduction. D'Arsonval Galvanometer. Moving iron: attraction and repulsion type instruments, errors. Moving coil instruments – Permanent magnet moving coil instruments, Dynamometer type moving coil Instruments, Torque equations and errors. Extension of ranges, use of shunts and Instrument Transformers.

Unit II: Measurement of Power and Energy

Dynamometer type wattmeter – Torque expression, Errors. Energy meters, Calibration of energy meters. Measurement of power using Instrument Transformers. Maximum demand indicator, Power factor meter.

Unit III: Measurement of R-L-C

Resistance measurement – Kelvin double bridge, Wheatstone bridge, substitution method, Loss of charge method, Guard Wire method. Measurement of inductance and capacitance – Maxwell, Anderson, Hay's and Schering bridges. Measurement of Earth resistance.

Unit IV: Measurement of Non-Electrical Quantities

Transducers – Classifications, Principle of operation of Resistance potentiometer, Inductive and capacitive transducers, LVDT, Strain Gauge and Piezo-electric transducers. Encoders. Hall effect sensors and photo sensors. Measurement of Pressure – High Pressure and low pressure measurement. Measurement of Temperature - Resistance thermometers, thermistors and thermocouples. Speed measurement- contact and non-contact type.

Unit V: Electronic Laboratory Instruments

Electronic voltmeter – Digital voltmeter of ramp and integrating types. Digital Multimeter – block diagram. Block diagram of dual channel oscilloscope. Spectrum Analyzer. Pulse, signal and function generators. Harmonic distortion analyzer. Strip chart and X-Y recorders, Field Bus Instrumentation.

Text Book

1. Sawhney.A.K., "A Course in Electrical & Electronic Measurement and Instrumentation", Dhanpat Rai & Company Private Limited, New Delhi, 18th Edition, 2007.

Reference Books

1. Helfrick A.D., "Modern Electronic Instrumentation & Measurements", Prentice – Hall India Private Limited, New Delhi, 2007.
2. Doeblin,E.O., "Measurement Systems : Application And Design", 5th Edition, Tata Mc-Graw Hill Publishing Company Limited , New Delhi, 2004.
3. Golding,E.W., and Widdis,F.C., "Electrical Measurements and Measuring Instruments", A H Wheeler & Company, Calcutta, 5thedition, 2003.
4. Rangan,C.S., Sharma, G.R., Mani, V.S., "Instrumentation Devices and Systems", Tata McGraw- Hill Publishing Company, New Delhi, 2nd Edition, 2002.

09EE213 CIRCUITS AND DEVICES LAB

Credits 0:0:2

1. Verification of Ohms and Kirchhoff 's law.
2. Verification of Superposition Theorem using PSPICE.
3. Verification of Thevenin and Norton Theorem using PSPICE.
4. Transient Response of a simple RL, RC and RLC circuits using PSPICE.
5. Resonance of series RLC and parallel RLC circuits using PSPICE.
6. Filters using PSPICE.

7. Characteristics of PN diode & Zener diode
8. Characteristics of JFET
9. Characteristics of UJT & SCR
10. Input Output Characteristics of Transistor under CE configuration
11. Study of Half wave & Full wave Rectifier with and without filter
12. Non-Linear wave shaping techniques-Clipper and Clamper

EE278 C++ AND DATA STRUCTURES LABORATORY

Credits 0:0:2

12 Experiments will be notified by the HOD from time to time

MA247 FOURIER SERIES , TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

Credit: 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

The infinite Fourier transform – sine and cosine transforms – properties (Proof not needed) – inversion theorem – Finite Fourier Transform – sine and cosine transforms – convolution theorem – Parseval's identity – transform of derivatives. (Proofs and derivations not needed)

Text Books:

1. Kandasamy, P., "Engineering Mathematics", S. Chand & Co., New Delhi, Volume – III, 1996.

2. Venkataraman, M.K., “Higher Engineering Mathematics”, National Publishing Co., 1992.

Reference Books:

1. Erwin Kreyzig, “Advanced Engineering Mathematics”, Wiley & Co, 1994.
2. Speigal, “Advanced Engineering Mathematics”, Schaum’s Series, 1995.

EE250 DC MACHINES AND TRANSFORMERS

Credits 3:1:0

Unit I: Dc Generators

Laws of magnetic circuit – Principle of operation, Constructional details, Armature Windings, EMF equation, Methods of Excitation, Separate, Shunt, Series and Compound excitations - No load characteristics – Armature reaction, Commutation, Inter poles, Compensating windings, Load characteristics of various types of DC Generators.

Unit II: Dc Motors

Principle of operation – Torque equation, Electrical and Mechanical characteristics of DC Shunt, Series and Compound motors, Starters – Speed control – Armature and Field control – Braking.- Losses and efficiency – Swinburne’s test – Separation of losses, Hopkinson’s test.

Unit III: Transformers

Principle of operation – Constructional features, Classification of Transformers, EMF equation, Transformation ratio, Transformer on no load and load, Phasor diagrams - Equivalent circuit - Voltage regulation, Regulation curve, Losses, Efficiency, All Day efficiency

Unit IV Test on Transformer

Phasing out, Polarity and Voltage ratio tests – Open circuit and Short circuit tests, Sumpner’s test, Separation of losses – Parallel operation, Auto transformer – Principle of operation – Saving of copper – Phasor diagram – Equivalent circuit.

Unit V: Three Phase Transformer

Constructional features- Connections- Parallel operations of Three phase transformers- Instrument Transformers: Current and Potential transformers.

Textbooks

1. Murugesh Kumar, K., “DC Machines and Transformers”, Vikas Publishing House Private Limited., New Delhi, 2nd Edition, 2004.
2. Arthur Eugene Fitzgerald, Charles Kingsley Jr, Stephen D. Umans , “ Electric Machinery”, Mc Graw – Hill Professional Series , New York, 6th Edition, 2002.

References

1. Cotton, H., “Advanced Electrical Technology”, A H Wheeler and Company Publications, London, 1990.
2. Gupta, B.R., and Vandana, Singhal, “Fundamentals of Electrical Machines”, New Age International Publishers Limited, 1996.

3. Sen, P.C., "Principles of Electrical Machines and Power Electronics" John Wiley & Sons, Inc., Singapore, 2nd Edition, 1997.

09EE201 ELECTRONIC CIRCUITS

Credits: 3:1:0

Pre requisite: EE 247 Electron Devices

COURSE OBJECTIVE

- The course is aimed to impart in-depth knowledge of Electronic circuits and its Characteristics
- Introduce about the different types of amplifiers.
- Gives the knowledge about the different wave shaping circuits.

