COMPUTER PROGRAMMING (CP)

I Semester : Common for all Branches						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS101	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course students will be able to

CO1: Design an algorithm and flow chart for a given problem.

CO2: Summarize the structure and tokens of C program.

CO3: Explain the use of Arrays in C program.

CO4: Illustrate the applications of functions and pointers.

CO5: Understand the purpose of structures and files in C.

UNIT – I

Fundamentals of Computers

Block diagram of a Computer, Types of Programming languages, Algorithm- Characteristics of an algorithm, Flow charts and Examples.

C Fundamentals

Identifiers and Key words, Data Types, Constants and Variable declarations, Operators, Expressions, Header files.

UNIT – II

Data input/output

printf(), scanf(), getchar(), putchar(), gets(), puts(); Type conversion- implicit, explicit.

Flow Control

Selection- if statements, switch statement, goto statement. Loops- While, do-while, for; break, continue, nested loops.

UNIT – III

Arrays

Declaring and Initializing One dimensional and Two dimensional arrays, Processing an array, Character arrays, String handling functions: strlen(), strcpy(), strcmp(), strcat(). Examples – Matrix operations.

Functions

Definition, Accessing a function, passing arguments to a function, storage classes: automatic, external, static, register; Recursion, Passing arrays to a function.

UNIT – IV

Pointers

Introduction to pointers, Pointer declarations, Operations on pointers, Pointers and arrays; Passing address to a function; Function returning Pointer; Pointer to a function, Dynamic Memory Allocation.

UNIT – V

Structures and Unions

Defining a structure, Processing a structure, Structures and pointers, Passing structures to a function, Self-referential structures, Unions, User-defined data types- typedef, enum.

Files

Introduction, Opening a file, Reading data from a file, Writing data to a file and Appending data to a file, Closing a File, Error handling functions in files.

Text Books :

1. Ron S.Gottfried, Programming with C, (TMH – Schuam Outline Series) 3rd Edition -2011.
2. B.W. Kernignan and Dennis M.Ritchie, The C Programming Language, (PHI), 2nd Edition 2003.

Reference Books :

1. E.Balaguruswamy, Programming in ANSI C, TMH, 2003.
2. Yashavanth P.Kanetkar , Let US C , BPB Publications, 7th Edition,2007.
3. Ajay Mittal, Programming in C, Pearson Education, 2010.

Web References:

1. https://www.tutorialspoint.com/cprogramming/c_program_structure.htm
2. http://fresh2refresh.com/c-programming/c-basic-program/

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

PROFESSIONAL COMMUNICATION AND ENGLISH – I (PCE – I)

I Semester : Common for all Branches						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
HU101	Foundation	3	-	-	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO 1: Use Grammatically acceptable English in Oral and Written communication.

CO 2: Use appropriate Vocabulary in Technical and General Contexts.

CO 3: Comprehend General and Technical Content using various Reading Skills like Skimming and Scanning.

CO 4: Write Functional Letters, Summaries and Essays of topical, Narrative, Descriptive, Analytical and Persuasive nature.

UNIT – I

Nobel Lecture - Kailash Satyarthi
Vocabulary: Synonyms and antonyms
Grammar: Parts of Speech, Types of Nouns, Pronouns and Adjectives
Reading: Reading with a purpose: reading for understanding
Writing: Writing notes and paragraphs

UNIT – II

The Doctor‟s Word - R K Narayan
Vocabulary: One-word substitutes, Idioms and Idiomatic Phrases
Grammar: Adverbs, Verbs –Verb forms, Types of Verbs, Prepositions, Conjunctions and Articles, Word Order
Reading: Skimming and Scanning
Writing: Functional Letters – Request Letters, Complaint Letters

UNIT – III

Stay Hungry, Stay Foolish - Steve Jobs
Vocabulary: Prefixes and Suffixes, Homophones and Homonyms
Grammar: Tenses, Concord, Voices and Reported Speech
Reading: Use of Dictionary, Thesaurus, Library and Internet for Information
Writing: Note–Taking and Note–Making, Completion of Stories

UNIT – IV

The Open Window – Saki(H H Munro)
Vocabulary: Words often Confused and Collocations
Grammar: Question Tags, Degrees of Comparison, Transformation of Sentences and Correction of Sentences
Reading: Reading Comprehension
Writing: Précis writing, Description of Objects, Story making from Pictures.

Detailed Study Text:

1. The Enriched Reading by D. Sudha Rani, Pearson India Education Services Pvt. Ltd, Second Impression, 2017.

Reference Books:

1. Michael Swan, Practical English Usage, Third Edition, OUP, 2006.
2. David Green, Contemporary English Grammar, Structure and Composition, , Second Edition, Lakshmi Publications, 2015.
3. Oxford Advanced Learners Dictionary of Current English, OUP, 2015.
4. Meenakshi Raman and Sangeetha Sarma, Technical Communication Principles and Practice, 3rd Edition, OUP, 2015.
5. Raj N Bakshi, English Grammar Practice, Orient Blackswan, 2005.

Question Paper Pattern:

Sessional Exam

I Sessional Examination : 30 Marks

1. Essay Type Question – 8 Marks
2. Short Answer Questions – 8 Marks
3. Vocabulary – 4 Marks
4. Grammar – 5 Marks
5. Letter Writing – 5 Marks

II Sessional Examination : 30 Marks

1. Essay Type Question – 8 Marks
2. Short Answer Questions – 8 Marks
3. Vocabulary – 4 Marks
4. Grammar – 6 Marks
5. Reading Comprehension – 4 Marks

End Exam

1. Essay Type Question – 10 Marks
2. Short Answer Questions – 8 Marks
3. Vocabulary – 12 Marks
4. Grammar – 10 Marks
5. Reading Comprehension – 10 Marks
6. Letter Writing – 10 Marks

APPLIED PHYSICS (AP)

I /II Semester : Common for all Branches					Scheme : 2017			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS103	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessional Exam Duration : 2 Hrs					End Exam Duration: 3 Hrs			

Course Outcomes : At the end of the course students will be able to

CO1:	Understand the different crystal systems, crystal planes and determination of the Crystal Structure, Production, detection, properties and applications of ultrasonic waves, determination of velocity of ultrasonic waves in liquids.
CO2:	Understand the phenomenon of interference, diffraction and their applications
CO3:	Understand the origin of Magnetism, hysteresis, soft and hard magnetic materials; Superconductivity, types, characteristics, Messiner and Josephson effects and of superconductors.
CO4:	Understand different production methods of lasers and their applications, different types of optical fibers, losses in fibers and applications of optical fibers.
CO5:	Properties, synthesis, applications of Nanomaterials and Carbon Nanotubes.

UNIT – I

Crystallography

Space lattice, Unit cell, Crystal systems, Miller Indices, Bravais Lattices, Interplanar Distance (without derivation), Number of atoms per unit cell, Coordination Number, Atomic Radius, Packing Factor for SC, BCC and FCC. Bragg‟s law, Bragg‟s X ray Spectrometer, Structural determination by Laue method, Powder method.

Ultrasonics

Introduction, Properties of ultrasonics, Production of ultrasonics by Magnetostriction method, Piezoelectric method, Detection of ultrasonics, Determination velocity of ultrasonics in liquids. Applications: SONAR, NDT, general applications.

UNIT – II

Interference

Introduction, Conditions for interference, Interference due to thin uniform film, wedge shaped film, Newton‟s rings. Applications of interference – Testing of flatness, determination of wavelength, radius of curvature, refractive index of liquid, Non-reflective coatings.

Diffraction

Introduction, Fraunhoffer diffraction due to single slit, double slit, grating, circular aperture (qualitative analysis only), Determination of wavelength using grating, Resolving power, Rayleigh‟s criterion for resolution, Resolving power of grating and telescope.

UNIT – III

Magnetic Materials

Origin of magnetism, permeability, susceptibility, Hysteresis, soft and hard magnetic materials and their applications, Ferrites: introduction**,** properties and applications.

Superconductivity

Introduction, properties and applications of superconductors, flux quantization, Meissner effect, Type-I and Type-II Superconductors, high temperature superconductors, Josephson effect, SQUIDS.

UNIT – IV

Lasers

Introduction, spontaneous and stimulated emission of radiation, characteristics of lasers, components of laser, Ruby, He-Ne, Nd-YAG and semiconductor lasers.

Fiber Optics

Principle and propagation of light in optical fibers, structure of optical fibers, types of optical fibers and their differences, Acceptance angle, Numerical aperture(NA), losses in optical fibers, fiber optic communication, fiber optic sensors.

UNIT – V

Nanomaterials

Introduction, Properties of nano particles, Synthesis by Ball Mill method, Sol-Gel method, CVD method, PVD method, Pulsed Laser Deposition method, Wire explosion method. Applications of nanomaterials

Carbon nano tubes

Carbon nano tubes: Classification, properties, Synthesis methods – Ball Mill method, CVD method, Arc method, Applications of carbon nano tubes, Effect of nanotechnology on environment.

Text Books :

1. M.N.Avadhanulu and P.G.Kshirsagar, A text Book of Engineering Physics, S.Chand & Company
2. V.Rajendran, Engineering Physics, McGraw Hill Education (India) Pvt Limited.
3. Dr. K.Vijaya Kumar, Engineering Physics, S.Chand & Company

Reference Books :

1. Hitendra K. Malik & A.K. Singh, Engineering Physics, Tata McGraw Hill Education Pvt. Ltd.
2. S.O. Pillai, Solid State Physics, New Age International Publications.
3. Francis A. Jenkins, Harvey E. White, Fundamentals of Optics, McGraw Hill International Editions.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

ENGINEERING CHEMISTRY (EC)

I / II Semester : Common for all Branches					Scheme : 2017			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS105	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam Duration : 2 Hrs					End Exam Duration: 3 Hrs			

Course Outcomes : At the end of the course students will be able to

CO1: Understand the concept of electrochemistry, distinguishes primary and secondary cell, energy storage devices and explains the concept of corrosion with preventing methods.

CO2: Describes the water quality issues for steam generation in the boilers and problems associated with treatment.

CO3: Understand the basic concepts of phase rule and refractories.

CO4: Judge the quality of coal, petrol, diesel and lubricants. Understands the efficiency of combustion.

CO5: Understand the chemistry of polymers and composits.

UNIT – I

Electrochemistry & Corrosion

Single electrode potential- Determination. EMF of a cell and its measurement, Nernst equation, numerical problems. Electrochemical series & its applications. Electrolyte concentration cells. Electrochemical energy systems – primary batteries – dry cell, secondary batteries- lithium ion cells, Fuel cells-H_2-O_2 Fuel cell. Conductometric titrations.

Process of Chemical & electrochemical corrosion and their mechanisms. Galvanic series. Galvanic corrosion, stress corrosion. Concentration cell corrosion- differential aeration corrosion, metal ion concentration corrosion and pitting corrosion. Factors influencing corrosion. Corrosion control methods - Cathodic protection and corrosion inhibitors. Protective coatings -metallic coatings - Hot dipping, and Electroplating of nickel and chromium

UNIT – II

Water Chemistry

Hardness of water- Types, expression, units and numerical problems. Analysis of water-Determination of hardness of water by EDTA method, alkalinity & dissolved oxygen by Winkler‟s method. Disadvantages of hard water-boiler troubles-scale and sludge, caustic embrittlement, priming & foaming and boiler corrosion. Water softening methods – internal conditioning – calgon process, colloidal conditioning & external conditioning – zeolite process and ion exchange process.

Desalination – reverse osmosis.

UNIT – III

Phase rule & Refractories

Terms involved in phase rule equation, definition, explanation with examples. Application to one component system - water and sulphur systems. Condensed phase rule-Two component alloy systems - Pb-Ag system.

Refractory-classification. Properties- refractoriness, refractoriness under load, thermal spalling, porosity and thermal conductivity. Reasons for failure of refractory.

UNIT – IV

Fuel Technology & Lubricants

Fuels-Classification. Calorific value-types, units and its determination by Bomb calorimeter. Solid fuels-Coal-proximate and ultimate analysis. Liquid fuels-Petroleum-Origin, Extraction, Refining, cracking-catalytic cracking. Synthetic petrol-Fischer-Tropsch‟s & Bergius process, Reforming, knocking-octane number, diesel- cetane number. Preparation of biodiesel. Gaseous fuels-Composition & uses of Natural gas, LPG & CNG .Combustion- numerical problems- calculation of volume and

mass of oxygen and air . Flue Gas Analysis by Orsat‟s Apparatus.
Lubricants- Classification of lubricants with examples. Definition and significance of the following characteristics of a good lubricating oil- viscosity, viscosity index, flash & fire point, acid number, saponifaction value, pour point and cloud point.

UNIT – V

Polymers & Composites

Fundamentals of addition & condensation polymerization with examples. Thermoplastic and Thermosetting plastics. Preparation, properties and uses of PVC, TEFLON, Nylons, Bakelite, Polyurethane. Rubber – Processing of latex. Drawbacks of natural rubber, vulcanization, properties of vulcanized rubber. Synthetic rubber- Buna S, Buna N, Silicone and Butyl Rubbers.
Polymer composites – definition and uses of FRP - laminar composites.

Text Books :

1. P.C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai and Sons, New Delhi 2010,15th edition.

Reference Books :

1. Shashi Chawla, A Reading of Engineering Chemistry, 3rd Edition, Dhanpat Rai and Co., New Delhi, 2011,3rd edition.
2. Gowariker et al., Polymer Science and Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 2004, 10th reprint.
3. Puri, Sharma and Pathania " Principles of Physical Chemistry". Vishal Publishing Co.,Jalandhar.1991,3 1st edition.
4. Kuriacose, J.C and Rajaram, J, Engineering Chemistry, Volume I/II, Tata McGraw – Hill Publishing Co. Ltd. New Delhi, 2010, 2nd edition.
5. S.S.Dara, A Textbook of Engineering Chemistry, S. Chand & Co.Ltd. New Delhi, 2007,10th edition

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

ENGINEERING DRAWING (ED)

Text Books

1. K.L.Narayana and P.Kannaiah" Text book on Engineering Drawing," Second Edition Scitech Publications, Chennai.,2006
2. N.D.Bhatt and V.M.Panchal," Elementary Engineering Drawing ", 45 th Edition , Charotar Publishing house , Anand, India., 2002

Reference Books

1. K.Venugopal, " Engineering Drawing and Graphics with Auto CAD" , Fourth Edition,2001, New Age International(P) Limited, Publishers, New Delhi, 2001
2. Dhananjay A Jolhe, " Engineering Drawing with an introduction to Auto CAD", Tata Mc Graw-Hill Publishing Company Ltd. , New Delhi , 2008
3. M.B.Shaw & B.C.Rana " Engineering Drawing "Second Edition Pearson Education , New Delhi, 2009

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question Paper Contains three Either OR type questions carrying 10 marks each

End Exam

Question Paper Contains Five Either OR type questions carrying 12 marks each with one question from each unit.

ELEMENTS OF ELECTRICAL ENGINEERING (EEE)

I / II Semester : Common for all Branches						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
EE101	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course students will be able to

CO1: Understand the basic electrical circuits.

CO2: Understand the construction and operations of DC machines .

CO3: Understand the construction and operation of induction motors and AC Generators.

CO4: Understand the basics of illumination and earthing.

CO5: Understand the construction and operations of transformers

UNIT – I

DC Circuits:

Definition of Current, Potential, Resistance, Power and Energy, Symbol and Units. Ohm‟s law, Kirchhoff‟s laws, Solution of Series, Parallel and Series Parallel circuits. Analysis of circuits using loop current method and node voltage method. Source transformation. (elementary treatment only) (Simple problems only).

UNIT – II

Principles of AC Circuits:

Instantaneous, average, r.m.s and maximum value of sinusoidal wave. Concept of phase and phase difference. Phasor representation of sinusoidal wave, A.C through pure resistance, pure inductance and pure capacitance, Series R-L-C Circuits (Simple Problems). Power factor. Concept of 3-Φ system; Star and Delta connections; Voltage and Current relationship (no derivation) (Problems with R load only), (elementary treatment only)

UNIT – III

DC Machines:

Electromagnetic Induction, Faradays Law‟s, Lenz‟s Law and Flemings rules. Construction and working principle of a DC machine, emf equation of a D.C Generator, DC motor principle, voltage equation of generator and motor (elementary treatment only), (Simple Problems only).

UNIT – IV

Transformers:

Working Principle and Construction of 1-Φ Transformer, transformer ratio, emf equation. (elementary treatment only) (Simple problems).

Induction Motors:

Construction and principle of operation of induction motor, slip. (elementary treatment only) (Theoretical aspects only).

AC Generators

Construction, EMF equation, (elementary treatment only) (Theoretical aspects only).

UNIT – V

Illumination:

Units and laws of Illumination, Types of lamps, Incandescent lamps, Fluorescent lamps and Sodium-vapour lamps. (elementary treatment only)

Earthing:

Difference between neutral wire and earth wire, Concept of earthing, applications of fuse and MCB‟s, electrical shock, precautions against shock, treatment of electrical shock. (elementary treatment only)

Text Books :

1. V.K.Mehta and Rohith Mehta, “Basic electrical engineering”, S.Chand publishers, 14th edition.
2. M.S. Naidu and S. Kamakshaiah, “Introduction to Electrical Engineering”, Tata McGraw Hill Publishers, 1st edition, 2004.
3. B.L. Thereja, “Electrical technology-Vol-I & II ”, S. Chand Publishers, 23rd edition, 2004.
4. Dr.S.L.Uppal, “Electrical Wiring, Estimating and Costing”, Khanna publishers, 1st edition, 2008.

Reference Books :

1. H. Cotton, “Electrical Technology”, CBS Publishers, 7th edition, 2005.
2. Joseph Edminister, “Electric Circuits” Tata McGraw Hill Publishers, 5th edition, 2010.
3. K.B.Raina and S.K.Battacharya, “Electrical Design Estimating and Costing” New age publishers, 1st edition, 1991.
4. V.N.Mittle, “Basic electrical engineering”, Tata McGraw Hill Publishers, 2nd edition, 2005.