Unit I POWER SUPPLIES

Rectifiers – Half wave and Full wave rectifiers, Average and RMS value, Ripple factor, Regulation, Rectification efficiency, Transformer Utility Factor. Filters – Inductor, Capacitor, L type and π type, Ripple Factor and Regulation. Need for voltage regulators – Series and Shunt regulators, Comparison, Current limiting and protection circuits – Introduction to Switched Mode Power Supplies.

Unit II WAVE SHAPING

Response of High pass and Low pass RC circuit for sinusoidal, step, pulse, square, ramp and exponential inputs. Linear wave shaping – Integrator, Differentiator. Non-linear wave shaping– Clipping and clamping circuits, clamping circuit theorem and applications, Attenuator and compensated attenuator. Introduction to pulse transformers and applications.

Unit III VOLTAGE AMPLIFIERS

BJT and JFET amplifiers – RC coupled amplifiers, Cascaded BJT amplifiers, Analysis at low, medium and high frequencies BIFET amplifiers, DC amplifiers – Problems in DC Amplifiers, Differential and Common mode gain, CMRR. Cascade and Darlington Amplifiers. Chopper Amplifiers.

Unit IV POWER AMPLIFIERS AND FEEDBACK AMPLIFIERS

Power amplifiers– Classification, Class A/B/C, Single ended and Push-pull configuration, Power dissipation and output power, Conversion efficiency, Complementary symmetry power amplifiers, Class AB operation. Basic concepts of feedback amplifiers – Effect of negative feedback on input and output resistances, gain, gain stability, distortion and bandwidth. Voltage and current feedback circuits.

Unit V OSCILLATORS AND MULTIVIBRATORS

Oscillators – Barkhausen criteria, RC and LC oscillators using BJT – RC Phase Shift, Wien bridge oscillators, Hartley and Colpitt's oscillators. Frequency stability of oscillators. Crystal Oscillators. Non-sinusoidal oscillators – Multivibrators – Bi-stable, Monostable, Astable Multivibrators and Schmitt Trigger using BJT.

Course Outcome

On completion of course the students will be able to:

- Design and analyze the various amplifiers characteristics.
- Design the Oscillator circuits for various applications.
- Design the wave shaping circuits required for specific use.

Textbooks

1. Salivahanan.S. Suresh Kumar.N. and Vallavaraj.A, "Electronic Devices and Circuits", TataMc Graw Hill Publishing Company Ltd., New Delhi, 4th Edition, 2008.
2. Jacob, Millman and Herbert Taub, "Pulse, Digital and Switching Waveforms", Tata Mc Graw Hill Publishing Company Ltd., NewDelhi, 2nd Edition, 2007.

Reference Books

1 Mehta.V.K, "Principles of Electronics", S.Chand & Co. Ltd., New Delhi, 23rd Revised Edition,2005.
2.Boylestad R.L. and Nashelsky L., "Electronic Devices and Circuit Theory", Pearson Education India Series, New Delhi, 8th Edition 2003.
3. Millman J. and Halkias C., "Electronic Devices & Circuits", Tata Mc-Graw Hill Publishing Company Limited, New Delhi, 2002.

EE259 CONTROL SYSTEMS

Credits: 3:1:0

Unit I Introduction

Open loop and Closed loop systems – Examples, Control system components. Transfer function of physical systems– Mechanical systems, Translational and Rotational systems, Electrical network, Thermal and hydraulic systems. Transfer function of DC Generator, DC servomotor, AC servomotor and Synchros , Transfer function of overall systems. Impulse Transfer function. Block diagram - reduction techniques. Signal flow graphs – Mason' gain formula.

Unit II Time Response Analysis

Standard Test signals –Time response of zero, first and second order system, Performance criteria, Type of systems. Steady state error constants – position, velocity and acceleration error constants. Generalized error series – Feedback characteristics of control systems. Controllers – P, PI and PID control modes.

Unit III Frequency Response Analysis

Frequency domain specifications – peak resonance, resonant frequency, bandwidth and cut-off rate, correlation between time and frequency responses for second order systems. Polar plot, Bode plot – Gain Margin and Phase Margin.

Unit IV Stability of Systems

Characteristic equation – Location of roots of characteristic equation – Absolute stability and Relative stability. Routh Hurwitz criterion of stability – Necessary and sufficient conditions. Nyquist Stability- Principle of argument – Nyquist path – Nyquist stability criterion – Determination of Nyquist stability – Assessment of relative stability. Bode Plot – Assessment of

stability. Root locus concept, Rules for construction of root loci, problems, stability analysis.

Unit V: State Variable Analysis

Introduction to state space analysis – Physical variable, Phase variable and Canonical variables forms. Transfer function from state space representation.

Text Books

1. Gopal, M, "Control Systems – Principles and Design" Tata McGraw-Hill Company Limited., New Delhi, 2002.
2. Ogata K., "Modern Control Engineering", Prentice-Hall of India Private Limited., New Delhi, 4th Edition, 2002.

Reference Books:

1. Nagrath I.J, & Gopal M, "Control System Engineering", New Age International Publishers Limited, New Delhi, 5th Edition, 2007
2. Benjamin C. Kuo, "Automatic Control Systems", John Wiley & Sons, Inc.,New Jersey, 8th Edition, 2003.
3. Norman S.Nise, "Control System Engineering", John Wiley & Sons Inc., New Jersey, 8th Edition, 2007.
4. Sivanandam S.N., Deepa S.N., "Control System Engineering using MATLAB", Vikas Publishing House Private Limited, New Delhi, 2nd Edition, 2006.

09EE202 DIGITAL ELECTRONICS

Credits: 3:1:0

Pre requisite: EE 247 Electron Devices

COURSE OBJECTIVE

- To introduce the concepts of Boolean algebra,
- To make them familiar with the implementation of combinational logic functions.
- To make them understand about the working of counters and flip flops

UNIT I: NUMBER SYSTEMS AND BOOLEAN ALGEBRA

Review of Binary, Octal & Hexadecimal number Systems-representation of signed Numbers-floating point number representation-BCD-ASCII-EBCDIC-Excess 3 codes, gray Code-error detecting & correcting codes. Boolean algebra: Postulates & theorems of Boolean algebra – canonical forms –simplification of Logic Functions using Karnaugh map, Quine Mcclausky method.

UNIT II: COMBINATIONAL LOGIC DESIGN

Logic gates –implementation of combinational logic functions – encoders & decoders – multiplexers & demultiplexers –code converters – comparator - half adder, full adder –parallel adder – binary adder – parity generator/checker – implementation of logical functions using multiplexers.