Web References:

1. http://nptel.ac.in/downloads/108105053/
2. https://www.electrical4u.com/
3. http://www.smps.us/references.html
4. https://www.facstaff.bucknell.edu/mastascu/eLessonsHTML/EEIndex.html

E-Text Books:

1. http://bookboon.com/en/electrical-electronic-engineering-ebooks
2. http://www.freeengineeringbooks.com/Electrical/Basic-Electrical-Engineering.php

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

BASIC ELECTRONICS ENGINEERING (BEE)

I/II Semester : Common for all Branches					Scheme : 2017			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
EC101	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessional Exam Duration : 2 Hrs					End Exam Duration: 3 Hrs			

Course Outcomes : At the end of the course students will be able to

CO1: Understand the energy band diagrams and properties of intrinsic and extrinsic semiconductors and solve simple problems on conductivity

CO2: Understand concepts & applications of p-n junction diode, BJT, FET and MOSFET

CO3: Understand basic operation of special purpose diodes like LED and photo diode

CO4: Design various rectifier circuits and Voltage regulators using Zener diodes

CO5: Apply the basic knowledge of number systems, Boolean algebra and logic gates to solve problems on simplification and realization of Boolean equations and binary arithmetic.

CO6: Understand the concepts of adders, multiplexers,decoders,flip flops and memory devices.

UNIT – I

Semiconductor materials & their properties:

Classification of materials based on Energy Band Diagrams, Transport Phenomena in semiconductors -- mobility & conductivity, Electrons and Holes in intrinsic semiconductor, Donor and Acceptor impurities, Mass-action law, Charge densities in semiconductors, Drift current & diffusion currents, electrical properties of Ge and Si, Hall-effect.

UNIT – II

Semiconductor Diodes And Applications:

Open-circuited p-n junction, p-n junction as rectifier (forward bias Reverse Bias), Current components in p-n diode, Volt-Ampere(V/I) characteristics of p-n diode, Temperature dependence of V/I characteristics, Diode resistance, Piecewise linear diode characteristics, Break down mechanisms in semiconductor diodes- Avalanche breakdown & Zener breakdown, Zener diode characteristics, Zener diode as voltage regulator Rectifiers (without filters)- Half wave, Full wave, and Bridge rectifiers- their operation, performance characteristics, analysis and comparison, Theoretical concepts of LED, Photo diode working.

UNIT – III

Fundamentals of Bipolar Junction Transistor (BJT):

Construction, Operation of n-p-n and p-n-p transistors, Symbols, Transistor current components, Types of configurations- CB, CE and CC configurations and their characteristics, Definitions of α, β, and γ and their relations, Simple problems, Comparison of CB, CE and CC configurations, Transistor as an amplifier.

UNIT – IV

Field Effect Transistors:

Construction and operation of n-channel JFET, Circuit symbols for n and p-channel JFET, Drain characteristics, Parameters of JFET, Transfer characteristics of JFET, Comparison of JFET and BJT, Applications of JFET

UNIT – V

Digital Electronics:

Number Systems-Binary, Octal and Hexadecimal number systems, Conversions, Binary Arithmetic, Subtraction using 1"s Complement & 2"s Complement method, Boolean Algebra, DeMorgon"s Theorems, Logic gates, Adders, Multiplexers, Decoders, Introduction to flip-flops – SR, JK, T and D flip flops, introduction to memory devices and their classification.

Text Books :

1. N.N Bhargava, D.C. Kulshrestha, S.C Gupta, NITTTR – Chandigarh, Basic Electronics and Linear Circuits, Mc Graw Hill Education (India), Pvt. Ltd.,
2. Albert Paul Malvino, Electronic Principles, Mc Graw Hill International edition
3. Morris Mano , Digital Logic and Computer Design, PHI.

Reference Books :

1. Robert Boylestad. Louis Nashelsky, Electronic devices. And circuit theory., PHI
2. David A. Bell, Electronic Devices and Circuits, Oxford University Press, 5th edition,2008
3. Millman Jacob, Christos Halkias, Satyabrata Jit, Electronic Devices and Circuits, TMH

Web References:

1. http://www.electronics-tutorials.ws/
2. http://nptel.ac.in/courses/117103063/
3. *www.electronicshub.org/tutorials/*
4. *engineering.nyu.edu/gk12/amps-cbri/pdf/Basic%20Electronics.pdf*

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

ENGINEERING MECHANICS (EGM)

I/II Semester : Common for all Branches						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CE101	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course students will be able to

CO1 : Calculate the resultant of different force systems

CO2 : Determine the unknown forces in determinate structures using equilibrium conditions

CO3 : Understand the concept of friction

CO4 : Determine the axial forces in the members of determinate trusses

CO5 : Locate the centroid of composite areas

CO6 : Determine the moment of Inertia of composite areas

CO7 : Compute the stresses and strains of axially loaded members, elastic constants of different materials

UNIT - I

Forces and Force Systems

Types of force systems – Resultant of coplanar, concurrent and non concurrent force systems – Concept of moment – Varignon‟s theorem.

Equilibrium of Systems of Forces

Equilibrium concept in mechanics – Free body diagram - Equilibrium of coplanar force systems

UNIT - II

Reactions in Beams

Types of loads, supports and beams – Support reactions for simply supported beams, cantilever and overhanging beams subjected to different types of loads.

Static Analysis of Simple Plane Trusses

Analysis of simple trusses by method of joints and method of sections.

UNIT - III

Static Analysis of Systems with Friction

Friction, impending motion, open belt friction, wedge friction and ladder friction, lifts by a simple screw jack with square threads

UNIT - IV

Central Points

Concept of first moment – Definition of centroid and centre of gravity – Centroid of composite areas.

Area Moment of Inertia

Moment of inertia for areas – Parallel and perpendicular axis theorems – Moment of inertia of compound sections – Radius of gyration.

UNIT - V

Mechanics of Deformable Solids

Mechanical properties of materials –Simple stresses and strains – Types of stresses – Hooke‟s law – Stress–strain curve for ductile material – Factor of safety and working stress.

Relation Between Elastic Constants

State of simple shear – Complimentary shear stress – Relation between Young‟s modulus, Rigidity modulus, Bulk modulus and Poisson‟s ratio

Text Books :

1. R.K. Bansal, "*A text book of Engineering Mechanics*", Laxmi Publications
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, "*Mechanics of materials*", Laxmi Publications.

Reference Books :

1. Thimoshenko & Young, "*Engineering Mechanics*", Tata McGraw–Hill Publications
2. Bhavikatti and Rajasekharappa, "*Engineering Mechanics*", New Age Intl. Publications
3. R.K.Rajput, "*Applied Mechanics*", Laxmi Publications.

Web References:

1.https//www.coursera.org

2.www.mathalino.com

3.www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

ENGINEERING MATHEMATICS – II (EM2)

II Semester : Common for all Branches						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS102	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course students will be able to

CO1: Find the solution for simultaneous system of linear equations by rank of matrix, eigen values and eigen vectors. Reduce the quadratic form to canonical form

CO2: Determine the Fourier series of a function and its expansion

CO3: Understand the Fourier transforms and Z transforms

CO4: Utilize Numerical Methods and principles of least square methods in engineering problems

CO5: Use Partial differential equations and method of separation of variables in solving the one dimensional wave and Heat equations

UNIT - I

Matrices

Rank of a matrix, Consistency of systems of linear equations, Rouche"s Theorem(Statement only). Eigen values and Eigen vectors, diagonalization of a matrix. Cayley -Hamilton Theorem, finding inverse of a matrix. Quadratic form, reduction of a quadratic form to canonical form by orthogonal transformation.

UNIT - II

Fourier Series

Determination of Fourier coefficients, Dirichlet"s conditions. Fourier series of Even and Odd functions. Functions having points of discontinuity. Change of interval. Half –Range Fourier Sine and Cosine series.

UNIT - III

Fourier Transforms

Infinite Fourier Transforms, Fourier Sine and Cosine transforms. Finite Fourier Sine and Cosine Transforms, Inverse Fourier Transforms.

Z-Transforms

Z- Transforms, Inverse Z- Transformation, Properties, Damping rule, Shifting rule. Application of Z-Transforms to Difference equations.

UNIT - IV

Numerical Methods

Solution of Algebraic and Transcendental Equations – Method of False Position, Iteration method, Newton Raphson method. Solution of Simultaneous Equations – Gauss Seidel iteration method.
Curve Fitting – Least squares method. Fitting a straight line $y = a + bx$ and parabola $y = a + bx + cx^2$.

UNIT - V

Partial Differential Equations

Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions. Linear equations of first order – Lagrange‟s Linear equation. Applications - Method of separation of variables. One dimensional Wave equation, One dimensional Heat equation.

Text Books :

1. B.S. Grewal- Higher Engineering Mathematics. Khanna Publishers, 42nd Edition, 2012.
2. T.K.V.Iyengar and others -A Text Book of Engineering Mathematics, Vol 1-S.Chand & Company, 13th Edition 2014.

Reference Books :

1. B.V. Ramana -Higher Engineering Mathematics, TMH Publishers, 2nd Edition, 2006.
2. N.P.Bali and others -A Text Book of Engineering Mathematics, Lakshmi publishers, 7th Edition, 2009.
3. Erwyn Kreyszig -Advanced Engineering Mathematics, John wiley, 8th Edition 2006.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

DATA STRUCTURES (DS)

II Semester : Common for all Branches						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS103	Foundation	3	-	-	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course students will be able to

CO1: Understand the purpose of array data structure and its operations.

CO2: Understand the linked list data structure and its operations.

CO3: Explain the operations performed on stack data structure.

CO4: Explain the operations performed on queue data structure.

CO5: Understand the purpose of structures and files in C.

UNIT - I

Introduction to Data Structures

Definition,Classification of Datastructures, Linear and Non Linear

Sequential Storage Representation

Arrays, Operations on Arrays- Insertion, Deletion, Traversing; Applications of arrays–Linear Search, Binary Search, Bubble Sort, Selection Sort, Insertion Sort, Merging of arrays.

UNIT - II

Linked Storage Representation –Linked Lists

Linked storage representation using pointers, Types of Linked Lists–Single linked list, Doublelinked list, Operations on linked lists-Traversing, Searching, Insertion and Deletion.

UNIT - III

Linear DataStructures - Stacks

Representation of Stack using sequential storage and linked allocation methods, Operations on Stacks- Push, Pop, and Display.

UNIT - IV

Linear DataStructures - Queues

Representation of Queue using sequential and linked allocation, Operations on Queues- Insertion, Deletion and Traversing, Circular queue.

UNIT - V

Non Linear Data Structures-Trees

Basic terminology, Binary trees, Representation of Binary tree in memory using arrays and linked lists, Binary Search Trees, Operations on binary search trees-Insertion,Deletion and RecursiveTraversals-Preorder, Inorder and Postorder.

Text Books :

1. Jean Paul Tremblay and Paul G.Sorenson[2007], An Introduction to DataStructures With Applications, TMH.
2. Debasis Samantha, Classic Data Structures Second Edition (2009), PHI.

Reference Books :

1. Pradip Dey, Manas Ghosh and Reema Tereja, Computer Programming and DataStructures, Oxford University Press.
2. S.K.Srivatsava and Deepali Srivatsava, Data Structures through „C‟ in depth, BPB Publications.

Web References :

1. https://www.tutorialspoint.com/data_structures_algorithms
2. http://www.geeksforgeeks.org/data-structures

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

PROFESSIONAL COMMUNICATION AND ENGLISH –II (PCE – II)

II Semester : Common for all Branches						**Scheme : 2017**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
HU102	Foundation	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Sessional Exam Duration : 2 Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO 1: Write Job Applications, Resumes and Statements of Purpose.

CO 2: Write Technical Reports, Proposals, Journal Papers and Project Reports.

CO 3: Write Business letters, Block letters, Memos and Emails.

CO 4: Comprehend General and Technical Content.

Course Content

1. Reading Comprehension/ Précis writing.
2. Writing Cover Letters for Job Applications, Resume Preparation
3. Profiling Companies
4. Statement of Purpose for Internships, Apprenticeships, Admissions in Universities
5. Writing Technical Reports and Proposals, Formats of Research Articles, Journal Papers, Project Reports
6. Email Writing
7. Writing Business Letters, Formats of Letters, Block Letters,Memos

Reference Books:

1. Sangeeta Sharma & Binod Mishra, Communication Skills for Engineers and Scientists, PHI Learning Private Limited.
2. Marilyn Anderson, Pramod K. Naya and Madhucchanda Sen, Critical Reasoning, Academic Writing and Presentation Skills, , Pearson Publishers.
3. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Publishing Company Ltd., 2005.
4. Raymond V. Lesikar, Marie E. Flatley, “Basic Business Communication: Skills for Empowering the Internet Generation”, 11th Edition, Tata McGraw-Hill. 2006.
5. Dr A. Ramakrishna Rao, Dr G. Natanam & Prof S.A. Sankaranarayanan, “English Language Communication : A Reader cum Lab Manual”, Anuradha Publications, Chennai, 2006.

Question Paper Pattern:

Sessional Exam

I Sessional Examination – 30 Marks

1. Reading Comprehension – 5M
2. Profiling a Company – 5M
3. Statement of Purpose – 7M
4. Job Application – 8M
5. Technical Report / Project Report – 5M

II Sessional Examination - 30 Marks

1. Email Writing – 5M
2. Memo Writing – 5M
3. Précis Writing – 7M
4. Business Letter – 8M
5. Formats of Research Articles/ Journal Papers – 5 M

End Exam

1. Technical Report – 10M
2. Reading Comprehension – 5 Marks
3. Précis Writing– 5M
4. Job Application Letter – 10M
5. Profiling a Company/ Business Letter – 10 Marks
6. Statement of Purpose – 10 Marks
7. Email/Memo Writing – 10 Marks

COMPUTER PROGRAMING LAB (CPL)

I Semester : Common for all Branches					Scheme : 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
CS102	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
End Exam Duration: 3 Hrs							

Course Outcomes : At the end of the course students will be able to

CO1: Execute programs using conditional and loop statements in C.

CO2: Develop programs using 1-Dimensional and 2-Dimensional arrays.

CO3: Perform Call by value, Call by reference and Recursion using functions

CO4: Implement programs using pointers, structures and files in C.

List of Experiments

1. Conditional Statements : Quadratic equations, usage of switch statement.
2. Loop Statements : Adam Number, Cosine series
3. Arrays : Max Min problem, standard deviation and variance.
4. Character Arrays : Palindrome, implementation of string handling functions.
5. Functions and Recursion : Matrix operations, Towers of Hanoi, GCD
6. Pointers : Interchanging problem, implementation of dynamic memory allocation.
7. Structures : Usage of structures in various applications.
8. Files : File operations and usage of files in various applications.
9. Assembling the hardware components and installation of OS

Reference Books :

1. Yashavanth P.Kanetkar , Let US C , BPB Publications, 7th Edition,2007.
2. B.W. Kernignan and Dennis M.Ritchie, The C Programming Language , (PHI), 2nd Edition 2003.

APPLIED PHYSICS LAB (APP)

I/II Semester : Common for all Branches					Scheme : 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
BS104	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	-	-	2	1	50	50	100

End Exam Duration: 2 Hrs

Course Outcomes : At the end of the course students will be able to

CO1: apply the knowledge of physics laboratory in measuring the standard values.

CO2: apply theoretical knowledge to experimental values.

List of Experiments

Note : At least 12 of the following experiments shall be conducted

1. Determination of size of small particles using a laser.
2. B-H curve to study the magnetic behavior of ferromagnetic materials.
3. Determination of Numerical Aperture of an Optical Fiber.
4. Verification of Faraday‟s Laws.
5. Determination of wavelength using a single slit.
6. Study of magnetic field along the axis of a circular coil (Steward Gees Apparatus).
7. LCR Series and Parallel Resonance.
8. Determination of wavelengths using a grating.
9. Hall Effect-determination of Hall coefficient and charge density.
10. Determination of radius of curvature of a plano-convex lens using Newton‟s rings.
11. Double refraction - determination of refractive indices of e-ray and o-ray.
12. Determination of small thickness by forming parallel fringes.
13. Determination of rigidity modulus by using torsion pendulum.
14. Determination of energy gap of a semiconductor by four probe method.

ENGINEERING CHEMISTRY LABORATORY (CHP)

I / II Semester : Common for all branches					Scheme :2017		
Course Code	Hours/Week			Credits	Maximum Marks		
BS106	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	-	-	2	1	50	50	100

End Exam Duration: 2 Hrs

Course Outcomes : At the end of the course students will be able to

CO1: Understand and appreciate various analytical methods including instrumentation that acts as a tools in analysis of water.

CO2: Understand various analytical methods in analysis of an alloy.

CO3: Understand various analytical methods including instrumentation that acts as tools in analysis of different fuels.

List of Experiments

Note : At least 12 of the following experiments shall be conducted

Volumetric Analysis

1. Demonstration of analytical balance.
2. Preparation of standard sodium carbonate solution.
3. Estimation of magnesium by EDTA titration.
4. Estimation of copper by EDTA titration.
5. Estimation of total and permanent hardness of water by EDTA titration method.
6. Estimation of copper in brass alloy.
7. Estimation of dissolved oxygen by Winkler‟s method.
8. Estimation of iron using diphynylamine indicator by dichrometry.

Instrumentation

9. Determination of calorific value of a solid fuel using Bomb calorimeter.
10. Determination of viscosity of lubricating oil using Engler‟s viscometer.
11. Determination of viscosity of lubricating oil using Redwood viscometer.
12. Determination of strength of mixture of acids (HCl and CH_3COOH) by conductometric titrations.
13. Verification of Beer-Lamberts law using colorimeter.
14. Potentiometric titrations.
15. Determination of simple eutectic of two component system.

PHONETICS AND COMMUNICATION SKILLS LAB (PCP)

I/II Semester : Common for all Branches					Scheme : 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
HU103	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100

End Exam Duration: 2 Hrs

Course Outcomes : At the end of the course students will be able to

CO1: Speak internationally intelligible English without mother tongue accent.

CO2: Adopt appropriate intonation patterns for effective oral communication.

CO3: Identify International Phonetic Symbols to find the pronunciation of new words.

CO4: Speak in English confidently, fluently and effectively.

CO5: Exhibit team playing and leadership skills.