UNIT III: COUNTERS AND REGISTERS

RS, JK, JK Master– Slave, D&T Flip Flops – level triggering and edge triggering –excitation tables –Asynchronous & Synchronous counters – modulus counters–shift register –Johnson counter- Ring counter – timing waveforms-counter applications.

UNIT IV: SEQUENTIAL LOGIC DESIGN

Basic models of sequential machines – concept of state table – state diagram – state reduction through partitioning & implementation of synchronous sequential circuits – Introduction to asynchronous sequential logic design.

UNIT V: PROGRAMMABLE LOGIC DEVICES

Semicustom design – Introduction to PLD's – ROM – PAL – PLA – FPGA – Architecture of PLD's: PAL 22V10, PLS 100/101 – Implementation of digital functions.

LOGIC FAMILIES: RTL, DTL, TTL families, Schottky – clamped TTL, Emitter Coupled Logic (ECL), Integrated Injection Logic (IIL), MOS inverters, CMOS inverters, Comparison of performance of various logic families.

Course Outcome

On completion of the course, the students will be able to

- Apply Boolean algebra & K –map to digital circuits
- Design combinational and Sequential circuits
- Design the logic families to specific applications.

Text Books

1. Morris Mano M., "Digital Electronics", Prentice Hall PTR, New Jersey, 3rd Edition, 2001.
2. Thomas L. Floyd, "Digital Fundamentals", Prentice Hall Higher Education Series, 10th Edition 2008.

Reference Books

1. Tocci.R.J., "Digital Systems – Principles & Applications", Prentice Hall India, New Delhi, 10th Edition , 2008.
2. Fletcher.W.I, "An Engineering Approach to Digital Design", Prentice Hall India, New Delhi, 2007.
3. Morris Mano M., **"**Digital Logic & Computer Design", Prentice Hall India, New Delhi, 2007.

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

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

Foundation for success – Definition, Approaches for successful living, overcoming obstacles for success, and winning strategies – Desire, commitment, responsibility hard work and discipline.
Emotions detrimental to personal growth - Hurt feelings – Dealing with anger, guilt, depression and stress. - 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

Biographical Studies –Founder Dr. D. G. S. Dhinakaran, Mother Teresa, Ida Scudder, William Carey, Amy Carmichael, George Muller – Their life and secret to success, values inculcated by such personalities. Social Issues – Corruption, Cyber Crime, AIDS Awareness, and Substance abuse-concept, source, consequences and remedy - Jesus Calls Ministry – History and Developments – 21 facets of Jesus Calls ministry.

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 Time, Talent and Treasures. Human Resource Development – Eradication of worries, Benefits 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:

1 C. Maxwell John. (2001). Power of Leadership, USA: River Oak Publishing.
2 Geoffrey Hanks. (1992). 70 Great Christians, Secunderabad: OM Books.
3 Khera Shiv. (1988). You Can Win, New Delhi: Mac Millan India Limited.
4 Khera Shiv. (2003). Living With Honour, New Delhi: Mac Millan India Limited.
5 Mani Jacob, ed., (2002). Resource for Value Education, New Delhi: Institute of Value 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

Foundation for success – Definition, Approaches for successful living, overcoming obstacles for success, and winning strategies – Desire, commitment, responsibility hard work and discipline.
Emotions detrimental to personal growth - Hurt feelings – dealing with anger, guilt, depression and stress. 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

Biographical Studies –Founder Dr. D. G. S. Dhinakaran, Mother Teresa, Ida Scudder, William Carey, Amy Carmichael, George Muller – Their life and secret to success, values inculcated by such personalities. Social Issues – Corruption, Cyber Crime, AIDS Awareness, and Substance abuse-concept, source, consequences and remedy - Jesus Calls Ministry – History and Developments – 21 facets of Jesus Calls ministry.

UNIT – V

Concept of God –Understanding and knowing God, Nature of God , Concept of Holy Spirit – The Gifts and the Fruit of the Holy Spirit, Concept of Man – His personality and accountability. Communication with God and Personal Devotion – Prayer, Quiet time and Practical Christian Living.

Sin and Temptation – nature and sources of sin, Ways to overcome temptation.

Inner Life Integrity – Understanding Personality, Self-centered and Christ-centered Personality, Integrity in Time, Talent and Treasures.

Reference Books:

1 C. Maxwell John. (2001). Power of Leadership, USA: River Oak Publishing.
2 Dr. D. G. S. Dhinakaran. Gifts of the Holy Spirit, Chennai: Jesus Calls.
3 E. M. Bounds. (2006). How to Pray Effectively, USA: Whitaker House.
4 Geoffrey Hanks. (1992). 70 Great Christians, Secunderabad: OM Books.
5 Khera Shiv. (1988). You Can Win, New Delhi: Mac Millan India Limited.
6 Mani Jacob, ed., (2002). Resource for Value Education, New Delhi: Institute of Value Education.
7 Valentine Davidar. (2000), Being Made whole, Hyderabad: Haggai Institute.

09EE214 DC MACHINES AND TRANSFORMERS LABORATORY

Credits 0:0:2

1. Load characteristics of a separately excited DC Generator.
2. Load characteristics of DC Shunt Generator
3. Load characteristics of DC Compound Generator
4. Load test on DC Shunt Motor
5. Load test on DC Series Motor
6. Speed control of DC Shunt Motor
7. Electric Braking of DC Shunt Motor
8. Swinburne's Test
9. Load test on Single Phase Transformer
10. Open circuit and Short circuit test on Single Phase Transformer
11. Sumpner's Test on a Single Phase Transformer.
12. Three Phase Transformer Connections

09EE216 ELECTRONIC CIRCUITS LABORATORY

Credits 0:0:2

1. BJT Amplifier (CE)
2. JFET Amplifier (CS)
3. Differential Amplifier using BJT
4. Study of Half-Wave & Full-Wave Rectifiers (with and without Filter)
5. Integrator and Differentiator using R and C
6. Voltage Regulator (Series Type)
7. Emitter Follower
8. RC Phase-Shift Oscillator
9. Colpitts Oscillator
10. Astable Multivibrator
11. Bistable Multivibrator
12. Schmitt Trigger Circuit

EE251 INDUCTION AND SYNCHRONOUS MACHINES

Credits 3:1:0

Pre requisite: DC Machines and Transformers

Unit I: Three-Phase Induction Motors

Principle of Operation – Construction and types of Rotor – Torque equation – Torque-Slip characteristics – Maximum torque – Effect of rotor resistance, Equivalent circuit – Phasor diagram – Performance calculation from circle diagram - Induction Generators – Testing, Automatic Starters – DOL, Autotransformer, Star-Delta and Rotor resistance starters – Speed control – Crawling and Cogging – Electrical Braking.

Unit II Single-Phase Induction Motors

Principle of operation – Double revolving field theory – Equivalent circuit – Performance calculations – Methods of self starting – Types of Single Phase Induction Motor - Magnetic Levitation-Linear Induction Motor.

Unit III: Synchronous Generators

Types - Constructional features – 3-phase windings – Winding factors – EMF equation – Armature reaction – Voltage regulation – Predetermination of regulation by Synchronous Impedance, MMF, and Potier reactance methods, Load characteristics – Power expression – Parallel operation – Synchronizing Current and Synchronizing power – Active and Reactive power sharing – Alternator on infinite Bus bar – General load diagram.

Unit IV: Synchronous Motors

Principle of operation – Methods of starting – Phasor diagrams – V-curves and Inverted V-curves - Power/Power-angle relations – Synchronous Condensers – Hunting and methods of Suppression.

Unit V: Two Reaction Theory
Salient Pole machine analysis – Phasor diagrams – Voltage regulation – Power / Power angle relation – Determination of X_d and X_q.

Textbooks
1. Murugesh Kumar, K, "Induction and Synchronous Machines", Vikas Publishing House Limited, New Delhi, 2000.
2. Arthur Eugene Fitzgerald, Charles Kingsley, Stephen D. Umans , " Electric Machinery", Mc Graw – Hill Professional Series , New York, 6th Edition, 2002.

Reference Books:
1. Alexander, S. Langsdorf., "Theory of Alternating Current Machinery", Tata McGraw - Hill Publishing Company Limited, New Delhi, 1990.
2. Gupta, B.R., and Vandana, Singhal., "Fundamentals of Electric Machines", New Age International Publishers Limited, New Delhi, 1996.

EE258 LINEAR INTEGRATED CIRCUITS

Credits 3:1:0

Pre requisite: EE247 Electron Devices

Unit I: Operational Amplifier Characteristics
Functional Block Diagram – Symbol, Characteristics of an Ideal Operational Amplifier, Circuit schematic of μA 741, Open loop gain, CMRR-input bias and offset currents, input and output offset voltages, offset compensation techniques. Frequency response characteristics – stability, limitations, frequency compensation, slew rate. Transfer characteristics.

Unit II: Linear Applications of Operational Amplifiers
Inverting and Non-inverting amplifiers – Voltage follower, Summing amplifier, Differential amplifier, Instrumentation amplifier. Integrator and Differentiator – Practical considerations. Voltage to Current and Current to Voltage converters, Phase changers. Sinusoidal oscillators. Active filters – Design of Low pass, High pass, Wide band pass and Band stop Butterworth filters, Narrow band pass and Notch filters.

Unit IIi: Non Linear Applications of Operational Amplifiers:
Comparator – Regenerative comparator, Zero crossing detector, Window detector, Sample and hold circuit, Precision diode, Half and Full wave rectifiers, Active peak detector, Clipper and Clamper, Logarithmic and Exponential amplifiers, Multiplier and Divider, Square and Triangular waveform generators. Voltage Regulators: Need for Single power supply operational amplifiers – LM324, AC Inverting and Non-Inverting amplifiers. Norton Amplifiers – Various configurations.

Unit IV: IC Voltage Regulators & Special Function ICS:
Block diagram of 723 General purpose voltage regulator – Circuit configurations, Current limiting schemes, Output current boosting , Fixed and adjustable three terminal regulators, Switching regulators- SPECIAL FUNCTION ICs**:** 555 Timer Functional block diagram and

description – Monostable and Astable operation, Applications, IC566 Voltage Controlled Oscillator, Analog Multiplier, Comparator ICs, PLL Functional Block diagram – Principle of operation, Building blocks of PLL, Characteristics, Derivations of expressions for Lock and Capture ranges, Applications: Frequency synthesis, AM and FM detection, FSK demodulator, Motor speed control.

Unit V: A-D and D-A Converters

Digital to Analog Converters: Binary weighted and R-2R Ladder types – Analog to digital converters: Continuous, Counter ramp, Successive approximation, Single slope, Dual slope and Parallel types – DAC/ADC performance characteristics.

Text Books

1. Sedra and Smith, " Microelectronic Circuits", Oxford University Press, London, 5th Edition, 2004.
2. Gayakwad, A.R., "OP-Amps and Linear Integrated circuits", Pearson Education India Series, New Delhi, 4th Edition, 2004.

References

1. Coughlin, F.R., and Driscoll, F.F., "Operational Amplifiers and Linear Integrated Circuits", Prentice Hall of India, New Delhi, 4th Edition, 1997.
2. Roy Choudhury, and Shail Jain, "Linear Integrated Circuits", New Age International Limited, 2nd Edition, 2003
3. Michael Jacob, J, "Applications and Design with Analog Integrated Circuits", Prentice Hall of India, New Delhi, 2nd Edition, 1996.
4. David A Bell, "Operational Amplifiers and Linear ICs", Prentice Hall of India, New Delhi,2nd Edition, 1997.

09ME228 HEAT ENGINES AND FLUID MACHINERY

Credits: 3:1:0

Course Objective:

To provide knowledge about Fluid properties, pumps, turbines, basic concepts and laws of thermodynamics, I.C.Engines, Conduction, convection and radiation heat transfer

UNIT-I:

Fluid Properties: Fluid density-specific weight-specific gravity – viscosity- surface tension - capillary -compressibility - vapor pressure – Manometers – Simple problems.

PUMPS: Positive displacement pumps and reciprocating pumps - operating principles -slip - Indicator diagram - separation- air vessels centrifugal pumps - operation – overall performance curves-cavitation -multi staging -selection of pumps - jet pump - compressor pump - submersible pump - gear oil pump -construction and principle of operation. – working principle of air compressor.

UNIT-II:
Turbine impulse momentum equation- moment of momentum equation (theory only) - turbine Classification-working principles -pelton wheel, Francis, Kaplan turbines - velocity triangles -draft tube- similarity laws - specific speed - governing of turbines- surge tanks.

UNIT-III
Basic concepts - thermodynamic system - properties - processes - cycle - equilibrium -first law of thermodynamics - application of first law to non flow and flow process - second law of thermodynamics - Kelvin Planck's statement -Clausius statement - reversibility - Carnot theorem - heat engine - reversed heat engine - entropy.

UNIT-IV
I.C.Engine - air standard cycles - air standard efficiency - Otto, Diesel and Brayton cycles-testing of IC Engines - performance curves, FHP determination, heat balance.