List of Experiments

Phonetics Laboratory

Focus in the lab is on accent neutralization for international intelligibility

1. Introduction to English Phonetic Symbols and associated sounds.
2. Practice in Consonant sounds
3. Practice in Vowels and Diphthongs
4. Practice in Accent, Rhythm and Intonation

Communication Skills Laboratory

Focus in the lab is more on fluency than on accuracy

1. Inter-personal Communication

a) Self Introduction

b) Introducing Others

c) Non-Verbal Communication

d) Posture, gait and body language.

2. Communication in Formal Situations

a) Public speaking – Extempore, Prepared Speech

b) Role-play

c) Situational Dialogues

d) Sell-out

e) JAM

f) Telephone etiquette

Reference Books :

1. Exercises in Spoken English Part – I, Part – II & Part – III Published by Central Institute of English and Foreign Languages, Hyderabad.
2. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice Hall of India, Pvt Ltd.
3. T. Balasubramanyam , A.Text Book of English Phonetics for Indian Students, Macmillan India Ltd.,
4. Krishna Mohan and Meera Benerjee , Developing Communication Skills , Macmillan India Ltd.,
5. D.Souza Eunice and Shahani. G , “Communication Skills in English” , Noble Publishing House

ENGINEERING WORKSHOP (EWP)

I /II Semester : Common for all branches					Scheme : 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
ME102	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
End Exam Duration: 3 Hrs							

Course Outcomes : At the end of the course students will be able to

CO1: To understand the usage of tools and equipments in fitting, carpentry, house wiring, soldering, foundry and smithy.

CO2: To prepare of simple models in carpentry, fitting and smithy

CO3: To prepare sand mould using foundry tools

CO4: To do soldering of circuit boards and

CO5: To give electrical connections in house wiring.

LIST OF EXPERIMENTS

Introduction to tools and equipment used in each trade

Cycle – I (Carpentry)

1. Dovetail joint
2. Mitre-faced Bridle joints
3. Mortise and Tenon joint

Cycle – II (Fitting)

1. V – fitting
2. Stepped fitting
3. Half round fitting

Cycle – III (Black smithy and Foundry)

1. Making Round to square cross section
2. Making eye bolt
3. Preparation of mould with split piece pattern.

Cycle – IV (House wiring)

1. One bulb controlled by one-way switch and two-way switches.
2. Two bulbs in series and parallel
3. Wiring for a water pump with single phase starter.

Cycle – IV (Soldering)

1. Soldering Practice
2. Soldering Resistances in Series
3. Soldering Resistances in parallel

Student has to perform at least two jobs from each trade.

Reference Books :

1. P. Kannaiah and K.L. Narayana [2010], " Workshop Manual ", Second Edition, Scitech Publication , Chennai
2. K.Venkata Reddy [2003],"First year Workshop manual", Bhagyasri Publishers, Tirupathi
3. Hazrachowdhury and S.K. Bose [2003], "*Workshop Technology Vol.1",*Media Promoters and Publication, New Delhi.

DATA STRUCTURES LAB (DSP)

II Semester : Common for all Branches			Scheme : 2017
Course Code	Hours/Week	Credits	Maximum Marks

CS104	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100

End Exam Duration: 3 Hrs

Course Outcomes : At the end of the course students will be able to

CO1: Use Arrays to store similar data and perform searching and sorting operations.

CO2: Understand the operations performed on Linked List.

CO3: Implementation of Stack and queues using static and dynamic allocation.

List of Experiments

1. Array Data Structures: Array Operations and merging.
2. Applications of Array Data Structures : 1. Searching – Linear and Binary
   2.Sorting –Bubble, Insertion, Selection
3. Linked List: Implementation of various operations for Single and Double Linked List.
4. Stack Data Structure: Implementation of stack operations using static and dynamic allocation.
5 Queue Data Structure: 1. Implementation of Circular Queue using static allocation.
   2. Implementation of Queue operations using dynamic allocation

Reference Books :

1. Yashavanth P.Kanetkar , Let US C , BPB Publications, 7th Edition,2007.

2. B.W. Kernignan and Dennis M.Ritchie, The C Programming Language , (PHI), 2nd Edition 2003.

HU201 : MANAGERIAL ECONOMICS & FINANCIAL ACCOUNTANCY (MEFA)
(For B.Tech III Semester ECE & CSE)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To enable the students to understand Principles of Managerial Economics
- To enable the students to know Accounting Practices for effective decision making
- To promote entrepreneurial abilities among the budding engineers

Course Outcomes:

- Students should be able to understand the application of Managerial Economics in various aspects of decision making
- Students should be able to think and analyze the critical problems in accountancy
- Students should be able to enhance their leadership qualities and understand the key elements to be an entrepreneur

Unit-1
Introduction to Managerial Economics & Demand Analysis:
Managerial Economics: Definition of Managerial Economics, Characteristics and Scope,Managerial Economics and its Relation with other subjects and its Uses, Role and Responsibilities of Managerial Economist
Demand Analysis: Meaning, Types of Demand, Demand Determinants, Law of Demand – Itsassumptions and exceptions, Law of Diminishing Marginal Utility

Unit-2
Elasticity of Demand and Demand Forecasting:
Elasticity of Demand: Definition, Types of Elasticity of Demand, Practical Significance of priceelasticity of demand, Measurement of Price Elasticity of Demand
Demand forecasting – Importance, Factors, Purposes of Demand Forecasting, Methods ofDemand Forecasting.

Unit-3
Theory of production & cost analysis and Market Structures:
Production Analysis: Meaning of production function, Isoquants & Isocosts, The law of diminishing Marginal Returns, Law of Returns to Scale, Internal and External Economies of scale.
Cost Analysis – Cost concepts, Cost output relationship for Short Run and Long Run, Break EvenAnalysis – Its Importance, Limitations and Managerial uses
Market Structures: Types and Features of different Competitive situation–Perfect Competition – Monopoly – Monopolistic and Oligopolistic Competition, Price output determination in case of perfect competition and Monopoly.
Unit-4
Types of Business Organizations & Capital and its Significance:
Types of Business Organizations: Features and Evaluation of Sole Proprietorship, Partnership, Joint Stock Company.

Capital and its Significance: Types of Capital – Estimation of fixed and working capital requirements – Methods and sources of raising fixed and working capital

Unit-5
Introduction to Financial Accountancy:

Principles of Accountancy: Introduction to Accountancy, Double Entry System of Book Keeping-Meaning – Scope – Advantages, Journal Entries, Ledger, Preparation of Trial Balance.

Unit-6
Final Accounts:

Preparation of Final Accounts: Trading Account, Profit & Loss Account, Balance Sheet with adjustments, Final Accounts problems.

Text Books:

1) Varshiney and Maheswari, Managerial Economics, Sultan Chand & Co, New Delhi
2) Y.K Bhushan, Business Organization & Management, S Chand & Co., New Delhi.
3) S.P Jain and K.L Narang, Financial Accounting - B.comFirstYearAndhraPradeshUniversities, Kalyani Publishers, New Delhi.

Reference Books:

1) Shukla & Grewal, Advanced Accountancy, S.Chand& Co., New Delhi
2) M.C Shukla, Business Organization and Management, S.Chand& Co., New Delhi.

NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

BS202 : COMPLEX VARIABLES AND SPECIAL FUNCTIONS (CVSF)
(For B.Tech III Semester ECE & EEE)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	3

Course objectives:

1. To make the students to understand Bessel and Legendre functions . To make use of these functions not only in mathematics but also in solving engineering problems.
2. The students gain the knowledge of complex variables, conformal mapping, complex series and complex integration.
3. To make the students to understand the importance of numerical differential equations, interpolation, correlation coefficient and regression analysis.

Course outcomes:

1. Students are able to understand and apply Bessel and Legendre functions in solving electrical engineering problems.
2. Students shall apply numerical solutions in engineering, science and also in many branches of applied mathematics.
3. Students are able to understand and apply Statistics in many fields of learning such as physical sciences and engineering.
4. Students shall apply Complex techniques in the area of transmission lines, control systems, signal processing and electromagnetic field theory.

Unit - I

Complex Variables: Analytic functions, Cauchy-Riemann equations, sufficient condition for analyticity, Harmonic function, Method to find the Conjugate function, Milne – Thomson method.Conformal Mapping (e^z , z^2 , sinz, cosz) , Bilinear Transformation.

Unit – II

Complex Integration & Series : Simple and Multiple Connected regions, Cauchy‟s Integral theorem, Cauchy‟s integral formula, Generalized Integral formula. Taylor‟s series, Maclaurin‟s series and Laurent‟s series. Residue theorem, Method of finding residues. Evaluation of real integrals by contour integration, Integration round the unit circle and in the interval (- ∞, ∞).

Unit-III

Interpolation : Operators, relation between the operators. Newton‟s forward and backward interpolation formulae. Lagrange‟s and Inverse Lagrange‟s interpolation formulae. Cubic Spline interpolation.

Unit - IV

Bessel Functions: Solution of Bessel‟s equation, Recurrence relations for $J_n(x)$, Generating function, Jacobi series, Orthogonality of Bessel‟s function.

Unit – V

Legendre Functions: Solution of Legendre‟s equation, Rodrigue‟s formula, Legendre polynomials, Generating function, Recurrence relations for $P_n(x)$, Orthogonality of Legendre polynomials.

Unit – VI

Numerical Methods & Statistics: Solution of first order Differential equations. Taylor‟s method, Picard‟s method, Euler‟s and modified Euler‟s methods. Runge-Kutta methods of secondand forth order. Normal distribution, properties. Correlation coefficient, Lines of

regression.

Text Books:

1. B.S. Grewal Higher Engineering Mathematics KhannaPublishers, New Delhi, 2005
2. T.K.V Iyengar and others A Text book of Engineering Mathematics Vol-3 S. Chand&co.2011

Reference Books:

1. S.S.Sastry Introductory Methods of Numerical Analysis, PHI, 2010
2. Erwin Kreyszig, Advanced Engineering Mathematics,John Wiley and Sons 8th Edition,2008

NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EC201: PROBABILITY THEORY AND STOCHASTIC PROCESSES (PTSP)
(For B.Tech. ECE III Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- The Objective of this course is to provide the students with knowledge about the random variable, random processes.
- To model the random processes in the communication system such as receiver performance, Interference, thermal noise, and multipath phenomenon.

Course Outcomes:

- This course provides a foundation in the theory and Applications of probability and stochastic processes.
- Students are able to understand the mathematical techniques relating to random processes which are applicable in the areas of Communications, signal processing, detection & estimation of signals.

Unit-I

Probability Theory: Probability and axioms of probability, Joint Probability and ConditionalProbability Total Probability, Baye‟s Theorem and Bernoulli‟s trials,.

Unit-II

Single Random Variables: Definition of a Random variable, Classification of Random variables, Distribution and Density functions- Gaussian, Uniform, Exponential, Binomial, Poisson‟s, Rayleigh, Chi square, Conditional distributions and density functions.
Operations on single random variable: Expectation, Moments about the origin, Central Moments, Variance, Skew and Kurtosis, Chebyshev‟s Inequality, Markov Inequality, Characteristic functions, Moment Generating function, Transformation of random variables.
Unit-III

Multiple Random Variables: Joint Distribution Function and its Properties, Joint Density and itsProperties, Marginal Distribution and Density Functions, Conditional Distribution and Density – Point Conditioning and Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem.

Unit-IV

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Schwartz Inequality, Joint Characteristic Functions, Jointly Gaussian Random Variables& prosperities, Transformations ofMultiple Random Variables, Linear Transformations of Gaussian Random Variables.

Unit-V

Random Processes-Temporal Characteristics: Random Process Concept, Classification of Random Processes, Distribution and Density Functions, Stationarity and Statistical Independence.Ensemble Averages, Time Averages, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance Functions.

Random Processes-Spectral Characteristics: Power Density Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Unit-VI

Linear Systems with Random inputs: Linear system Fundamentals, Random signal response oflinear systems, System evaluation using random noise, spectral characteristics of system response.

Text Books:

1. Peyton Z. Peebles, Probability Random variables and Random signal principles 4th Edition,TMH, 2009.

2. Athanasios Papoulis and Unni Krishna Pillai, Probability, Random variables and stochastic processes, 4th Edition, PHI,2009.

Reference books:

1. **Henry Stark and John W.Woods,Probability and Random processes with applicationsto signal processing, 3rd edition ,Pearson Education,2009.**

R.P.Singh and S.D. Sapre, Communication Systems Analog & Digital, 2ndedition,TMH -2007.

Simon Haykin, Communication Systems, 2nd Edition, John Wiley,2009.

I.J.Nagrath, S.N.Sharan, R.Ranjan, S.Kumar, Signals and Systems,11th Edition, TMH, 2008

NOTE:
End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EC202: ELECTRONIC DEVICES AND CIRCUITS (EDC)

(**Common to B.Tech. III Semester ECE & EEE**)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To understand electronic devices, including diodes, bipolar junction transistors and FET
- To understand basic circuits of the electronic devices and Computer aided circuit analysis

Course Outcomes:

- Students are able to understand the operating principles of major electronic devices, circuit models and connection to the physical operation of the device and ability in analysis and design of basic circuits

Unit-I

Review of Semiconductor Physics & Transistor: Energy band diagram- Fermi-level, Drift and diffusion concepts, Continuity equation, Minority carrier injection, and Potential variation within graded semiconductor, Contact potential difference, p-n junction diode & Zener diode characteristics, Rectifiers with filters, Eber‟s moll model and small signal model of bipolar junction transistor, Graphical determination of h parameters.

Unit-II

Transistor Biasing: Need for biasing, Operating point, DC and AC load lines, Bias stabilization techniques: fixed bias, collector to base bias, self-bias, Stabilization against variations in I_{co}, V_{BE} and β for the self bias circuit, Bias compensation techniques, Thermal runaway and thermal stability.

Unit-III

Junction Field Effect Transistor (JFET): Principle of operation, Characteristics of JFET, FET small signal model, Graphical determination of g_m , r_d and μ, FET as Voltage Variable Resistor (VVR),Advantages of FET over BJT.

Unit-IV

FET Biasing: Biasing techniques: Fixed bias, Source self-bias, Voltage divider bias
MOSFETS: Depletion and enhancement types of MOSFETs.

Unit-V

Single Stage Amplifiers : Transistor as an amplifier, Transistor Low frequency hybrid Model, Analysis of a transistor amplifier circuit using h-Parameters, Comparison of CB, CC and CE amplifier configurations, Emitter Follower, Linear analysis of transistor amplifier circuits, Miller‟s Theorem and its Dual.

Unit-VI

Multistage Transistor Amplifiers: Types of coupling – RC coupled, Direct coupled, Analysis oftwo cascaded amplifier stages, Approximate CE, CB and CC models, CE amplifier with emitter resistance, Darlington, Bootstrap and Cascode amplifiers, Frequency response of an amplifier at Low and High frequencies, Bandwidth of cascaded amplifier stages.

Text Books:

1. J.Milliman, C.Halkias & Satyabrata Jit, Electronic Devices and Circuits, 2nd Edition, TMH, 2007.
2. J. Milliman & C.Halkias, Integrated Electronics –TMH, 2007
3. Robert Boylestad & Lowis Nashelsky, Electronic Devices and Circuit Theory, 5th Edition PHI, 1993
4. Allen Mottershed, Electronics devices and circuits, PHI

Reference Books:

1. Ben.G.Streetman , Solid state electronic devices, PHI
2. David .A. Bell , Electronic devices and circuits, 4th Edition, PHI, 1999.
3. Nagrath , Analog and Digital Circuits, TMH

NOTE:
End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EC203 : SIGNALS AND SYSTEMS (SAS)
(For B.Tech ECE III Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	3

Course objectives:

- The objective of the course is to analyze the linear, time invariant systems to standard input signals.
- To study different standard signals that can be applied to various systems

Course outcomes:

- The students are able to apply various transformation techniques to estimate the characteristics of systems.
- The students are able to estimate frequency spectrum of any standard signal

Unit-I

Introduction: Basic continuous and discrete time signals, Classification of Signals and Systems and their properties, Basic operations on signals, Elementary signals, Singularity functions: Impulse, Step and Ramp fuctions.

Unit-II

Fourier Series and Fourier Transforms: Dirichlet‟s conditions, Trigonometric Fourier series and Exponential Fourier series, Spectrum and its significance, Amplitude and Phase spectra, Fourier transform(FT), Fourier transform of standard signals, properties of Fourier transforms, Fourier transforms involving impulse function, Fourier transform of periodic signals.

Unit-III

Signal transmission and Sampling: Linear time invariant (LTI) system, Transmission of signals through continuous and discrete time LTI systems, Transfer function of an LTI system. Distortion less transmission through LTI system, Causality & stability, , Sampling of continuous time signals, Sampling theorem, Reconstruction of signal from its samples, effect of undersampling – Aliasing, Practical aspects of sampling; pulses of finite duration, Flat top sampling

Unit-IV

Convolution and correlation of signals : Graphical method of convolution, auto correlation and Cross correlation of functions, properties of correlation function, Energy density spectrum, Parseval‟s theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function, Relation between convolution and correlation, Applications of convolution and correlation.

Unit-V

Laplace transforms: Laplace transform(LT), Concept of region of convergence (ROC) for Laplace transforms, Properties of Laplace transforms, Laplace transform of periodic signals.Inverse Laplace transform. Laplace transform solution for electric circuits, System impulse response and definition of system transfer function.

Unit-VI

Z–transforms : Z-Transform of Discrete time signal, Region of Convergence(ROC) and its properties, Constraints on ROC for various classes of signals, properties of Z Transforms, Systemfunction, Causlity and stability, Inverse Z Transform, Unilateral Z Transform.

Text Books:

1. Simon Haykin, Communication Systems, 2nd Edition, Wiley-Eastern.
2. Oppenheim A.V and Willsky, Signals and Systems, 2nd Edition, Pearson Edition.
3. B.P.Lathi , Communication Systems , Wiley Eastern.

References Books:

1. Simon Haykin and Van Veen,Wiley, Signals & Systems, 2nd Edition.
2. Simon Haykin, Signals and Systems, Wiley-Eastern.
3. Hwei Piao Hsu, Schaum‟s, Outline of Theory Problems of Signals and Systems, McGraw-Hill Professional.

NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EE210 : CIRCUIT THEORY (CT)
(For B.Tech ECE III Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To review the basic electrical concepts of voltage, current and resistance.
- To review the components of a basic electrical circuit and make the students proficient in basic analysis, design and measurement of linear analogy electrical systems important across engineering disciplines.

Course Outcomes:

- Students can analyze complex dc & ac linear circuits and can design simple linear electrical circuits
- Students are able to analyze the circuits and can understand the applications of RL, RC,and RLC circuits for DC and AC excitations.
- Students can Predict the transient behavior of first and second order circuits

Unit-I

Introduction to Electrical Circuits: Resistance, Inductance, Capacitance, Specifications of R, L,C and their V-I characteristics, Independent and dependent sources, Response for various types of excitations – step, ramp and parabolic signals, Power and energy in R-L-C components.

Unit-II

Network Analysis: Kirchhoff‟s laws-network reduction Techniques-series, parallel, series parallel, Star – to – Delta or Delta – to – Star Transformations, Source Transformation, Nodal analysis, mesh analysis, super node and super mesh for D.C excitations.

Unit-III

Analysis of AC Concepts: Concept of impedance, impedance triangle, admittance, concept of complex power, real, reactive power and power factor, Analysis of series, parallel and series-parallel (RL, RC and RLC) circuits with suitable examples and phasor diagrams.
Magnetic Circuits: Concept of mutual inductance in coupled circuits- coefficient of coupling – dot convention – composite magnetic circuit analysis.

Unit-IV

Network Topology:
Definitions, Graphs, Tree, incident matrix, Basic Cutest and Tie set schedules, Matrices for PlanarNetworks, Duality and Dual Networks
Resonance:
Resonance in series and parallel circuits – bandwidth and Q factor, Half-Power Frequencies

Unit-V

Network Theorems:
Super Position, Reciprocity, Thevenin‟s, Norton‟s, Maximum Power Transfer, Milliman‟s,Tellegen‟s, and Compensation Theorems for DC and AC excitations.

Unit-VI

Transient Analysis: Transient response of RL, RC and RLC circuits for DC and sinusoidal excitations using Laplace transform method.

Text Books:

1. William Hayt & Kemmerly, *Engg. Circuit Analysis*, 6th Edition, TMH, 2006
2. Joseph A Edminister, *Theory and problems of Electric circuits*, 4th Edition, TMH, 2004
3. D. Roy Choudary, Networks and Systems, New Age International, 2007.
4. Van Valkenburg, *Network analysis*, 3rd Edition, PHI,2005
5. Sivanaga Raju, G. Kishor and C. Srinivasa Rao (2010) , "Electrical Circuit Analysis", Cengage Learning

Reference Books:

1. A.Sudhakar and S.P.Shyam Mohan, *Circuits and Networks*, 2nd Edition, TMH, 2002
2. Smarajit Ghosh, Network Theory, PHI, 2005.

NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

ML201 : QUANTITATIVE APTITUDE (QA)

(Common for all branches of II B.Tech - I Semester)

L	T/D	P	C
1	1	0	2

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

Numerical Ability

Number Systems, HCF and LCM, Decimal Fractions, Square Roots and Cube Roots, Linear and Quadratic Equations

Averages, Mixtures & Allegations, Ages, Ratios, Proportions and Variations, Percentages, Profitand Loss

Time, Speed and Distance, Time and Work

Permutations and Combinations, Probability, Clocks and Calendars

Introduction to concepts of Reasoning

Cubes, Series and sequences, Odd man out, Coding and decoding

General Mental Ability
Puzzles and Teasers

References Books:

1. Arun Sharma, *How to Prepare for Quantitative Aptitude,* TMH Publishers, New Delhi.
2. R.S. Aggarwal, *Quantitative Aptitude,* S.Chand Publishers, New Delhi.
3. Sharon Weiner-Green, *Ira K.Wolf, Barron's GRE,* Galgotia Publications, New Delhi.
4. Ethnus, *Aptimithra,* McGraw Hill Publishers
5. R.S Aggarwal , *Verbal and Non-Verbal Reasoning,* S.Chand Publishers, New Delhi.
6. Shakuntala Devi, *Puzzles to Puzzle You,* Orient Paper Backs Publishers, New Delhi.
7. Shakuntala Devi , *More Puzzles,* Orient Paper Backs Publishers, New Delhi.
8. Ravi Narula , *Brain Teasers,* Jaico Publishing House, New Delhi.
9. George J Summers, *Puzzles and Teasers,* Jaico Publishing House, Mumbai.

DISTRIBUTION AND WEIGHTAGE OF MARKS

There shall be four objective type (Paper / PC based) tests, carrying 25 marks each, during the semester. The sum of the marks scored in all these four tests shall be the final score.

EC204: ELECTRONIC DEVICES & CIRCUITS LAB (EDC (P))

(For B.Tech III Semester - ECE)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To study the different Electronic Devices characteristics and applications.
- To study the design and analysis of amplifier circuits

Course Outcomes:

- Students are able to design and analyze the Characteristics of different devices and amplifier circuits.

Electronics Workshop Practice (2 lab sessions)

1. Identification, specifications and testing of R, L, C components (colour codes), potentiometers, Bread boards, CDS, PCB.
2. Identification, specifications and testing of active devices : Diodes, BJT, FET, SCR, & UJT
3. Study and operation of Multimeters , Function generators ,Regulated power supplies CRO & DSO

List of Experiments (For laboratory examination – Minimum of 10 experiments))

1. Forward and reverse bias characteristics of PN junction diode Characteristics
2. Zener diode characteristics and Zener diode as voltage regulator.
3. Half Wave Rectifier with and without filters.
4. Full Wave Rectifier with and without filters.
5. Input and output characteristics of BJT in CB Configuration.
6. Input and output characteristics of BJT in CE Configuration.
7. FET Characteristics.
8. Frequency response of CE Amplifier.
9. Frequency response of CC Amplifier.
10. UJT Characteristic and UJT Relaxation Oscillator.
11. SCR Characteristics.
12. LED Characteristics.

EC205 : BASIC SIMULATIONS LAB (BS (P))

(For B.Tech. ECE III Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To study the generation of various continuous time and discrete time domain signals using MATLAB software.
- To study the basic operations on continuous time and discrete time domain signals.

Course Outcomes:

- Students are able to understand the basic difference between continuous time & discrete time domain signals.
- Students are able to understand the process of sampling the band limited continuous time domain signals.

List of Experiments:

1. Operations on matrices
2. Generation of signals
3. Even and odd parts of signal
4. Convolution between signals
5. Auto-correlation and Cross-correlation between signals
6. Computation of Unit Sample response and Unit step response of signals
7. Finding the Fourier transform of signal
8. Laplace transform of signals
9. Location of poles and zeros in the Z-plane
10. Sampling theorem verification
11. Verification of linearity and Time Invariance property
12. Gibbs phenomenon
13. Removal of noise by Auto-Correlation
14. Verification of Weiner-Khinchine relations

EC206 : ANALOG ELECTRONIC CIRCUITS (AEC)
(For B.Tech IV Semester ECE & EEE)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

1. To provide knowledge about single stage amplifiers, multi-stage amplifiers, feedback amplifiers,
2. large signal amplifiers, differential ,tuned amplifiers and FET amplifiers and their analysis
3. To provide knowledge about working and design of oscillators
4. Different transistor models at high frequencies

Course Outcomes:

1. Able to know about the design and analysis of single stage amplifiers, multi-stage amplifiers, Feedback amplifiers, large signal amplifiers, differential, tuned amplifiers and FET amplifiers and oscillators
2. Analysis of bipolar transistor models at high frequencies using π-models.

Unit-I

Transistor at High Frequencies: Hybrid-π model, Hybrid-π conductances, and capacitances, CE short circuit current gain, Parameters f_β and f_T, Current gain with resistive load, Single stage CE transistor amplifier frequency response, Gain-bandwidth product (GBW).

Unit-II

FET Amplifiers: FET small signal analysis, Low frequency CS and CD amplifiers, CS and CD amplifiers at high frequencies.

Differential Amplifiers: Ideal differential amplifier, CMRR, Emitter-coupled differential amplifier, Differential amplifier supplied with constant current, Practical considerations, Transfer characteristics of differential amplifiers.

Unit-III

Feedback Amplifiers: Classification of amplifiers, Concept of feedback, Transfer gain with feedback, General characteristics of negative feedback amplifiers- Gain, Bandwidth, Input resistance, Output resistance & Noise, Method of analysis of feedback amplifier, Analysis of feedback (Voltage & Current series, Voltage & Current shunt) amplifiers.

Unit-IV

Oscillators: Barkhausen criterion, RC Phase shift oscillator using FET & BJT, General form of LC oscillator circuit, Hartley and Colpitts oscillators, Wien-bridge oscillator and Crystal oscillatorits significance.

Unit-V

Large Signal Amplifiers: Classes of operation, Class A amplifiers (Series-fed, Transformer coupled, Push pull), Class B amplifiers (Push pull, Complementary-symmetry), Crossover distortion and Class AB operation, Class C amplifiers and efficiency.

Unit-VI

Tuned Amplifiers: Need of tuned amplifiers, Analysis of single stage capacitive coupled tunedamplifier.

Special semiconductor devices: Principle of operation, Characteristics and applications of- Tunnel diode, Varactor diode, Photo Diode, Photo transistor, UJT, SCR, DIAC and TRIAC,LCD, LED.

Text Books:

1. Millman and Halkias, Integrated Electronics, 2nd Edition, TMH 2010.
2. Allen Mottershed, Electronic Devices and Circuits, 28th Edition, PHI 2006.
3. Donald A.Neamen, *Eletcronic Circuit Analysis and Design, 2nd Edition*, Mc Graw Hill 2001.
4. G. K. Mithal , Electronic Devices and Circuits, 23rd Edition, Khanna pub. 2006

Reference Books:

1. Bogart Theodore, Electronic Devices and Circuits, 6th Edition, PE 2008.
2. Millman and Grabel, Microelectronic, 2nd Edition, TMH 2003.
3. Henry Zanger, Semiconductor Devices and Circuits, Johnwiley 1984.

NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EC207: PULSE AND DIGITAL ELECTRONICS (PDE)
(For B.Tech ECE IV Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	3

Course Objectives:

- To provide the fundamentals of linear and nonlinear wave shaping, multivibrators and sampling gates.
- To provide the students with an introduction to the fundamentals of Number systems, logic gates, Combinational and sequential circuits

Course Outcomes:

- Students are able to examine the switching operations of transistor, sampling gates, digital circuit building blocks (multivibrators), passive and active wave shaping.
- Competently use an oscilloscope to examine digital signals, build simple power supplies, and demonstrate the simple digital gates and operation of flip flop

Unit-I

Linear Wave Shaping: High pass, Low pass RC circuits, Their response for sinusoidal, Step, Pulse, Square and ramp inputs, RC network as differentiator and integrator.
Non Linear Wave Shaping: Diode clippers, Clipping at two independent levels, Transfer characteristics of clippers, Clamping operation, Clamping circuits using diode with different inputs, Clamping circuit theorem.

Unit-II

Switching Characteristics of Diode and Transistor: Diode as a switch, Piecewise linear diode characteristics, Transistor as a switch, Saturation parameters of Transistor and their variation with temperature, Transistor-switching times, Design of transistor switch.

Multivibrators: Design and Analysis of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

Unit-III

Number Systems: Binary, Octal, Decimal, Hexadecimal systems, Conversion of number systems, Weighted and non-weighted codes, Digital Data Representation: Fixed - Signed magnitude, 1"s complement, 2"s complement, Floating point – Biased exponent, Binary arithmetic, Hamming code, Error detection and correction.

Unit-IV

Logic Gates and Simplification of Boolean Expressions: OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR gates, Boolean theorems, Switching functions: types, Sum of products, Product of sum, Canonical forms, Minimization of Boolean functions using K-maps and tabulation methods.
Sampling gates: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates.

Unit-V

Combinational Circuits: Binary adders and Subtractors using signed magnitude, 1"s complement, 2"s complement, Carry look-ahead adders (fast adders), BCD adders and Subtractors, Decoders, Encoders, multiplexers, De-multiplexers, Parity generator and checker, Code conversion circuits, Magnitude comparator.

Unit-VI

Sequential Circuits : Finite state model of sequential circuits, Flip-flops, shift registers, Asynchronous and Synchronous counters, Ring and Johnson counters, Design of non-binary counters, Synthesis of synchronous sequential circuits, Melay and Moore machines, Minimizationof states.

Text Books:

1. Milliman and Taub, *Pulse, Digital and Switching Waveforms*, McGraw-Hill.
2. M. Moris Mano, Charles R.Kime, *Digital Logic and Computer Design Fundamentals*, 2nd Edition, Pearson Ed.
3. Zvi Kohavi, *Switching and Finite Automata Theory*, TMH.
4. R.P.Jain, *Modern Digital Electronics*, 3rd Edition, TMH.

Reference Books:

1. David .A. Bell, *Solid State Pulse Circuits*, 4th Edition, PHI.
2. Wakerly, *Digital Design- Principles and Practices*, 4th Edition, PHI.

NOTE:
End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EC208 : NETWORKS AND TRANSMISSION LINES (NTL)
(For B.Tech ECE IV Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To understand the network functions, filters and transmission lines and how to apply the different mathematical techniques to the filters, attenuators, network synthesis and transmission lines.
- To understand the network functions and synthesis.

Course Outcomes:

- Able to apply different types of filters and attenuators.
- Able to understand the basic idea in designing of transmission lines for systems.

Unit-I
Two port Networks:
Terminals and terminal pairs, Driving point and transfer functions for two port Networks - Z, Y, h, g, ABCD parameters, Equivalence of two port networks. Inter connection of two ports, analysisof reciprocal networks.

Unit-II
Characteristics of Networks:
Symmetrical networks, Characteristic impedance and propagation constant. Asymmetrical networks, Image and iterative impedances, Image transfer constant & iterative transfer constant, Properties of L, T and PI sections, Lattice, Bridged -T, Twin –T networks. L – matching networks.

Unit-III
Filters Basics: The Decibel and Neper, Types of Filters, Characteristics of the filter.
Constant K filters: Low pass, High pass, Band pass, Band stop filters design.
m-derived filters: m-derived low pass, High pass, Band pass, Band stop filters design.
Compositefilter design, Equalizers, Attenuators.

Unit-IV
Transmission lines:
Types of transmission lines, Primary constants, Skin effect, Transmission line equations from source and load end, Infinite line, Secondary constants, Velocity of propagation, Group velocity. Terminations: Open and short circuited lines, Transmission line as circuit element, Line distortion, Distortion less line, loaded lines.

Unit-V
Characteristics:
Properties of transmission lines at UHF, Reflection coefficient, Standing waves,Characteristics of half wave, Quarter wave and 1/8 wave lines.

Unit-VI
Smith Chart:
Construction and applications of Smith chart, Transmission line matching. Single and double stubmatching.

Text Books:

1. Van Valkunberg, Network Analysis (Unit-I).3rdEdition, PHI 1974.
2. Umesh Sinha, Networks and Transmission Lines, 8thEdition, Satya Prakashan

Reference Books:

1. John D Ryder, Networks Lines and Fields, 2nd Edition, Prentice Hall 2003.
2. Johnson, Transmission Lines and Networks, TMH.
3. V K A Atre, Network Theory & Filter Design, New Age International.
4. A.Sudhakar and S.P.Shyam Mohan, Circuits and Networks, 3rd Edition, TMH 2007

NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EC209 : ELECTROMAGNETIC WAVES (EMW)
(For B. Tech ECE IV Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	3

Course Objectives:

- To develop and understand the fundamental concepts of electromagnetic fields with an emphasis on wave propagation.
- The main objective of the course is to get students familiar with the typical problems and Constraints that arise when designing and developing Electromagnetics.

Course Outcomes:

- Students can learn electromagnetic fields and have a solid foundation based on the laws of Electromagnetics.

Unit-I

Co-ordinate Systems and Vector Calculus: Vector Algebra, Co-ordinate systems-Cartesian, Cylindrical and Spherical, Transformation of Vector functions from one Co-ordinate system to another. Gradient, Divergence, Curl and their physical interpretations, Stokes theorem, Divergence theorem.

Unit-II

Electro Static Fields-I: Coulomb‟s law, Electric field intensity, Field due to different charge distributions-Line charge, Sheet charge and Volume charge distributions. Electric flux and Flux density, Gauss's law and its application. Maxwell's first equation in integral and point forms.

Unit-III

Electro Static Fields-II: Energy expended in moving a point charge in an electric field, Line integral, Potential difference and Potential, Potential field of a point charge and system of charges, Potential gradient, Dipole, Energy density in the electrostatic field. Current and current density, Continuity of current, Metallic conductors, Nature of dielectric materials, Boundary Conditions for perfect dielectrics and conductors, Capacitance-examples, Poisson's and Laplace equations- examples.

Unit-IV

Magneto static Fields: Biot-Savart‟s law, Ampere's circuital law, Magnetic flux and magnetic flux density, Scalar and vector magnetic potentials, Force on a moving charge, Differential current element and force between two differential current elements, force and torque on closed circuit, Magnetization and permeability, Magnetic boundary conditions, Energy in a magnetic field.

Unit-V

Time Varying Fields & Maxwell's Equations: Faraday's law, Lorentz Force Equation, Maxwell's equations in various forms, Displacement Current Density.

Unit-VI

Uniform Plane Wave: Wave motion in free space, perfect, lossy dielectrics and good conductors.Poynting theorem, Polarization, Reflection of plane waves- normal and oblique incidence (Perpendicular and Parallel Polarizations)

Text Books:

1. Hayt.W.H, *Engineering Electromagentics*, 7th Edition, TMH.
2. Sadiku, *Engineering Electromagnetics*, 3rd Edition, Oxford University Press.
3. G.S.N.Raju, *Electromagnetic Field Theory and Transmission Lines*, 1st Edition, Pearson Ed.