UNIT-V
Heat transfer - modes of heat transfer - steady state heat conduction - heat conduction with internal heat generation - extended surfaces - fin - convection - empirical relations - Radiation - laws of radiation - radiant heat transfer between two surfaces.

Text Books
1. Modi, P.N. & Seth, S.M., "Hydraulics and Fluid Mechanics", (Including hydraulic machines) Standard Book House, New Delhi, 15th Edition, 2005.
2. Nag P.K., "Basic and applied Thermodynamics" TMH, New Delhi, 2002.

Reference Books
1. Som,S.K, & Biswas, "Introduction to Fluid Mechanics and Fluid Machines", Tata McGraw Hill, 2000.
2. Holman, "Heat Transfer", McGraw Hill International, 8th, Edition, 2003.
3. Cengel,. A., "Introduction to Thermodynamics and Heat Transfer", Tata McGraw` Hill, New Delhi, 1997.
4. Kothandaraman,C,P., etal, "A course in heat engines and thermodynamics", Dhanpat Rai & Sons, 5th Edition, 2002.

EE253 GENERATION ,TRANSMISSION AND DISTRIBUTION

Credits: 3:1:0

Unit I: Power Generation
Generation, Transmission & Distribution Scenario of India - Types of generation: Conventional and Non-conventional, Thermal Power Plant, Hydro Power Plant, Gas Power Plant, Nuclear Power Plant, Non-conventional Energy Sources - Load capacity factor - Connected load factor - Load duration curve - Selection of units.

Unit II: Power Transmission Systems

Various systems of transmission – Advantages of high transmission voltages - Comparison of conductor materials required for various overhead systems - Overhead Lines Parameters **:** Electrical constants - Resistance, Inductance and capacitance of Single and 3 Phase lines - Effects of earth on capacitance - Skin effect - Proximity effect - Transposition - Bundled conductors - Line supports-Performance**:** Short and Medium transmission lines - Phasor diagrams - Nominal T and π methods - Line regulation - Efficiency. Rigorous solution for long line - ABCD constants - Ferranti effect - Tuned power lines - Surge impedance and surge impedance loading.

Unit III: Line Insulators

Types - Potential distribution over a string of suspension insulators - Methods of increasing string efficiency. Corona – Factors affecting corona - Stress and Sag Calculation – Effect of wind and ice - supports at different levels – Stringing chart.

Unit IV: Underground Cables

Types - Capacitance and insulation resistance - Sheath effects - Grading - Stresses - Loss angle - Breakdown voltage - Optimum cable length -Comparison between Overhead lines and Underground cables.

Unit V: Distribution Systems

Feeders, Distributors and Service mains - Radial and ring main systems - Calculation of voltage in distributors with concentrated and distributed loads, A.C. single phase and three phase distribution systems.

Text Books

1. Mehta, V.K., Rohit Mehta , "Principles of Power Systems", S.Chand & Company Private Limited, New Delhi, 2004.
2. Singh S.N, "Electric Power Generation, Transmission and Distribution", Prentice Hall of India Private Limited, New Delhi, 2003.

Reference Books

1. Soni, M.L., Gupta, P.V., Bhatnagar U.S. and Chakrabarthi A., "A Text Book on Power System Engineering", Dhanpat Rai & Sons Company Private Limited, New Delhi, 1997.
2. Uppal, S.L., "Electrical Power", Khanna Publishers Limited, New Delhi, 13th Edition, 1995.
3. Wadhwa, C.L., "Electrical Power Systems", New Age International Publishers Limited, New Delhi, 2006, 4th Edition, Reprint Aug, 2007.
4. Weedy B.M., Cory B.J., " Electric Power Systems", John Wiley & Sons Limited, England, 4th Edition, Reprint, November 2001.

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 I - Business Environment – Types– micro environment –macro environment - global environment –competitor analysis –environment analysis – forecasting techniques.

Unit II - Nature of International Business – International business and domestic business –FDI – factors – International operations managements –strategic issues.

Unit III - Technological Environment – source of technological dynamics – appropriate technology – technology adaption –globalization – transfer of technology.

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)
2. Aswathappa, International Business, The McGraw Hill Companies, New Delhi (latest edition)
3. Shaikh Saleem, Business Environment, New Delhi, Pearson, 2006.

09MS209 MANAGERIAL SKILL

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)
Governance Types of Governance: Global Governance – Democratic Governance – Participatory Governance - Corporate Governance - Project Governance – E-Governance – Elements of Effective Governance- Case Study of Effective Governance Models.

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
Preparation for Group Discussions - Techniques – Do's & Don'ts of a GD – **Personal Interview**: Types of Interviews - Preparation for interview – Criteria for successful interview – Mock Sessions.

Unit IV – (5hrs)
Adapting to Corporate life – Corporate Dressing – Dress codes – Grooming for men and women – Business Etiquettes – Table manners – Dealing with people – Peers, Subordinates & Bosses – Communication media etiquettes.

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

Recommended Text Book
Stephen P. Robbins, Essentials of Organizational Behavior, (2002) John Wiley & Sons, , New York,

Reference Books:

1 Timpe, Dale A. (2005), "Creativity" M/s. Jaico Publishing House, New Delhi
2 Rao. V.M. E-Governance (2006) ABD Publishers. Jaipur
3 Jerald Greenberg, Robert A. Baron / Carol A. Sales / Frances A. Owen / Verlag (1999) Behaviour in Organizations,: Pearson Education
4 Pradip. N. Khandwalla (2006) The Winning Edge, Corporate Creativity. published by Tata Mcgraw Hill
5 John l. Colley, Corporate Governance Jacqueline l. Doyle, published 2003 Mcgraw-hill Professional

09EE217 LINEAR AND DIGITAL IC LABORATORY

Credits: 0:0:2

1. Performance characteristics of Op-amp IC
2. Instrumentation amplifier using Op-amp ICs.
3. Maximally flat active filter using Op-amp IC.
4. Precision full wave and half wave rectifier, using Op-amp IC.
5. Wien's bridge oscillator using Op-amp IC.
6. Astable multivibrator and Schmitt trigger, using Op-amp IC
7. Realization of different flip-flops, using logic gates.
8. Realization of simple switching functions, using NAND or NOR gates.
9. Half adder, Full adder, Half subtractor and Full subtractor using logic gates.
10. Shift register and Ring counter
11. Multiplexer and Demultiplexer
12. Digital to Analog converter