Reference Books:

1. Jordan and Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd edition, Pearson Ed.
2. John.D.Kraus, *Electromagnetics*, 6th Edition, Mc Graw-Hill.
3. Nanapeneni Narayana Rao, *Elements of Engg. Electromagnetics*, 6th Edition, Pearson Ed.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

EE211 : ELECTRICAL TECHNOLOGY (ET)
(For B. Tech ECE IV Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To know the designing and working principles of D.C generators ,D.C motors, poly phase induction motors and Transformers
- Providing knowledge about Alternators , synchronous motors and single phase induction motors

Course Outcomes:

- Able to get clear idea about basic principles and design of D.C generators and D.C motors, single phase induction motors and Transformers.
- Able to get knowledge about Alternators , synchronous motors and poly phase induction

Unit-I

D.C.Generators: Constructional features-single lap and wave windings-EMF equation-methodsof excitation- characteristics of shunt, series and compound generators.

Unit-II

D.C. Motors : Principle of operation —torque equation- speed-torque characteristics of shunt, series and compound Motors – Losses and efficiency–testing– Swinburne‟s test and brake test– Speed control of DC shunt motor- 3 point and 4 point starters.

Unit-III

Transformers: Principle of operation –constructional features-useful and leakage fluxes-EMF equation-leakage reactance-vector diagram-equivalent circuit of single phase transformer – types
–Constructional features – Phasor diagram on No Load and Load – Equivalent circuit
Performance of Transformers: Losses and Efficiency of transformer and Regulation – OC andSC tests– all-day efficiency-parallel operation-auto transformers.

Unit- IV

Polyphase Induction Motors: A.C Windings-Pitch factor and Distribution factor- EMF equation **-Constructional features -Principle of operation– Slip-Torque characteristics – Equivalent circuit- Circle Diagram- Losses and Efficiency -.Methods of Speed control-Star-delta and rotor rheostat starters-applications.**

Unit-V

Alternators: Constructional features – salient pole and turbo alternators-concept of synchronous reactance-vector diagram- regulation –determination by Synchronous Impedance Method –synchronizing of alternators to infinite bus bar.

Unit-VI

Synchronous Motors: Principle of operation-V and inverted V curves, methods of starting, hunting and its suppression -applications.
Single Phase Induction Motors: Construction- Characteristics –starting split phase and shaded pole methods- single phase series motor.

Text Books:

1. M.S Naidu and S. Kamakshaiah, Introduction to Electrical Engineering, TMH Publications.2. T.K. Nagasarkar and M.S.Sukhija, Basic Electrical Engineering, Oxford University Press, 2005

Reference Books:

1. V.K Mehta, Principles of Electrical Engineering, S.Chand Publications.

2. I.J. Nagarath amd D.P Kothari, Theory and Problems of basic electrical engineering, PHI Publications

3. David V. Kerns, JR. J. David Irwin, Essentials of Electrical and Computer Engineering

NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.
Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

ML202 :SOFT SKILLS (SS)

(Common to B.Tech IV Semester CIVIL, EEE & ME and V Semester ECE & CSE Branches)

(Draft Syllabus)

Scheme **2013**
Internal Assessment **100**

L	T/D	P	C
1	1		2

The purpose of this course is to provide exposure to the students to the soft skills that are crucialto an employee‟s ability to work EFFECTIVELY.

Objectives:

- Acquire competence to use grammar with an understanding of its basic rules
- Be able to speak and write appropriately applying these rules
- Communicate effectively and enhance their interpersonal relationship building skills with renewed self confidence
- Work together in teams and accomplish objectives in a cordial atmosphere
- Face interviews, GDs and give presentations
- Understand and develop the etiquette necessary to present oneself in a professional setting

Course Outcomes:

- Students will be able to demonstrate the competence to use grammar with an understanding of its basic rules
- Students will be able to communicate effectively and enhance their interpersonal relationship building skills with renewed self confidence
- Students will be able to work together in teams and accomplish objectives in a cordial atmosphere
- Students will be able to face interviews, GDs and give presentations
- Students will be able to understand and develop the etiquette necessary to present themselves in a professional setting

Course Work

To achieve the objectives, the following course content is prescribed.

Contents

- Revision and reinforcement of language skills – grammar – vocabulary
- Communication Skills – Barriers to Communication – Strategies to overcome the barriers
- Non Verbal Communication – Body Language – Proxemics – Kinesics
- Emotional Quotient – self analysis of emotional responses
- Group Discussions – understanding the objective and skills tested in a GD – types of GDs **– roles in a GD – dos and don‟ts in a GD**
- Team Work – importance of team work – team vs group – attributes of a successful team – working with groups – dealing with people – group decision making
- Goal Setting – importance of goal setting – difference between goals and dreams – importance of writing goals – SMART goals – short term goals – long term goals

- Time Management – scheduling – how to delegate effectively – plugging time leaks – learning to say "No"
- Presentation Skills – Oral Presentations – PPTs – Prepared Speeches – Extempore
- General Awareness & Current affairs
- Business Etiquette – telephone and email etiquette – dining etiquette – dos and don"ts in a formal setting

References

1. Stephen R. Covey, "The Seven Habits of Highly Effective People", Pocket Books Publishers, London
2. Infosys Campus Connect Portal –//http::campusconnect.infosys.com//
3. Shiv Khera, "You Can Win", MacMillan India Publishers, New Delhi
4. Stephen R. Covey, A. Roger Merrill and Rebecca R. Merril, "First Things First", Pocket Books Publishers, London
5. Gloria J.Galanes, Katherine Adams, John K Brillhart, "Effective Group Discussion: Theory and Practice".
6. Priyadarshani Patnaik, "Group Discussion and Interview Skills with VCD", Foundation Books.
7. Sangeeta Sharma & Binod Mishra, "Communication Skills for Engineers and Scientists", PHI Learning Private Limited.
8. Dr. Shalini Verma, "Body Language- Your Success Mantra", S.Chand, 2006.
9. Andrea J. Rutherford, "Basic Communication Skills for Technology", 2nd Edition, Pearson Education, 2007.
10. Krishna Mohan and Meera Bajerji, "Developing Communication Skills", MacMillan India Ltd.

DISTRIBUTION AND WEIGHTAGE OF MARKS

For the Soft Skills subject there shall be continuous tests for 50 marks and viva-voce for 50marks.

EC210 : ANALOG ELECTRONIC CIRCUITS LAB (AEC (P))
(For B.Tech ECE IV Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To study the Analog Electronic Circuits and applications.
- To study the design and analysis of amplifier circuits

Course Outcomes:

- Students are able to design and analyze the Characteristics of different amplifier circuits.

List of Experiments (12 Experiments to be done)

i) Design and Simulation in Simulation Laboratory using any simulation Software (Minimum 6 Experiments)

1. Two stage RC Coupled Amplifier
2. Boot Strap Emitter Follower
3. Darlington Emitter Follower
4. Common Source FET Amplifier
5. CE Amplifier(with & without Feedback)
   i) Current Series Feedback
   ii) Voltage Shunt Feedback
6. Voltage Series Feedback Amplifier
7. Single Stage Tuned Amplifier
8. Common Drain Amplifier
9. RC Phase Shift Oscillator
10. Wien Bridge Oscillator
11. Differential Amplifier
12. Power Amplifiers
    i) Class B Push Pull Amplifier
    ii) Class C Amplifier

ii) Testing in the Hardware Laboratory (6 Experiments)

1. Two stage RC Coupled Amplifier
2. Boot Strap Emitter Follower
3. Darlington Emitter Follower
4. Common Source FET Amplifier
5. CE Amplifier(with & without Feedback)
   i) Current Series Feedback
   ii) Voltage Shunt Feedback
6. Voltage Series Feedback Amplifier
7. Single Stage Tuned Amplifier
8. Common Drain Amplifier

9. RC Phase Shift Oscillator
10. Wien Bridge Oscillator
11. Differential Amplifier
12. Power Amplifiers
    i) Class B Push Pull Amplifier
    ii) Class C Amplifier

Equipment Required for the Laboratory

1. Software Simulations for Electronic Circuits
- **i)** Computer Systems with Latest Specifications
- **ii)** Connected in LAN(Optional)
- **iii)** Operating Systems(Windows XP)
- **iv)** Suitable Simulation Software

2. Hardware Requirement for Electronic Circuits
- **i)** Regulated Power Supply
- **ii)** CRO‟s
- **iii)** Function Generators
- **iv)** Multi-meter
- **v)** Components

EC211: PULSE AND DIGITAL ELECTRONICS LAB (PDE(P))
(For B.Tech ECE IV Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To study the Pulse and Digital Circuits and applications.
- To study the design and analysis of pulse and digital circuits

Course Outcomes:

- Students are able to design and analyze the Characteristics of different pulse and digital circuits.

List of Experiments (12 Experiments to be done)

1. Linear Wave Shaping.
2. Non-Linear Wave Shaping Clippers.
3. Non –Linear Wave Shaping Clampers.
4. Transistor As A Switch.
5. Astable Multivibrator.
6. Monostable Multivibrator.
7. Bistable Multivibrator.
8. Schmitt Trigger.
9. Sampling Gates
10. Study of Logic Gates (Using Discrete Components)
11. Verification of Logic Gates and Adders
12. BCD to Excess-3 Code Converter
13. Multiplexer & Decoder
14. Shift Register and Ring Counter
15. Asynchronous Decade Counter

Equipment Required for the Laboratory

Hardware Requirement for Electronic Circuits

i) Regulated Power Supply, Function Generators

ii) CRO's, Multi-meter Components

EE212 : ELECTRICAL CIRCUITS AND MACHINES LAB (ECMP)
(For B.Tech ECE IV Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- Verification of KVL,KCL
- Verification of network theorems
- Load tests and break tests on generator and motors

Course Outcomes:

- Able to prove network theorems.
- Able to study the load regulation characteristics of generators and Motors
- Able to study about the regulation characteristics of 1-phase transformer and Alternators

List of Experiments:

1. Load test on DC Compound Generator.
2. Swinburne‟s Test.
3. Brake Test on Three Phase Squirrel cage Induction Motor.
4. Regulation of Alternator.
5. Load Test on Single Phase Transformer.
6. OC and SC test on Single Phase Transformer.
7. Brake Test on DC Shunt Motor.
8. Determination of self-inductance, Mutual inductance and coefficient of coupling.
9. KCL and KVL.
10. Thevenin‟s Theorem.
11. Norton‟s Theorem.
12. Superposition Theorem..

C301: ANALOG COMMUNICATIONS (ACM)
(For B.Tech ECE V Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide insight about introduction to Basic analog modulations of communication theory.
- To provide knowledge in analog modulations, Time division and frequency division systems and design.
- To familiarize the sources of noises and their effect on different modulation schemes
- To familiarize the Information and coding of signal sources and their parameters design

Course Outcomes:

- Student will be able to acquire knowledge about the Basic analog modulations of communication theory with design.
- Student will be able to design of Time division and frequency division systems
- Students are able to estimate noise factor in different modulation schemes
- Student will be able to design and coding efficiency of information of a signal source.

Unit-I

Amplitude Modulation: Block diagram of general communication system, Need for Modulation,Generation and demodulation of AM, Band width, Power relations, Generation and demodulation of DSB-SC.

Single Side Band Modulation (SSB): SSB modulation, Coherent detection, Vestigial side band modulation, Frequency division multiplexing (FDM), Comparison of various AM systems-problems.

Unit-II

Angle Modulation: Frequency Modulation and Phase Modulation, FM narrow band and wide band techniques, Band width, Generation of FM, Direct and indirect FM, Demodulation of FM- frequency and phase discrimination methods.

Unit-III

Pulse Modulation Schemes: Review of sampling theorem, Generation and demodulation of PAM, PWM, and PPM, Time division multiplexing (TDM).

Unit-IV

Pulse Code Modulation (PCM): PCM, Companding, Band width, Noise in PCM systems, Transmitters and receivers of Differential Pulse code modulation(DPCM), Delta Modulation(DM), Adaptive Delta modulation(ADM).

Unit-V

Noise: Various types of noise, Equivalent noise band width, Noise figure, Noise temperature, Noise figure of cascaded stage amplifiers.

Noise in AM and FM: Noise in AM and FM, Figure of merit of AM, DSBSC, SSB, and FM, Threshold effect, Pre-emphasis and De-emphasis circuits.

Unit-VI

Information Theory: Information, Entropy, Rate of information and information capacity, Shannon–Hartley law and its significance, Shannon–Fano and Huffman coding techniques, Channel capacity for Binary symmetric channel, Binary erase channel.

Text Books:

1. S.S.Haykin, *Communication Systems*, 2nd Edition, Wiley Eastern, 2007
2. Taub and schilling, *Principles of Communication Systems*, TMH, 2002

Reference Books:

1. Kennedy, *Electronic Communication Systems*, TMH, 2008
2. B.P.Lathi, *Modern Digital and Analog Communication Systems*, BPB, 2001
3. A.B.Carlson, *Communication Systems*, Mc.Graw-Hill, 2000

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC302: LINEAR IC APPLICATIONS (LICA)
(For B.Tech ECE - V Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	4

Course objectives:

- To provide knowledge in OP-AMPS, timers.
- To make students familiar with applications of OP-AMPS and timer in various areas.
- To provide Introduction to logic families

Course outcomes:

- Student will be able to design different analog circuits based on Op-Amps and timer for any application.
- Student gain comprehensive understanding about logic families

Unit-I

Op-Amp Fundamentals: Differential amplifier concept, op-amp ideal characteristics, Practical inverting and non-inverting op-amp, Study of typical IC op-amp and its different stages, Features of 741 op-amp, dc characteristics: i/p bias current, i/p offset current, Offset voltages, Offset balance, Thermal drift, ac characteristics: frequency response, stability of op-amp, Frequency compensation, Slew rate, op-amp parameters, Brief analysis of opamp using JFET, Introduction todual OP-AMP TL082 as a general purpose JFET –input operational amplifier: pin configuration and features.

Unit-II

Op-amp Applications-I : Summing amplifier, difference amplifier, Current to voltage and voltage to current converters, Instrumentation amplifier, clippers and clampers, Precision AC to DC converters, Integrator, Differentiator, Log & antilog amplifier, Sample and hold circuits.
Op-amp Applications-II
Comparators and active filters: Comparators, window detector, Schmitt trigger, Pulse, Square and triangle wave generators, Active filters (Butterworth filters up to second order only).

Unit-III

Timers & Waveform Generators: 555 Timer: Astable and Monostable modes, Applications, waveform generators: IC 566 and IC 8038.
Phase Locked Loops: Principle of operation, Lock and capture ranges, detailed study of differentblocks of PLL, IC 565 PLL, and Applications of PLL.

Unit-IV

IC Regulators: General form of series Regulators, Fixed voltage regulator, IC 723 voltageregulator, switching regulators (SMPS).

Unit-V

D/A and A/D Converters : DACs : Weighted resistor, R-2R ladder type and inverted R-2R ladder, ADCs: Parallel comparator type, Successive approximation and dual slope types, over sampling ADC, Specifications of converters.

Unit-VI

Logic Families: Specifications of logic gates, DTL, HTL, TTL, ECL, MOS and CMOS circuits, CMOS bilateral switch, Comparison of logic families, TTL driving CMOS and CMOS driving TTL.

Text Books:

1. Roy Choudhury & Shail B.Jain, *Linear Integrated Circuits*, 4/e, New Age Int. Pub. 2010.
2. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, 4/e, PHI, 2003.
3. Moris Mano, *Digital Logic and Computer Design*, Pearson Ed., 2011.
4. TL082: Data sheet: http://www.ti.com/lit/ds/symlink/tl082.pdf
5. Application note:http://www.ti.com/lit/an/sloa020a/sloa020a.pdf

Reference Books:

1. S. Salivahanan, V.S.K. Bhaaskaran, *Linear Integrated Circuits*, TMH, 2008.
2. Anand Kumar, *Pulse and digital Circuits*, PHI, 2/e, 2010.
3. R.P. Jain, *Modern Digital Electronics*, TMH, 3/e, 2003.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC303: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION (EMI)
(For B.Tech. ECE VSemester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To Acquire Knowledge of fundamental measurement concepts and measurement methodologies
- To get key idea of basic instruments that are the technological implementation of general methodologies.
- To understand about transducers and to analyze various signals using CRO.

Course Outcomes:

- Students will be able to understand various measurement techniques available.
- Students will be able to know the Basic working of instruments used for measurement.
- Students will be able to analyze the errors in measurements and their rectification.

Unit-I

Measurement and Error: Measurement, Generalized measurement system, Static and dynamic characteristics of Instrumentation system, Calibration, errors and their statistical analysis, PMMC instrument, specifications of an instrument, Electronic voltmeters-AC voltmeters using rectifiers, ammeters and multimeters.

Unit-II

AC bridges: Condition for Bridge Balance, Measurement of Inductance-Maxwell bridge, Measurement of capacitance-Schering bridge. Measurement of Resistance- Kelvin bridge, Wheatstone bridge. Hay‟s bridge, Wein Bridge, LCR Bridge and Q-meter.

Unit-III

Analog & Digital Instruments: Standard and AF sine & square wave signal generators, Function generators, Wave analyzers, Harmonic distortion analyzer, Spectrum analyzer, Analog Vs Digital instruments, Principle & operation of DVMs-Ramp type, Dual slope type, Successiveapproximation type, Digital frequency meter.

Unit-IV

CRO: Basic CRO operation, Deflection sensitivity, Cathode ray tube, Time base circuits, Delay line, CRO probes, measurements with CRO, Lissajous Figures, Analog storage CRO, Digital storage CRO, Sampling oscilloscope.

Unit-V

Transducers: Sensors and Transducers, Classification & Selection of transducers, Temperature Sensors, Temperature transducers, Strain gauges, LVDT, Piezo electric transducers. Measurementof physical parameters-Force, Velocity, Acceleration, Pressure, Speed, Displacement and Humidity.

Unit VI

DAS: Introduction to DAS, Data Logging, Use of ADC, Sample & Hold circuit, Multiplexers andde-multiplexers in DAS.
Computer controlled test systems: Introduction to testing an audio amplifier, testing a radio receiver, Instruments used in computer controlled instrumentation, IEEE-488 Electrical interface, Digital control description.

Text Books:

1. William D. Cooper & Albert D. Helfrick, *Modern Electronic Instrumentation and Measurement Techniques*, PHI, 2nd Edition, 1990.
2. A.K. Sawhney, *A course in Electrical and Electronic Measurements and Instrumentation*, Dhanpat Rai & Co., (Pvt). Ltd., Nineteenth Edition, 2011.
3. H.S. Kalsi, Electronic Instrumentation, TMH, 2nd Edition, 2006

Reference Books:

1. K. Lal Kishore, *Electronic Measurements and Instrumentation*, Pearson Education, 2012.
2. J.B. Gupta, A course in *Electronics & Electrical Measurements and Instrumentation*, S.K. Kataria and Sons, 2012.
3. D.V.S Murthy, *Transducers and Instrumentation,* PHI, 2nd Edition, 2013.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC304: ANTENNAS AND WAVE PROPAGATION (AWP)
(B.Tech. ECE V Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course objective:

- To understand the applications of the electromagnetic waves in free space
- To provide an in-depth understanding of modern antenna concepts, and practical antenna design for various applications

Course outcomes:

- Student will be able to write parametric integral expressions for a given current source.
- Student will be able to determine directions of maximum signal radiations and the nulls in the radiation patterns.
- Student will be able to design array antenna systems from specifications.

Unit-I

Antenna Basics: Introduction, Radiation mechanism, Current distribution on a thin wire antenna. Basic antenna parameters, Radiation patterns, Beam area, Radiation intensity, Beam efficiency, directivity, Gain, Antenna aperture, Effective height.

Unit-II

Radiation fields of wire antennas: Potential functions and the electromagnetic field, Potential functions for sinusoidal oscillations Electric dipoles, Short electric dipole, Fields of a short electric dipole, Radiation resistance of short electric dipole, Assumed current distribution, Half wave dipole, Radiation resistance, Quarter wave monopole.

Unit-III

Array of Point Sources: Point sources and their arrays.
Linear Array: BSA and EFA, Parasitic array, Point source, Power pattern, Examples of power patterns, Field patterns, Array of two isotropic point sources, Pattern multiplication, Linear array of n Isotropic point sources of equal amplitude and spacing (EFA and BSA), Null directions, Binomial array.

Unit-IV

Resonant and Non-Resonant Radiators: Introduction to Resonant Antenna and Non Resonant Antenna, Long wire antenna, V–Antenna, Inverted V-antenna, Rhombic Antenna, Helical AntennaVHF, UHF and Microwave Antennas: Dipoles with parasitic Elements, Folded Dipole, Yagi-Uda Array Antenna, Flar sheet and corner reflectors, Parabolic Reflector antenna, Spill over loss,Aperture efficiency, Basic characteristics of Cassegrain Reflector Antenna., Loop Antenna , slotAntenna, Horn Antenna & Frequency Dependent Antenna: Principle & Log-periodic Antenna.

Unit-V

Micro Strip Antennas: Basic Characteristics, Feeding Methods, Rectangular, Circular patch quality factor, Bandwidth efficiency, Introduction to Smart antennas.
Measurements: Introduction, Pattern Measurement Arrangement, Directivity Measurement, GainMeasurements (by comparison, Absolute and 3-Antenna Methods).

Unit-VI

Radio Waves Propagation: Radio waves, Fundamental equation for FRISS free space propagation, Modes of propagation, Structure of atmosphere, Sky wave propagation (neglecting earth‟s magnetic field), Virtual Height, MUF, Skip distance.
Space wave propagation - Range of space wave propagation, Effective earth radius, Field strength of space wave propagation, Duct propagation

Text Books:

1. J.D. Kraus, RJ. Marhefka and Ahmad S. Khan, *Antennas and Wave Propagation*, TMH, New Delhi, 4'h ed., (Special Indian Edition), 2010.
2. C.A. Balanis, *Antenna Theory*, John Wiley & Sons, 3rd ed.. 2005.
3. K.D. Prasad, *Antennas and Wave Propagation*, Satyaprakashan Tech India publications , New Delhi, 2001

Reference books:.

1. E.V.D. Glazier and H.R.L. Lamont *Transmission and Propagation*, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
2. Jordan E. C. and Balmain, *Electro Magnetic Waves and Radiating Systems*, PHI, 1968, Reprint 2003.
3. R.E.Collins, *Antennas and Radio Propagation*, McGraw-Hill, 1987.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EE316: LINEAR CONTROL SYSTEMS (LCS)
(B.Tech. ECE - V Semester)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
2	1	0	3

Course Objectives:

- To help the students understand concept of open loop and closed loop system.
- To study the concept of time response and frequency response of the system and the basics of stability analysis and state variable analysis.

Course Outcomes:

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

Unit – I

Equations and Models of Linear Systems: open-loop and closed-loop systems, control system components, servomotor, tachometer, synchros, position control systems, Transfer functions, equations of electrical and mechanical systems.

Unit – II

Block Diagrams: block diagram representation and manipulation, signal flow graphs-mason‟s gain formula to determine overall system gain.

Feedback Characteristics of Control Systems: Feedback and non-feedback systems, effects of feedback, regenerative feedback.

Unit – III

Time Response: Types of input, transient response of second order system for step input, time-response specifications, steady state error and error constants, proportional, derivative and integralcontrols.

Concept of Stability: Stability of systems-Routh Hurwitz criterion, Relative stability.

Unit – IV

Root Locus: Definition of Root Locus, construction Procedure, properties of typical systems analyzed by root locus techniques.

Frequency Response: Co-relation between time and frequency response, frequency domain specifications, resonant peak (Mp) and resonant frequency(Wp) for a second order system, relative stability-gain margin(GM) and phase margin (PM),

Unit – V

Frequency Plots: Bode plots, , Polar plots, Nyquist criterion for open loop stable system, M and N circles,

Unit – VI

Compensation (Without Design): The necessity of compensation, series and parallel compensation. Realization of basic lead, Lag and lead-Lag compensators.

State Variable Analysis: Introduction, concepts of state, state variables, state transition matrix, and state model, state model of linear systems, state-space representation using phase variable andphysical variables, solution of state equations. Concept of Controllability and Observability.

Text books:

1. *Nagrath and Gopal (2003), "Control systems Engineering", New Age International Publications.*
2. *B.C.Kuo (2003), "Automatic Control Systems", Oxford.*
3. *K. Ogata (2003), "Modern control Engineering", Pearson*
4. *Naresh - K.Sinha (1998), "Control Systems", New Age International Publishers.*
5. *B.S.Manke (1996), "Linear Control Systems".*

Reference books:

1. *Madan Gopal (2003), "Control Systems", TMH.*
2. *Dorf, Bishop (1998), "Modern Conrtol systems", Addison Wesley*
3. *(Shaum's out line series) (1986), "Feedback control systems", TMH*
4. *R.C.Shukla, "Control Systems", Dhanpat Rai.*
5. *Ashok Kumar, "Control Systems", TMH.*

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC305: COMPUTER ORGANIZATION (CO)
(For B.Tech. ECE - V Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To familiarize Student with the basic Knowledge necessary to understand the hardware operation of Digital computers.
- To Expertise & Exemplify the organization and architecture of CPU, input-output, memory.
- To provide basic knowledge about parallel processing and multi processing.

Course Outcomes:

- Student will be able to acquire basic knowledge about designs of digital logic circuits and apply to computer organization.
- Student will be able to know how to organize the required system Configuration to meet the desired performance.
- Student will be able to design basic computer.

Unit-I

Register Transfer and Micro-Operations: Register transfer, Bus and Memory transfers, Arithmetic, Logic and Shift micro-operations, Arithmetic logic shift unit.

Unit-II

Basic Computer Organization and Design: Instruction codes, Computer registers, Computer instructions, timing and control, Instruction cycle, Memory reference instructions, Input /output and Interrupt, design of basic computer.

Unit-III

Micro-Programmed Control: Control memory, Address sequencing, Micro-program example, Design of control unit, Micro-program sequencer.

Unit-IV

Central Processing Unit: General register organization, stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control.

Computer Arithmetic: Algorithms for fixed point and signed 2"s complement binary arithmetic operations, Floating point arithmetic operations.

Unit-V

Input/Output Organization: Peripheral devices, input/output interface, Asynchronous datatransfer, Modes of transfer, Priority interrupt, DMA.

Memory Organization: Memory hierarchy, Main memory, Auxiliary memory, Associativememory, Cache memory, Virtual memory.

Unit-VI

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC pipeline, Vector processing and Array Processing.

Text Books:

1. M.Morris Mano, *Computer System Architecture*, PHI, 3/e, 2007.

Reference Books:

1. John P.Hayes, *Computer Architecture and Organization*, McGraw Hill, 3/e, 1998
2. Hemachar, *Computer Organization*, Mc Graw Hill, 5/e, 2002.
3. K.Hwang& F.A. Briggs, *Computer Architecture and Parallel Processing*, Mc Graw Hill, Indian Edition, 2013.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

ML203: BUSINESS ENGLISH & TECHNICAL WRITING (BETW)
(Common to B.Tech IV Semester ECE& CSE Branches)

Scheme 2013
Internal Assessment 100
End Exam : -
End Exam Duration : 3 Hrs

L	T/D	P	C
2	1	0	2

The purpose of this course is to help the students enhance their proficiency in oral and written communication in English to enable them to use English effectively at the corporate workplaces with global presence.

Objectives:

The course aims at enabling the students to use English effectively for the purpose of:

- Using correct grammar and vocabulary
- Practice all aspects of English Language Skills required for a global professional
- Using English effectively in interpersonal and professional contexts
- Practice gathering ideas and information and organizing them coherently
- Practice writing technical papers, journal articles, project reports, and proposals
- Practice writing business letters, block letters, memos and emails

Course Outcomes:

- Students will be able to use grammatically acceptable English
- Students will be able to demonstrate all aspects of language skills for a successful professional career
- Students will be able to use English effectively in interpersonal and professional contexts
- Students will be able to write technical content effectively
- Students will be able to handle business correspondence effectively

Course Work

To achieve the objectives, the following course content is prescribed for the Business English and Technical Writing Laboratory Sessions.

Contents

- Revision of grammar and vocabulary:
  - articles, prepositions, tenses, concord
  - voices, reported speech, sentence types
  - synonyms, antonyms, one word substitutes, idioms, collocations
  - word making, affixes, commonly used foreign words, words often confused
  - jumbled sentences and jumbled paragraphs
  - common errors in English pertaining to both grammar and vocabulary (TOEFL type)
- Reading Comprehension – practice tests
- Listening Comprehension – practice tests
- Speaking skills with focus on correct pronunciation

- Writing Cover Letters for Job Applications/ Resume Preparation/ Statement of Purpose for Internships, Apprenticeships, Admissions in Universities, etc.
- Writing Technical Reports/ Proposals/Formats of Research Articles, Journal Papers, Project Reports
- Email writing
- Writing Business Letters/ Formats of Letters, Block Letters/Memos

References

1. Raj N Bakshi, "English Grammar Practice", Orient Longman.
2. Sangeeta Sharma & Binod Mishra, Communication Skills for Engineers and Scientists, PHI Learning Private Limited.
3. Marilyn Anderson, Pramod K.Naya and Madhucchanda Sen, Critical Reasoning, Acedemic Writing and Presentation Skills**,** , Pearson Publishers.
4. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Publishing Company Ltd., 2005.
5. Raymond V. Lesikar, Marie E. Flatley, "Basic Business Communication: Skills for Empowering the Internet Generation", 11th Edition, Tata McGraw-Hill. 2006.
6. Dr A. Ramakrishna Rao, Dr G.Natanam & Prof S.A.Sankaranarayanan, "English Language Communication : A Reader cum Lab Manual", Anuradha Publications, Chennai, 2006.
7. Dr. Shalini Verma, "Body Language- Your Success Mantra", S.Chand, 2006.
8. Andrea J. Rutherford, "Basic Communication Skills for Technology", 2nd Edition, Pearson Education, 2007.

DISTRIBUTION AND WEIGHTAGE OF MARKS

Business English and Technical Writing Examination
For Business English and Technical Writing subject, there shall be continuous PC based evaluation during the semester for 80 marks and viva voce to be conducted by an externalexaminer for 20 marks.

EC306: ANALOG COMMUNICATIONS LAB (ACM (P))
(For B.Tech V Semester ECE)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To design and verify various analog modulation and demodulation schemes.
- To become familiar with AM and DSBSC in MATLAB environment.
- To study the spectral characteristics of various analog modulation schemes using spectrum analyzer.

.

Course Outcomes:

- Student will be able to design various receiver circuits.
- Students will be able to measure and analyze receiver characteristics.

List of Experiments:

1. Amplitude Modulation and Demodulation
2. Frequency Modulation and Demodulation
3. SSB modulation and Demodulation
4. Balanced modulator
5. Pulse Amplitude Modulation
6. Pulse width Modulation
7. Frequency Division Multiplexing
8. Analog Sampling and Reconstruction of signals
9. Preemphasis and Deemphasis
10. Study of Spectrum analyzer to analyse AM and FM signals
11. Simulation of Amplitude modulation
12. Simulation of DSBSC modulation

EC307: LINEAR IC APPLICATIONS LAB (ICA (P))
(For B.Tech. ECE - V Semester)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To Design and verify various analog circuits using ICs such as 741,555 etc.

Course Outcomes:

- Student will be able to design small applications using Opamp and Timer.

List of Experiments (Minimum of 12 experiments to done)

1. Inverting and Non-inverting Amplifier.
2. Summing and differential amplifier.
3. Integrators and differentiators.
4. Precision Rectifiers
5. Schmitt Trigger &Square wave Generator
6. Square and Triangle Wave Generator.
7. Active Filters – II Order LPF
8. Active Filters – II Order HPF
9. Digital to Analog Converter.
10. 723 Low Voltage and High Voltage Regulator
11. 555 Timerin Astable and Monostable Modes
12. Sample and Hold Circuit
13. 8038 Waveform generator
14. Phase Locked Loop (PLL)

Equipment required for the laboratory:

Dual power supply

Component development

systemFunction generator

CRO

Probes

IC

Tester

EC308: MICROPROCESSORS AND MICRCONTROLLERS (MP&MC)
(For B.Tech. ECE & EEE - VI Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	3

Course Objectives:

- To provide basics of processing technologies.
- To provide knowledge on microprocessor architecture and programming.
- To provide knowledge on microcontrollers and their applications.

Course Outcomes:

- Student will be able to differentiate Principle, Organization & Architecture between microprocessors and microcontrollers.
- Student will be able to gain Knowledge on architecture and interfacing with microprocessors and microcontrollers.
- Student will be able to get Knowledge on interfacing and applications of microprocessors and microcontrollers.

Unit-I
Introduction of Microprocessors: 8-bit, 16-bit microprocessors.
8086: 8086 CPU architecture, segmented memory, Maximum mode and Minimum mode.Addressing modes,8086 instruction set.

Unit-II

8086 Programming model: Simple programs on Arithmetic operations Sorting, Searching, Code conversions, String manipulations. Assembler directives, Assembly language programming using MASM / TASM. Procedures & Macros.

Unit-III

8086 Interfacing: Memory Interfacing: Interfacing of Static memory and Dynamic memory.
I/O Interfacing: 8255 (Programmable Peripheral Interface), 8255 applications – Stepper Motor interfacing, DAC interfacing Waveform generation and ADC interfacing.

Unit-IV

Peripheral Interfacing: 8254(Programmable Timer / Counter), 8251(USART), 8257 (DMAController), 8259 (Programmable Interrupt Controller).

Unit-V

Introduction to MCS51 family: 8051 Micro controller Architecture, Input / Output ports and circuits, External memory, counters and Timers, Serial data input/output, interrupts.

Unit-VI

Programming and Interfacing: Instruction set, Programming with 8051 Micro controller. Interfacing LCD, LEDs, Stepper Motor.

Text Books:

1. A K Ray, K M Bhurchandi, *Advanced Microprocessors and Peripherals*, 2nd Edition, Tata McGraw Hill Education Private Ltd, 2010.
2. Mazidi Muhammad Ali, Mazidi Janice Gillespie & McKinlay Rolin D, *The 8051 Microcontroller and Embedded Systems*, 2nd Edition, Pearson Education, 2008.

Reference Books :

1. John Uffenbeck, *The 8086/8088 Family: Design, Programming, and Interfacing*, 3rd Edition, Pearson Ed, 2006.
2. Barry B. Brey, *The Intel Microprocessors-Architecture, Programming and Interfacing*, 8th Edition, Princeton Hall India,2009.
3. Kenneth J. Ayala, *The 8051 Microcontroller*, Penram International Publication Ltd, 2006.
4. Gaonkar Ramesh, *Microprocessors Architecture, Programming & Applications with 8085/8080A*, 5th Edition, Penram International publication Ltd, 2010.
5. N. Senthil Kumar, M. Saravanan, S. Jeevananthan, *Microprocessors and Microcontrollers*, 3rd Edition, Oxford University Press, 2010.
6. N. Senthil Kumar, M. Saravanan, S. Jeevananthan, *Microprocessors and Interfacing*, OUP India, 2012.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC309: DIGITAL SYSTEM DESIGN USING HDL (HDL)
(For B.Tech. ECE - VI Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide insight about introduction to Digital design using VHDL
- To familiarize the sequential and combinational design in VHDL
- To acquire knowledge in writing the subprograms, packages and test benches programs

Course Outcomes:

- Student will be able to acquire the knowledge about the Basic programming skills in VHDL
- Student will be able to Design of sequential and combinational circuits using VHDL
- Students are able to design and write the programs using subprograms, packages and test benches

Unit-I

Introduction to VHDL: History, VHDL terms, Traditional design methods, Traditional schematics, Symbol versus entities, Schematics versus architectures, Component instantiation, Behavioral descriptions, Concurrent signal assignment, Event scheduling, Sequential statements, Architecture selection, Configuration statements.

Basic language elements: Identifiers, Data objects, Data types: Scalar, Complex, Access and file type, Operators.