09EE215 AC MACHINES AND CONTROLS LABORATORY

Credits: 0:0:2

1. Load test on Three Phase Induction Motor
2. No load and blocked rotor tests on Three Phase Induction Motor
3. Speed control of Three Phase Induction Motor
4. Load test on Single Phase Induction Motor
5. Regulation of Alternator by EMF/ MMF methods
6. Operation of alternator on Infinite bus bar
7. V and Inverted V curve for Synchronous Motor
8. Measurement of transient and sub-transient reactance in direct and quadrature axis of an Alternator.
9. Transfer function of Separately Excited DC Generator.
10. Transfer function of a) Field controlled DC Motor b) Armature controlled DC Motor.
11. Time & Frequency Response of the System using MATLAB
12. Measurement of Physical Variable with the help of LABVIEW

EE252 ELECTRICAL MACHINE DESIGN

Credits 3:1:0

Pre requisite: DC Machines and Transformers
Induction and Synchronous Machines

Unit I: General Aspects

Major considerations – Limitations - Main dimension- Output equation - Choice of specific electric and magnetic loadings - Separation of D and L for rotating machines. MMF for air gap - Effects of slots, ventilating ducts and saliency - MMF for teeth -Total MMF calculation - Leakage reactance, Estimation of number of conductors / turns - Coils - Slots - Conductor dimension - Slot dimension.

Unit II: Dc Machines

Choice of number of poles - Length of Air gap - Design of field system, Inter poles, Commutator and Brushes.

Unit III: Transformers

Classification – output equation - Core section - Window dimensions - Yoke dimension - Overall dimension - No load current calculation – Temperature rise of Transformers- Design of tanks and cooling tubes.

Unit IV: Three Phase Induction Machines

Length of air gap - Cage rotor - End ring current - Wound rotor - Dispersion coefficient. No-load current calculation - Stator and rotor resistance - Losses and efficiency

Unit V: Synchronous Machines

Short circuit ratio – Air gap length –Salient pole machine -Design of field winding- Turbo-alternator – Damper winding.

Text Books

1. Sawhney A.K. and Chakrabarti A., "A Course in Electrical Machine Design", Dhanpat Rai & Sons Company Limited, New Delhi, 6th Edition, 2006.
2. Mittle V.N. and Mittle A., "Design of Electrical Machines", Standard Publications and Distributors, New Delhi, 2002.

Reference Books:

1. Sen, S.K, "Principles of Electric Machine Design with Computer Programmes", Oxford & IBH Publishing Company Private Limited, 2001, Reprint 2004.
2. Agarwal R.K., "Principles of Electrical Machine Design", S.K.Kataria and Sons, New Delhi, 2002.
3. Shanmugasundaram, A., Gangadharan G. and Palani R., "Electrical Machine Design Data Book", New Age International Publishers Private Limited., 1st Edition 1979, Reprint 2005.

EE254 POWER ELECTRONICS

Credits: 3:0:0

Unit I: Power Semiconductor Devices

Introduction - Power Diodes - Power Transistors - Power MOSFETs - IGBTs - Thyristor family : SCRs, Triacs, GTOs and IGCT - Static and Dynamic characteristics - Protection circuits - Series and parallel connections, MCT.

Unit II: Ac to Dc Converters

Diode rectifiers: Single phase and Three phase diode bridge rectifiers with R, RL and RLE load - Estimation of average load voltage and average load current – Free-wheeling diode, Controlled rectifiers: Single phase and three phase half wave Thyristor converters. Estimation of average load voltage and average load current - Single phase Half controlled and Fully Controlled Thyristor Bridge Converters - Estimation of average load voltage and load current for continuous current operation - Input power factor estimation for ripple free load current - Three phase Half and Fully Controlled Thyristor Converters (no analysis) - Dual Converters.

Unit III: Ac to Ac and Dc to Dc Converters

AC to AC Converter: Single phase Full Wave controller with R and RL load - Estimation of RMS load voltage, RMS load current and input power factor - Three phase AC voltage controllers (No analysis) - Single phase to Single phase Cyclo converters- DC to DC Converter**:** Principle of step up and step down operation - Single quadrant DC chopper with R, RL and RLE load - Time ratio control - Estimation of average load voltage and load current for continuous current operation - Two quadrant and Four quadrant DC choppers.

Unit IV: Dc to Ac Converters

Types - Voltage source and Current source inverters - Single phase bridge inverters - Three phase bridge inverters - Control of AC output voltage - Harmonic reduction – Single phase Series Inverters.

Unit V: Control Circuits & Applications

Functional requirements of the switching control circuits - Generation of control signals for single phase AC to DC converters - Cosine wave crossing control, Ramp comparator approach. Generation of timing pulses for DC choppers - PWM techniques for DC to AC converters - Introduction to power converter control using Microprocessors, Microcontrollers and DSP- Applications: Motor drive applications: DC Motor Drives using Phase Controlled Thyristor Converters and DC Choppers - AC voltage controller and inverter fed induction motor drives - UPS - HVDC systems - Tap changing of Transformers.

Text Books

1. Rashid, M.H., "Power Electronics – Circuits, Devices and Applications", Pearson Education India Series Private Limited, New Delhi, 2004.
2. Ned Mohan, Undeland and Robbins, "Power Electronics - Converters, Applications and Design", John Wiley & Sons (Asia) Private Limited, Singapore, 2003.
3. Vedam Subrahmanyam, "Power Electronics", Tata Mc Graw- Hill Publishing Company Limited, New Delhi, 1996.

Reference Books

1. Philip T. Krein, " Elements of Power Electronics", Oxford University Press, Inc., New York, 2003.
2. Joseph Vithayathil., "Power Electronics", Mc-Graw Hill series in Electrical and Computer Engineering, USA, 1995.

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 weakness-techniques(NPV, Payback, ARR, Profitability index)-Project disparities and conflict in ranking-Project control and Performance Analysis - Decision making.

Text Books:

1. Jain .S.P,Narang.K.L(2007) Kalyani publishers ,New Delhi
2. Prasanna Chandra 2009 7th edition, McGraw Hill, New Delhi

Reference Book:

1. Bhavesh M Patel, Project Management, (2009) Recent Reprint, Vikas Publishing House, Noida (UP)

09EE219 MEASUREMENTS AND COMPUTER AIDED ELECTRICAL MACHINE DESIGN LAB

Credits: 0:0:2

1. Measurement of Resistance using Wheatstone and Kelvin's bridge
2. Measurement of Inductance using Hays and Anderson bridge
3. Measurement of Capacitance using Schering and Maxwell bridge
4. Calibration of voltmeter, Ammeter and Wattmeter
5. Study of Resistive , Inductive and Capacitive Transducers.
6. Study of Thermo Electric Transducers
7. Design of D.C Machine using AutoCAD
8. Design of Single and Three Phase Transformer using AutoCAD
9. Design of Three phase Induction Motor using AutoCAD
10. Design of Single Phase Induction Motor using AutoCAD
11. Design of Synchronous Machine using AutoCAD
12. Effect of air gap variation on induction machines performance