Unit-II

Dataflow Modeling: Architecture body, Concurrent signal assignment, Delta delay, Multiple drivers, Conditional signal assignment, Block statement, using Sequential and combinational simple examples: Multiplexer, De-multiplexer, 4-bit adder, Priority encoder, Decoders, One bit comparator, BCD to 7-segment decoder, 74381 ALU,

Unit-III

Sequential modeling: Entity declaration, Architecture body, Process statement, Variable assignment statement, Concurrent vs Sequential signal assignment statement, Wait statement, If statement, Case statement, Null statement, Loop statement, Exit statement, Next statement, Assertion, Report statement, examples. Multiple Processes. Using Sequential and combinational examples: Multiplexer, De-multiplexer, 4-bit adder, Priority encoder, Decoders, Latches and flip- flops,Counters, Shift Registers, Synchronous Design and other examples.

Unit-IV

Structural Modeling:Architecture body, Component declarations, Component instantiation, Simple examples. Generic and configurations: Generics, Configurations, Configuration specification, Declarations, Conversion functions. Sequential and combinational examples.

Unit-V

Subprograms, Packages and Libraries: Subprograms: Functions, Conversion functions and procedure, Package declaration, Package body, Design file, Libraries. Converting real and integer to time

Unit-IV.

Model Simulation: Simulation, writing a test bench, Dumpling results into a text file, Reading vectors from a text file. Modeling a Moore FSM, a Melay FSM.

Text Books:

1. Douglas Perry, *VHDL,* 4th Edition. Tata McGraw-Hill, 2002
2. Stephen Brown, *Fundamentals of Digital Logic with VHDL Design*,2nd Edition TMH, 2009.
3. J.Bhaskar, *VHDL Primer*, 3rd Edition, Pearson Ed, 2003.

Reference Books:

1. Charles H. Roth Jr, *Digital System Design Using VHDL,* PWS Publications, 1998.
2. Alan B. Marcovitz, *Introduction to Logic Design*, 2nd Edition, TMH, 2005.
3. Cypress Semiconductors Data Book

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC310: DIGITAL COMMUNICATIONS (DCM)
(For B.Tech VI Semester ECE)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To acquire basics involved in digital communication systems.
- To make student understand baseband pulse transmission, Nyquist criterion and solutions.
- To analyze error control coding that encompasses techniques for encoding and decoding of digital data schemes for reliable transmission over noisy channels.

Course outcomes:

- Student will be able to analyze various methods of base band and band pass digital transmission and detection methods.
- Student will know how to analyze and design of a digital communications system.
- Students will be able to apply channel coding, line coding and pulse shaping techniques for data transmission.

Unit-I

Introduction: Elements of Digital Communication Systems, Sampling theorem, Ideal sampling, Practical sampling, Quantization (uniform & non uniform).

Unit-II

Baseband Data Transmission: Baseband PAM and Duo-binary PAM systems, M-ary signaling schemes, Signal shaping, Eye diagrams, Scrambler &Unscrambler, Synchronization.

Unit-III

Linear Block Codes: **Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, Encoding, Syndrome calculation, BCH Codes.**
Convolution Codes: **Introduction, encoding of convolution codes, Time domain approach, Transform domain approach. Graphical approach: State, Tree and Trellis diagram decoding using Viterbi algorithm.**

Unit-IV

Digital Communication Techniques for Coherent Systems: Optimum receiver, Description of ASK, FSK and PSK Systems (coherent), Description of QPSK, MSK and QAM Schemes, Determination of probability of errors, Probability of error for ASK, FSK and PSK schemes(coherent)

Unit-V

Digital Communication Techniques for Non Coherent Systems: Description of Non-coherent reception of ASK and FSK Signals, Description of non-coherent reception of PSK signal, Determination of probability of occurrence of error, Probability of error in the received Non-coherent ASK and FSK signals.

Comparison of ASK, FSK and PSK Signaling Schemes in terms of bandwidth, error probability, signaling speed etc.

Unit-VI

Spread Spectrum Modulation: Introduction, Pseudo-noise sequence, DS spread spectrum withcoherent binary PSK, Processing gain, FH spread spectrum.
Multiple Access Techniques: TDM and FDM systems, TDMA, FDMA & CDMA.

Text Books:

1. K. Sam Shanmugam, *Digital and Analog Communication Systems*, Wiley-India, 2nd Edition, 2005
2. Simon Haykin, *Digital Communication*, Wiley Eastern, 2nd Edition, 2006.

Reference Books:

1. John G.Proakis, *Digital Communications*, Mc Graw-Hill, 4th Edition, 2008.
2. Taub and Schilling, *Principles of Communication Systems*, McGraw-Hill, 3rd Edition, 2008.
3. S. Rappaport, *Wireless Communications*, PHI, 2nd Edition, 2010.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC311: MICROWAVE ENGINEERING (MWE)
(For B.Tech ECE - VI Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To impart the knowledge about the various wave guides.
- To impart knowledge about various microwave devices, microwave tubes, microwave junctions.
- To impart the knowledge on microwave signal characteristic measurements.

Course Outcomes:

- Students will be able to learn the advantages of microwave frequencies.
- Students will be able to learn about various microwave components, tubes, junctions.
- Students will be able to know how to measure various microwave signal characteristic.

Unit-I

Guided Waves and Wave Guides: Microwave frequencies advantages and applications, Rectangular and circular wave guides . Wave equations rectangular and circular wave guides for TE and TM modes, Cutoff frequency and wave length, Group and phase velocity, Wave impedance, Guide attenuation, Rectangular and cylindrical resonators, Q of the resonators.

Unit-II

Passive Microwave Devices: Introduction to Scattering parameters and its properties, Derivation of S- matrix for E-plane, H-plane, Magic tee, directional couplers, Hybridring. Microwave propagation inferrites, Faraday rotation, Gyrator Circulator and isolators.

Unit- III

Microwave Tubes-I: Velocity modulation, Current modulation, Operation and performance of two-Cavity klystron, Reflex klystron oscillator

Unit-IV

Microwave Tubes-II : Travelling wave tube (TWT) amplifier. Magnetron: Magnetron- mode separation, frequency pushing and frequency pulling and applications.

Unit-V

Microwave Solid State Devices: PIN diode, Varactor diode Gunn effect , GUNN diode, IMPATT , TRAPATT and BARITT Diodes, Parametric amplifier- Principle and characteristics.

Unit-VI

Microwave Measurements: Bolometric and thermocouple methods for measurement of power, Frequency, Attenuation, VSWR, Impedance measurements and measurement of scattering parameter For 3 and 4 port devices.

Text Books:

1. Samuel Y.Liao, *Microwave devices and circuits*, 3rd Edition, PHI 2003.
2. M. Kulkarni, *Microwave & Radar Engineering*, 3rdEdition, Umesh Publications 2003.

Reference Books:

1. O P Gandhi, *Microwave Engineering and Applications*, Pergamon Press 1989.
2. R.E. Collins, *Foundation of Microwave Engineering*, 2ndEdition, Wiley 2003.
3. E.C. Jordan and Balmain, *EM Fields & Waves and Radiating System*, 2ndEdition, PHI 2003.
4. Sushrut Das, *Microwave Engineering*, 1st Edition, Oxford University Press, 2014

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC312 :DIGITAL SIGNAL PROCESSING (DSP)
(For B.Tech ECE - VI Semester)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To become familiar with Digital Filter design and transform domain Processing.
- To understand the concepts of representation, transformation of the signals and the information they contain.

Course Outcomes:

- Student will be able to analyze the effects of quantization and aliasing in a real time DSP system
- Student will be able to apply various filter design techniques and FFT computations for a real time system.

Unit-I

Introduction: Introduction to digital signal processing: Discrete time signals and sequences, linear shift invariant systems, stability and causality, linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems – DTFT, DFS.

Unit-II

Discrete Fourier Transform: Discrete Fourier Transform (DFT), Properties of DFT, Computation of DFT, Circular Convolution, Overlap add method, Overlap save method.

Unit-III

Fast Fourier Transforms: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation infrequency FFT Algorithms, Inverse FFT, comparison of DFT&FFT computations.

Unit-IV

IIR digital filters: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Mapping of differentials, Impulse invariance, Bilinear transformation technique. Realization of IIR filters.

Unit-V

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency response, Design of FIR Digital Filters using Fourier series method, Windowing Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters, Realization of FIR filters.

Unit-VI

Introduction to DSP Processors: Introduction to programmable DSPs: Multiplier and Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, VLIW Architecture, Pipelining, Special addressing modes, On-Chip

Peripherals.

TMS320C67XX Processor: Features of TMS320C67XX processors, Internal architecture,addressing modes, External memory access, Peripherals.

Text Books:

1. V. Oppenheim and R. W. Schaffer, Discrete Time Signal Processing, PHI.
2. John G. Proakis, Dimitris G.Manolakis, Digital Signal Processing, Principles, Algorithms, and Applications, Pearson Education, 2007.
3. Emmanuel C.Ifearchar, Barrie W.Jervis, DSP A Practical Approach, Pearson Ed.
4. B. Venkataramani, M. Bhaskar, Digital Signal Processors – Architecture, Programming and Applications, TATA McGraw Hill, 2002.

Reference Books:

1. Andreas Antoniou, *Digital Signal Processing*, TATA McGraw Hill, 2006
2. MH Hayes, *Digital Signal Processing*, Schaum‟s, Outline Series, TATA Mc-Graw Hill, 2007.
3. P. Ramesh Babu, *Digital Signal Processing*, Scitech Publications.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC313: DIGITAL COMMUNICATION LAB
(For B.Tech VI Semester ECE)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To acquire knowledge in designing various digital modulation and demodulation schemes.

Course Outcomes:

- Student will be able to implement and analyze various digital modulation schemes
- Student will be able apply channel coding techniques for data transmission

List of Experiments:

1. Amplitude shift keying
2. Frequency shift keying
3. Phase shift keying
4. Pulse position modulation and demodulation
5. Delta modulation and demodulation
6. Time division multiplexing
7. Differential pulse code modulation and demodulation
8. Data conditioning and Carrier modulation

Simulation using MATLAB software

9. Probability of error for ASK
10. Probability of error for PSK
11. Probability of error for FSK
12. Probability of error for QPSK

EC314: DIGITAL SIGNAL PROCESSING LAB (DSP (P))
(For B.Tech ECE VI-Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To develop MATLAB coding to implement DSP algorithms.
- To familiar with DSP processors and programming DSK‟s.

Course Outcomes:

- Student will be able to develop MATLAB coding for implementation of DSP algorithms.
- Student will be able to programming on DSP processors.

List of Experiments:

MATLAB Programs

1. Linear Convolution
2. Autocorrelation & Cross correlation and verification of Auto correlation Properties.
3. Verification of Sampling Theorem.
4. IIR Filter Design – Butterworth
5. IIR Filter Design – Chebyshev
6. FIR Filter Design – Windowing Method
7. Circular Convolution using DFT- IDFT method

Using DSP Kits:

8. Linear convolution & Circular Convolution
9. N-Point DFT & Computation of non-real time PSD
10. To implement audio loopback
11. FIR Filters
12. Implementation of adaptive algorithm for noise cancellation

EC315: MICROPROCESSORS AND MICROCONTROLLERS LAB (MP&MC (P))
(For B.Tech. ECE - VI Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To provide knowledge on various applications in the field of microprocessors and microcontrollers
- To gain Knowledge on instruction set for programming and interfacing.

Course Outcomes:

- Student will be able to perform programming on microprocessors and microcontrollers
- Student will be able to interface and control real time peripherals.

List of Experiments :

Introduction to Assembly Language Programs Using 8086 Kits

1. Arithmetic Programs
2. Searching and Sorting
3. Factorial and Fibonacci Series generation

Assembly Language Programs Using TASM and Debug:

4. String Related Programs
5. Procedures
6. Macros

Interfacing Experiments

7. Stepper Motor Interfacing
8. Programming 8253 and Relay Interfacing

Microcontroller Experiments

Introduction to microcontroller programming and usage of system programming board

9. Interfacing an LED and a Switch to 89S52
10. Program on Dancing LEDs using 89S52
11. LCD Interfacing to 89S52
12. Stepper Motor Interfacing to 89S52

FOUR YEAR B.TECH. DEGREE COURSE

EC401: VLSI DESIGN (VLSI)
(For B.Tech. ECE VII Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	4

Course Objectives:

- To introduce the concepts of IC fabrication technologies and their corresponding Stick Diagrams.
- To understand scaling techniques of CMOS devices and their effects
- To study the methods to design the basic Gate level designs and draw their corresponding Layouts.
- To provide basic idea of Subsystem design, PLDs and CMOS testing.

Course Outcomes:

- Student will be able to understand the operation of a MOS transistor down to the physical level and relate this knowledge to the development of its operational equations.
- Student will be able to analyze and implement various logic gates and circuits using MOS transistors.
- Student will be able to analyze PLD and FPGA families for logic design. They will be in a position to analyze various CMOS testing schemes.

Unit-I

Introduction to VLSI and Basic Electrical Properties: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS &BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation.
Basic Electrical Properties of MOS and BiCMOS Circuits: $I_{ds}V_sV_{ds}$relationships, MOS transistor threshold Voltage, g_m, g_{ds}, Figure of merit, Pass transistor, NMOS Inverter, Various pull ups and Pull downs, CMOS Inverter analysis and design, Bi-CMOS Inverters.

Unit-II

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2µ CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

Unit-III

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance(R_S) concept and Sheet Resistance R_S in MOS, Area Capacitance Units, Calculations Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

Unit-IV

Subsystem Design: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters, High Density Memory Elements.

Unit-V

Semiconductor IC Design and VHDL Synthesis: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic(PLA‟S), Design Approach. VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools, TestPrinciples.

Unit-VI

CMOS Testing : CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

Text Books:

1. Kamran Eshraghian, EshraghianDougles and A. Pucknell, *Essentials of VLSI circuits and systems*,
PHI, 2005 Edition.
2. Weste and Eshraghian, *Principles of CMOS VLSI Design*, Pearson Education, 1999.

Reference Books:

1. John .P. Uyemura, *Introduction to VLSI Circuits and Systems*, JohnWiley, 2003.
2. John M. Rabaey, *Digital Integrated Circuits*, PHI, EEE, 1997.
3. Wayne Wolf, Pearson Education, *Modern VLSI Design*, 3rd Edition, 1997.
4. S.M. SZE, *VLSI Technology*, 2nd Edition, TMH, 2003.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC402: DIGITAL IMAGE PROCESSING (DIP)
(For B.Tech. ECE - VII Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To make students familiar with Digital Image, Image fundamentals and transforms.
- To provide knowledge about different Image Processing techniques.
- To make students to understand the basics of Color Image Processing techniques.

Course Outcomes:

- Student will be able to analyze various image processing methods
- Student will be able to analyze and process the Color Images.

Unit-I

Introduction: Definition, Applications Of Digital Image Processing, Fundamental Steps, Components Of Image Processing System, Human Visual System, Simple Image Formation Model, Image Sampling And Quantization, Spatial And Gray Level Resolution, Image Interpolation, Some Basic Relationships Between Pixels, Linear And Non Linear Operations.

Unit-II

Image Enhancement :

Spatial Domain: Basic Gray Level Transformations, Histogram Processing, Enhancement Using Logical And Arithmetic Operations, Image Subtraction, Image Averaging, Basic Of Spatial Filtering, Smoothing And Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Frequency Domain: Introduction To Fourier Transforms, Basics Of Filtering In Frequency Domain, Fundamental Steps In Filtering In Frequency Domain, Smoothing Frequency Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering.

Unit-III

Image Restoration: Model Of Image Degradation/Restoration Model, Noise Models, Restoration In Presence Of Noise Only-Spatial Filtering, Adaptive Filters, Periodic Noise Reduction By Frequency Domain Filtering, Linear Position Invariant Derivations, Algebraic Approach To Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

Unit-IV

Image Compression: File format (bmp, tiff, pcx, gif, jpeg.), Compression fundamentals, Image Compression Models, Error Free Compression: VLC, Arithmetic Coding, LZW coding, Bit plane Coding, Lossless Predictive Coding, Lossy Compression: Lossy Predictive Coding, Block Transform coding, Digital Watermarking

Unit-V

Image Segmentation: Fundamentals, Detection of Discontinuities: Point, Line, Edge detection, Edge Linking and Boundary Detection: Local Processing, Regional Processing Global Processing via Hough Transform.

Unit-VI

Image Transform and Color Image Processing :

Image Transform: Introduction One and Two Dimensional Discrete Fourier Transform (DFT), Properties of DFT, Properties of Discrete Cosine and Sine transforms, Properties of Slant, KL andHaar transforms.
Color Image Processing: Color fundamentals, Color models: RGB, CMY and CMYK, HSI, Converting colors from RGB to HIS, HIS to RGB manipulating HIS component images, Pseudocolor Image Processing, Full Color Image Processing.

Text Books :

1. Rafael Gonzalez & Richard Woods, *Digital Image Processing*, 3rd Edition. Pearson publications, 2012.
2. Anil K. Jain, *Fundamental of Digital Image Processing*, PHI publication, 2013.

Reference Books :

1. Pratt, *Digital Image Processing*, 2nd Edition, Wiley Publication, 1991.
2. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, *Digital Image Processing*, Mc. Graw Hill, 2011.
3. S. Sridhar, *Digital Image Processing*, Oxford University Press, 2011.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC403: EMBEDDED SYSTEMS (EMS)
(For B.Tech. ECE -VII Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide basics of Embedded Systems.
- To provide knowledge on architecture and programming.
- To provide knowledge on basic and advanced microcontrollers and their applications.

Course Outcomes:

- Student will be able to acquire Knowledge on types and applications of Embedded Systems.
- Student will be able to get idea on architecture and interfacing with basic and advanced microcontrollers.
- Student will be able to gain Knowledge on programming and applications of embedded processors.

Unit-I

Introduction: Definition of Embedded System, Embedded Systems Vs General ComputingSystems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

Unit-II

Introduction to Linux: Basics, Command line tools, Shell commands, Introduction to Shell Scripting. Overview of Embedded Linux Kernel.

Unit-III

ATOM Processors: Introduction to Intel Atom Processors, Interfacing array LEDs, LCD, DCMotor, Sensors, and Communication Board.