09EE218 POWER ELECTRONICS LABORATORY

Credits: 0:0:2

13. Load test on Three Phase Induction Motor
14. No load and blocked rotor tests on Three Phase Induction Motor

15. Speed control of Three Phase Induction Motor
16. Load test on Single Phase Induction Motor
17. Regulation of Alternator by EMF/ MMF methods
18. Operation of alternator on Infinite bus bar
19. V and Inverted V curve for Synchronous Motor
20. Measurement of transient and sub-transient reactance in direct and quadrature axis of an Alternator.
21. Transfer function of Separately Excited DC Generator.
22. Transfer function of a) Field controlled DC Motor b) Armature controlled DC Motor.
23. Time & Frequency Response of the System using MATLAB
24. Measurement of Physical Variable with the help of LABVIEW

1. Characteristics of MOSFET, IGBT, SCR and TRIAC
2. Single Phase and Three Phase Diode Bridge Rectifier with R & R – L Load
3. Single Phase Half and Fully Controlled Thyristor Converter with R & R – L Load
4. D.C. Chopper with R & R – L Load
5. Three Phase PWM Inverter with R & R – L Load
6. Single Phase A.C. Voltage Controller with R & R – L Load
7. Three Phase A.C. Voltage Controller with R & R – L Load
8. Single Phase Cycloconverter with R & R – L Load
9. Single Phase Series Inverter with R & R – L Load
10. Simulation of Power Electronic Circuits using MATLAB Simulink
11. Simulation of Power Electronic Circuits using PSPICE
12. Simulation of Power Electronic Circuits using PSIM

EE256 POWER SYSTEM PROTECTION AND SWITCHGEARS

Credits: 3:0:0

Pre requisite: Power System Analysis

Unit I: Introduction

Principles and need for protective schemes – Nature and cause of faults – types of fault – per unit representation - Analysis of Symmetrical fault – Current limiting reactors. CTs and PTs and their applications in their protection schemes.

Unit II: Protective Relays & Apparatus & Line Protection

Definition - Requirement of relays - Universal torque equation - Non directional and directional over current relays – Earth fault relays - Distance relays - Impedance, Mho and Reactance relays - Differential relays - Negative sequence relays - Pilot (Translay) relay - Carrier and Microwave pilot relays – Under frequency relays - Introduction to static relays - Microprocessor and computer based protective relaying.

Apparatus and Line Protection: Alternator, transformer, Busbar and motor protection using relays – Feeder Protection – radial and ring main system. Microprocessor based protective schemes.

Unit III: Circuit Breakers

Functions of switchgear - Elementary principles of arc extinction - Arc control devices - Recovery voltage and restriking voltage - current chopping and capacitance current breaking - Bulk oil, low oil, air break, air blast, and sulphur hexafluoride and vacuum circuit breakers - HVDC breakers - Rating - Testing of circuit breakers.

Unit IV: Surge and Surge Protection

Switching surges - Lightning phenomenon – Traveling waves on transmission lines - Over voltage due to lightning - Protections against lightning - Lightning arresters – Types - Lightning arrester selection - Surge absorbers.

Unit V: Earthing and Insulation Co-Ordination

Solid, resistance and reactance Earthing - Arc suppression coil - Earthing transformers – Earth wires - Earthing of appliances- Insulation co-ordination: Definition - Determination of line insulation - Insulation levels of sub-station equipment - Co-ordination amongst items of substation equipment - Introduction to Indian Electricity rules.

Text Books

1. Badri ram and Vishwakarma D N ., "Power System Protection and Switchgear" Tata McGraw Hill Publishing House Limited, New Delhi , 1995.
2. Ravindranath, B., and Chander, M., "Power System Protection and Switchgear", New Age International Private Limited., New Delhi, 1977.
3. Wadhwa, C.L., "Electrical Power Systems", New Age International Publishers Limited, New Delhi, 2006, 4th Edition, Reprint: August, 2007.

Reference Books

1. Paithankar Y. G., Bhide S. R., "Fundamentals of Power System Protection" Prentice Hall of India Limited, New Delhi , 2003.
2. Soni, M.L., Gupta, P.V., Bhatnagar, U.S. and Chakrabarti, A., "A Text Book on Power Systems Engineering", Dhanpat Rai & Sons Company Limited, New Delhi, 2003.
3. Sunil, S.Rao., "Switchgear Protection and Power Systems", Khanna Publishers Limited, New Delhi, 11th Edition, 1999.

EE255 POWER SYSTEM ANALYSIS

Credits: 3:1:0

Pre requisite: Generation, Transmission and Distribution

Unit I: Introduction

Need for System analysis in planning and operation of power system- One line diagram- Per unit representation - Symmetrical components - Short circuits analysis for fault on machine terminals.

Unit II: Network Formulation & Modelling, Short Circuit Studies

Primitive network and its representation – bus incidence matrix – Formation of Bus admittance matrix and bus impedance matrices.- modeling of synchronous machines , transformers, loads,

π-equivalent circuit of transformer with off-nominal tap ratio- Short Circuit Studies**:** Types of faults - Algorithms for fault calculations - Sequence Impedance matrices - Symmetrical and Unsymmetrical fault analysis using Z_{bus}.

Unit III: Load Flow Studies
Formulation of load flow problem - bus classification – Solution by Gauss - Seidal , Newton - Raphson and Fast decoupled methods - Comparison -. Computation of slack bus power, transmission loss and line flow.

Unit IV: Economical Operation of Generating Stations
Optimal operation of generators – Economical scheduling of thermal plant with and without transmission losses – Loss formula derivation- Unit commitment - Elementary idea of optimal load scheduling of Hydro - Thermal plants.

Unit V: Stability Studies
Steady state and Transient stability - Swing equation and its solution by Modified Euler and Runge-Kutta methods - Equal area criterion - Factors affecting stability and methods of improving stability- Causes of voltage instability – voltage stability proximity indices for two-bus system

Text Books

1. Hadi Saadat, "Power System Analysis", Tata Mc Graw-Hill Publishing Company Limited, New Delhi, 2002, 11th Reprint 2007.
2. Gupta, B.R., "Power System Analysis and Design", S.Chand & Company Limited., New Delhi, 2005.

Reference Books

1. Weedy B.M., Cory B.J., " Electric Power Systems", John Wiley & Sons Limited, England, 4th Edition, Reprint, November 2001.
2. Wadhwa C. L., "Electrical Power Systems", New Age International Private Limited, New Delhi, 3rd Edition, Reprint 2003.
3. Nagsarkar T.K., Sukhija M.S., "Power system Analysis" Oxford University Press, London, 2007.

EE263 MICROPROCESSORS AND MICROCONTROLLERS

Credits: 3:1:0

Unit I: Architecture & Programming of 8085 Microprocessor:
Functional Block Diagram – Registers, ALU, Bus systems – Timing and control signals- Programming of 8085: Instruction formats – Addressing modes – Instruction set – Need for Assembly language – Development of Assembly language programs – Machine cycles and Timing diagrams

Unit II: Memory & I/O Interfacing

Interface requirements – Address space partitioning – Buffering of Buses – Timing constraints – Memory control signals – Read and write cycles –Typical EPROM and RAM Interfacing- I/O Interfacing: Memory mapped I/O scheme – I/O mapped I/O scheme – Input and Output cycles – Simple I/O ports – Programmable peripheral interface (8255). Data transfer schemes – Interfacing simple keyboards and LED displays.

Unit III: Interrupts and Dma

Interrupt feature – Need for interrupts - Characteristics of Interrupts – Types of Interrupts – Interrupt structure – Methods of servicing interrupts - Development of Interrupt service subroutines – Multiple interrupt requests and their handling – Need for Direct Memory Access – Devices for handling DMA – Typical DMA Controller features.

Unit IV: Applications

Multiplexed seven segment LED Display systems – Stepper motor control – Measurement of frequency, phase angle and power factor – Interfacing ADC0801 A/D Converter – DAC 0800 D/A Converter – Waveform generators.

Unit V: Intel 8051 Microcontroller

Architecture – Memory Organization – Addressing modes – Instruction set – Boolean processing – Simple programs - 8051 Peripherals **:** Interrupt structure – Timer, Serial ports and Power control : Features and Modes – Interfacing – Instruction set – Boolean processing – Simple programs – Typical Applications – MCS 51 family features 8031/ 8051/ 8751.

Text Books

1. Ramesh S.Goankar, "Microprocessor Architecture: Programming and Applications with the 8085", Penram International Publishing (India) Private Limited, 5th Edition, 2002.
2. Mazidi Muhammed Ali, Mazidi Janice Gillispie, "The 8051 Microcontroller and Embedded Systems", Pearson Education India Series, New Delhi, 2000.

Reference Books

1. Kenneth L Short, "Microprocessors and Programmed Logic, Prentice Hall of India , New Delhi, 2nd Indian Reprint, 2004.
2. The MCS – 80 / 85 Family User's Manual, INTEL Corporation, USA.
3. "8-bit Embedded Controllers", User's Manual, Intel Corporation, USA,1990.

10EE202 DIGITAL SIGNAL PROCESSING

Credits: 3:1:0

Course Objective:

This Course will provide the students

1. To have an overview of signals and systems.
2. To study DFT & FFT Transforms.
3. To study the design of IIR filters.
4. To study the design of FIR filters.

5. To study the applications of DSP techniques in processors.

Unit I: Discrete Time Signals and Systems

Need and benefits of Digital Signal Processing – Signal Classification and basic operations on them – Properties of DT system: Linear, Time Invariance, Causal, Stable, Passive and Lossless – LTI system: Convolution Sum- Interconnection Schemes- I/O relationship determination of impulse response and step response -Anti Aliasing and Anti Imaging Filtering-Typical DSP system: ADC/DAC – sampling, quantization, and encoding.

Unit II: Discrete Transforms

Discrete Fourier Transform (DFT): Properties – DIT FFT and DIF FFT algorithms- linear filtering via circular convolution-inverse FFT- Wavelet Transform: MRA by the wavelet method.

Unit III: Infinite Impulse Response Digital Filters

Review of design of Analogue Butterworth and Chebyshev Filters, Frequency transformation in analogue domain – Design of IIR digital filters using impulse invariance technique – Design of digital filters using bilinear transform – pre warping – Frequency transformation in digital domain – Realization using direct, cascade and parallel forms.

Unit IV: Finite Impulse Response Digital Filters

Symmetric and Anti symmetric FIR filters – Linear phase FIR filters – Design using Frequency sampling technique – Window design using Hamming, Hanning and Blackmann Windows – Concept of optimum equiripple approximation – Realization of FIR filters – Transversal, Linear phase and Polyphase realization structures.

Unit V: General Purpose Signal Processors

Computer Architectures for Signal Processing – Van Neumann and Harvard architectures pipelining- hardware multiplier-accumulator-special instructions-replication-on-chip memory-extended parallelism: SIMD, VLIW, and super scalar processing –selecting digital signal processors.

Text Books:

1. Emmanuel C. Ifeachor, Barrie W.Jervis, "Digital Signal Processing , A Practical approach", Pearson Education India Series, New Delhi, 2004.
2. Lonnie C.Ludeman, "Fundamental of Digital Signal Processing", John Wiley & Sons, New Jersey, 2003.

Reference Books:

1. Oppenheim, A.V.and Schaffer, R.W., "Discrete Time Signal Processing", Prentice Hall of India, New Delhi,2001.
2. Sanjit K.Mitra, "Digital Signal Processing, A Computer based Approach", Tata McGraw-Hill Publishing Company Limited, New Delhi, 2004.
3. John. G. Proakis , Dimitris .G. Manolakis, "Digital Signal Processing: Principles, Algorithms & Applications", Prentice Hall of India, New Delhi, 2007.

Course Outcomes:

At the end of the course the students will have an understanding on the

1. Different types of digital signals and systems.
2. Different Transforms and its application to signals and systems.
3. Design of IIR & FIR filters.
4. Different DSP processors.

09EE220 COMPUTER AIDED POWER SYSTEMS ANALYSIS LABORATORY

Credits: 0:0:2

1. Formation of Y_{bus} Matrix using Direct Inspection Method
2. Formation of Y_{bus} Matrix using Singular Transformation Method
3. Load Flow Analysis by Gauss-Seidel Method
4. Load Flow Analysis by Newton- Raphson Method
5. Automatic Load Frequency Control
6. Simulation of AVR(Automatic Voltage Regulator) using MATLAB-SIMULINK
7. Z_{bus} Formation using building algorithm
8. Analysis of Symmetrical Faults
9. Perform Economic Load Dispatch using MATLAB programming
10. Transient Stability Analysis of single machine infinite bus bar (SMIB)
11. Harmonic Analysis of simple electrical circuit using MATLAB-SIMULINK
12. Speed Control of DC motor using MATLAB-SIMULINK

EE277 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

Credit: 0:0:2

12 Experiments will be notified by the HOD from time to time