Unit –IV

ARM Architecture:ARM Design Philosophy, Registers, Program Status Register, Instruction Pipeline, Interrupts and Vector Table, Architecture Revision, ARM Processor Families. Introduction to ARM 9 processor.

UNIT –V:

ARM Programming Model – I :Instruction Set: Data Processing Instructions, Addressing Modes, Branch, Load, Store Instructions, PSR Instructions, Conditional Instructions.

UNIT –VI:

ARM Programming Model – II : Thumb Instruction Set: Register Usage, Other Branch Instructions, Data Processing Instructions, Single-Register and Multi Register Load-Store Instructions, Stack, Software Interrupt Instructions.

Text Books:

1. Shibu K.V, *Introduction to Embedded Systems*, Tata Mc Graw Hill, 2009.
2. Andrew N. Sloss, Dominic Symes, Chris Wright, *ARM Systems Developer's Guides- Designing & Optimizing System Software*, Elsevier, 2008.
3. Steve Furber, *ARM System on Chip Architecture*, 2nd Edition, Addsion Wesley Professional,2000.

Reference Books:

1. Mazidi Muhammad Ali, Mazidi Janice Gillespie & Mc Kinlay Rolin D, *The 8051 Microcontroller and Embedded Systems*, 2nd Edition, Pearson Education, 2008.
2. Raj Kamal, *Embedded Systems Architecture, Programming and design*, 2nd Edition, TMH, 2006.
3. Arnold S Burger, *Embedded System Design An Introduction to Processes, Tools and Techniques*, 1st Edition, CMP Books, 2007.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC404: OPTICAL COMMUNICATIONS (OC)
(For B.Tech. ECE VII Semester)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	1	0	3

Course Objectives:

- To provide a comprehensive knowledge in the area of Optical Communication.
- To provide idea on overview of optical fibers, optical sources, optical Detectors and power launching methods and measurements.

Course Outcomes:

- Student will be able to understand the elements of Optical communication and gain knowledge about Optical Networks like SONET.
- Student will able to calculate Power budget and measure various parameters like NA, attenuation and dispersion in Optical communication.

Unit-I

Overview of Optical Communications: Introduction and Historical background, Elements of optical fiber communication, Advantages & Applications of optical fibers.

Optical Fiber Waveguides: Nature of light-Spherical and planar wave fronts, Basic optical laws and definitions, Optical fiber modes and configurations, Mode theory of circular waveguides, Single and multimode step index fibers, Fiber materials and fabrication.

Unit-II

Signal Degradation in Optical Fibers: Attenuation-Absorption, Scattering and bending losses in optical fibers, Core and cladding losses.

Signal dispersion in optical waveguides: Intra modal dispersion (Material dispersion and wave guide dispersion), Intermodal dispersion, Pulse Broadening

Unit-III

Optical Sources and Photo Detectors: LED‟s –Structures, Light source materials, Internal quantum efficiency, Modulation capability, principles and operation of Febry perot and DFB laserdiodes, Physical principles of PIN and APD, Noise in photo detectors.

Unit-IV

Optical Receiver and Digital Transmission Systems: Fundamental receiver operation, Digital receiver performance calculation, Analog receivers, Point-to-point links, Link power budget,Rise-time budget, Wavelength Division Multiplexing (WDM)

Power Launching in Optical fibers: Source-to-fiber power launching basics, fiber joints and splices, fiber connectors.

Unit-V

Optical Networks: Basic concepts of SONET/SDH, Transmission formats and speeds, SONET/SDH Rings, SONET/SDH Networks.

Unit-VI

Optical Fiber Measurements: Measurement of Attenuation-Cut back technique, Insertion loss method and OTDR, Measurement of dispersion-Time domain and Frequency domain measurements.

Text Books:

1. Gerd Keiser, *Optical Fiber Communications,* 3rd Edition, Mc Graw Hill,2004.
2. John M. Senior, *Optical Fiber Communications Principles and Practice,* 2nd Edition,Pearson, 2009.

Reference Books:

1. D.C. Agarwal, *Fiber Optic Communication,* 2nd Edition, S.Chand& Co, 2004.
2. Djafar K. Mynbaev, *Fiber Optic Communications Technology*, Pearson, 2001.
3. John Gowar, *Optical Communication Systems,* 2nd Edition, PHI, 2004.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC405: MICROWAVE AND FIBER OPTICS LAB (MWFO (P))
(For B.Tech. ECE - VII Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To provide knowledge on various types of microwave devices and components.
- To find the S-matrix of different microwave junctions.
- To provide the knowledge on characteristics of optical fibers.

Course Outcomes:

- Students will be able to understand the working principle and measure characteristics of various microwave devices and components.
- Students will be able to measure frequency, wavelength and VSWR at microwave frequencies.
- Students will be able to design a communication system using optical fiber as medium.

List of Experiments

1. Reflex Klystron Oscillator Characteristics
2. Frequency, Wavelength and VSWR Measurements
3. GUNN Diode Characteristics
4. Impedance Measurement of Unknown Load
5. S-Matrix of E and H Plane Tees
6. S-Matrix of Magic Tee
7. S-Matrix of Circulator
8. S-Matrix of Directional Coupler
9. Radiation Pattern of Horn Antenna
10. Fiber Optic Communication
11. Study of Radiation Pattern for Helix Antenna/ Ground Plane
12. Study of Radiation Pattern for Cut Parabola/ Zeppelin

EC406 : VLSI LAB (VLSI (P))
(For B.Tech ECE - VII Semester)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course objectives:

- To study and use various coding styles like behavioural, data flow and structural in VHDL
- To code successfully and verify various combinational and sequential logic using VHDL language.
- To introduce the backend process using standard EDA tools.

Course outcomes:

- Student will be able to design and simulate digital logic circuits using VHDL language and simulator tools..
- Student will be able to understand Layout Design Rules.
- Student could draw Layout of any combinational circuit (complex CMOS logic gate)-learning about data paths.

List of Experiments :
Simulate and Synthesize the following with VHDL as programming language and standard simulator

1. Priority Encoder using data-flow style
2. 4-bit comparator using signal assignment statement
3. 2x4 decoder using bahavioural style coding
4. 4-bit up-counter design
5. D-FF generation
6. Design AND-OR-INVERT circuit
7. 4-bit shift register using structural style
8. Full adder circuit using structural style
9. Arithmetic unit using VHDL PACKAGE construct
10. 16x1 MUX using 4x1 MUX as package
11. BCD to seven segment decoder
12. Square wave generator

EDA Tool Programs:

It is expected that every student who learns synthesis on Cadence should conduct at least fivefrom the following experiments.

1. Layout, physical verification, placement and route for complex design, static timing analysis, IR drop analysis and cross talk analysis of the following
    a. Basic logic gates
    b. CMOS inverter
    c. CMOS NOR/NAND gates
    d. CMOS XOR and MUX gates
    e. CMOS 1 Bit full adder
    f. Static / dynamic logic circuit
    g. Latch
    h. Pass transistor

EC408: MOBILE COMMUNICATIONS (MCN)
(ForB.Tech VIII Semester ECE)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course objectives:

- To acquire a comprehensive knowledge in the area of Mobile communication.
- To understand multiple access and interference reduction techniques in mobile communication.

Course outcomes:

- Student will be able to analyze the functioning of Cellular system which will help in providing necessary expertise in the Mobile industry.
- Student will be able to analyze various methodologies to improve the cellular capacity.

Unit-I

Introduction: Basic Cellular System, Operation of Cellular system, Hexagonal cells, Frequencyreuse of channels, Co-channel interference reduction. Cell splitting

Unit-II

Cell Coverage: Incident, Reflection & Elevation angle, Point to point modes, path loss formula,path loss from point to point prediction model, Mobile to Mobile propagation

Unit-III

Cell site Antennas & Mobile Antennas: Antenna at cell site and mobile antennas.
Frequency Management & Channel Assignment: Frequency management, Frequency-spectrum utilization, Set-up channels, Channel assignment to cell site & mobile units, Fixed & non-fixed channel assignment.

Unit-IV

Hand offs : Why hand off(H.O), Types of H.O, Delaying H.O, Queuing H.O., Initiation of H.O, Forced H.O, Intersystem H.O, Power difference H.O, Mobile assisted H.O, Soft H.O

Switching & Traffic: Space & Time switching, Analog switching equipment for cellular mobile system, Cellular digital switching equipment, MTSO inter connections.

Unit-V

Introduction to Digital Mobile Telephony: Introduction to digital technology, ARQ techniques, Stop and wait ARQ, Selective reference mission with ARQ. Multiple access schemes.

Digital Cellular System: Global system for mobilecommunication (GSM), GSM architecture, layer modeling, Transmission, GSM channels & channel modes, Radio resources management, Mobility management, Communication management, Network management.

Unit-VI

Intelligent Cell Concept & Applications: Intelligent cell concept, Power-delivery intelligent cells, Processing grain intelligent cells. Applications of intelligent cell concept.

Intelligent Network for Wireless Communication: Advanced intelligent network (AIN) &Its architecture. SS7 protocol model, AIN for mobile communication.

Text Books:

1. Lee William C.Y, *Mobile Communications Engineering Theory and Applications*, McGraw Hill, 2nd Edition, October, 1997.
2. Lee William.C.Y, *Mobile Cellular Telecommunications Analog and Digital System*, Mc Graw Hill, 2nd Edition, 1995.

Reference Books:

1. T.S.Rappaport, *Wireless communications*, Pearson Ed, 2nd Edition, 2003.
2. Pandya Raj, *Mobile and Personal Communication Services and Systems*, PHI, 2nd Edition, March, 2004.
3. Jochen Schiller H, *Mobile Communications*, Pearson Ed, *2nd Edition*, 2008.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC409: COMPUTER NETWORKS (CN)
(For B.Tech ECE VIII Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To make the students understand various reference models and their structures in the networking Domain.
- To make the students understand different Protocols used in latest Internet Domain.

Course Outcomes:

- Student will be able to acquire knowledge about latest Networking Protocols.
- Student will be able to acquire knowledge about various security issues that improve the efficiency of computer networks.

Unit-I

Introduction to Data Communication Networks: Network Services and Architecture.

Reference models: ISO OSI Reference model, TCP/IP Reference model. Broad band ISDN andATM networks.

Physical Layer: Transmission media, Data modems, RS-232 Interfaces, Switching and Multiplexing(FDM,TDM & WDM).

Unit -II

Data Link Layer: Design issues, Error detection and correction, Stop-and-wait, Go-Back-N andSelective Repeat ARQ, HDLC protocol, Aloha protocol, CSMA protocols.

Introduction to IEEE standards: MAC sub layer (specifications and frame structure), & Physical layer for IEEE 802.3 (CSMA/CD) standard, IEEE 802.4 (Token bus) standard, IEEE802.5 (Tokenring) standard, Introduction to Wireless LANs, Networking and internetworking devices.

Unit -III

Network Layer: Virtual circuit and datagram approach in subnets, Shortest path routing, Flooding, Hierarchical routing, Broadcast routing, multicast routing and distant vector routing algorithms, Congestion control algorithms.IPV4, IPV6 Addresses, Internet Protocol IPV4, IPV6.

Unit -IV

Transport Layer: Transport services, addressing, upward and downward multiplexing, TCP and UDP.
Session Layer:-Encryption-DES Algorithm, Public key cryptography-RSA Algorithm.

Unit -V

Application Layer: HTTP- Transaction, Request messages, Response message, Headers.
WWW: Introduction to Browser architecture, Types of documents.

Unit -VI

DNS: Introduction to name spaces, DNS in the internet, Resolution, DNS messages.
VOIP: Basics of SIP.

Text Books:

1. Andrew S. Tanenbaum, *Computer Networks*, Third edition, PHI, 2001.
2. Behrouz.A. Forouzan, *Data communications and Networking*, Second edition, TMH, 2003.

Reference Books:

1. William Stallings, *Data and Computer Communications*, 3rd edition, Pearson, 2007.
2. Gerd Keiser, *Local Area Networks*, second edition, TMH, 2002.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC410: EMBEDDED SYSTEMS LAB (ES (P))
(For B.Tech. ECE -VIII Semester)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
0	0	3	2

Course Objectives:

- To provide knowledge on application in the field of embedded systems.
- To provide knowledge on various microcontrollers programming.

Course Outcomes:

- Student will be able to perform programming on ARM and Intel ATOM processors.
- Student will be able to interface and control real time peripherals.

List of Experiments:

AT89S52 Interface Programming

1. Module Interfacing
2. Port interfacing

Intel ATOM Programming

3. Linux function and system calls
4. Peripheral interfacing
5. Display Interfacing
6. Motor Interfacing
7. GSM port interfacing

ARM Processor Programming

8. LED sequence Interfacing
9. Motor Interfacing
10. Peripheral Interfacing
11. Display Interfacing
12. ARM 9 Application

B. TECH – ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTIVES	
INTERDISCIPLINARY ELECTIVE	
Course No.	**Course Title**
IDE301	Optimization Techniques
IDE302	Remote Sensing and GIS
IDE303	New and Renewable Energy Systems
IDE304	Artificial Intelligence and Expert Systems
IDE305	Nanotechnology
IDE306	Introduction to Information Systems
IDE307	Mechatronics
IDE308	Control and Automation
IDE309	Web Development Programming
IDE310	Environmental and Water Resources Engineering
GLOBAL ELECTIVE	
GE401	Introduction to Psychology
GE402	Research Methodology
GE403	Entrepreneurship Development
GE404	Intellectual Property Right and Patent Filing
GE405	Constitution of India
GE406	Ethical Hacking
GE407	Information Security and Cyber Laws
GE408	Foreign Languages
PROFESSIONAL ELECTIVE-I	
EC 412	Real Time Operating Systems
EC 413	DSP Processors and Architectures
EC 414	Radar Engineering
EC 415	Software Defined Radio
EC 416	Neural Networks and Fuzzy Logic
PROFESSIONAL ELECTIVE-II	
EC 417	CPLD and FPGA Architectures
EC 418	Low Power VLSI Design
EC 419	Telecommunication Switching Systems
EC 420	Satellite Communications
EC 421	Advanced Microprocessors
PROFESSIONAL ELECTIVE-III	
EC 422	Wireless Communications and Networks
EC 423	Speech Signal Processing
EC 424	Analog VLSI Design
EC 425	Biomedical Instrumentation
EC 426	Optical Networks

IDE 301: OPTIMIZATION TECHNIQUES (OT)
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme **2013**
Internal assessment **30**
End Exam Marks **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	-	-	3

Course Objectives

- To understand the different types of decision making environment and introduce widely used mathematical models.
- To enable the students to construct mathematical models of real world physical systems for quantitative analysis of managerial problems in industry;
- To enable the students to understand the systematic approach to allocate scarce resources more effectively.

Course outcomes :
Students will be able to

- Develop mathematical models from the verbal description of the real system.
- Understand the importance of mathematical modeling in solving practical problems in industry.
- Suggest proper deployment of scarce resources and provide optimum solution.

Unit: 1
Introduction: Definition, Nature and Significance of Operations Research , Models in OperationsResearch, Application Areas of Operations Research in Management.
Linear Programming: Model Formulation, Graphical solution of L.P.P, Slack, Surplus and Artificial variables, Simplex method, Big M method, Degeneracy in L.P.P, Dual linear programming problem, Solution of the Primal problem from the solution of the Dual Problem.

Unit: 2
Transportation Problems: Balanced and unbalanced Transportation problems, Initial basic feasible solution using N-W corner rule, least cost entry method and Vogel‟s approximation method, Optimal Solution, Degeneracy in Transportation Problem.
Assignment Problems:The Assignment Algorithm (Hungarian Assignment method), Balanced and Unbalanced Assignment Problems, Travelling Salesman Problem as an Assignment Problem.

Unit: 3
Game Theory : Definitions and Terminology, Two Person Zero Sum Games, Pure Strategy Games (with Saddle Point), Principal of Dominance, Solution for Mixed Strategy Games (Game without Saddle Point),
Queuing Theory:Introduction, single channel - poission arrivals - exponential service times with infinite population, Multi channel - poisson arrivals - Exponential service times with infinite population.
Unit: 4
Project Management: Phases of project management, guidelines for network construction, criticalpath, forward and backward pass, floats and their significance, crashing for optimum duration.
Sequencing Models :Introduction, General assumptions, processing n jobs through 2 machines,processing „n‟ jobs through m machines, Processing 2 jobs through m machines.

Unit: 5

Dynamic Programming: General Concept of Dynamic Programming, Problems related to general allocation and capital investment decisions.

Unit: 6

Inventory Control: Definition, Costs associated with inventory, Basic EOQ model, Inventory control systems – P System, Q System, ABC analysis, VED analysis

Simulation: Introduction, Advantages of Simulation, Generation of Random numbers, Simulation Languages, Monte Carlo Simulation, Application of Simulation to queuing theory, inventory control

TEXT BOOKS:

1.Hamdy, A. Taha, Operations Research-An Introduction, Prentice Hall of India Pvt. Ltd.,
2.S.D. Sharma, Operations Research, Kedarnath, Ramnath& Co., Meerut,
3.R. Paneer Selvam, Operations Research , PHI Learning Pvt. Ltd., New Delhi.

REFERENCE BOOKS:

1. Hillier / Libernam, Introduction to Operations Research , Tata McGraw Hill Edition
2. J.K. Sharma, Operations Research-Problems and Solutions, Macmillan India Ltd.
3. Billy E Gillett, Introduction to Operations Research A Computer Oriented Algorithmic Approach, Tata McGraw Hill Edition.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE 302: REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM (RS&GIS)
(Interdisciplinary Elective for B. Tech – VI Semester)

Scheme 2013
Internal Assessment : 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To know the basics, importance, analysis and applications of RS and GIS.
- To study the various types of operating systems of RS and GIS.

Course Outcomes:
The student will be able to:

- Explain the principles and applications of Remote Sensing and various types of platforms used in Remote Sensing.
- Explain the applications of GIS.
- Explain GIS data types and Input techniques.

Unit: 1
Introduction To Remote Sensing:
Concept and Scope of Remote Sensing: Definitions, Process and Characteristics of Remote Sensing System, Advantages and limitations.
Concept of Electromagnetic Radiation (EMR):Wavelength-frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR wavelength regions and their applications, Interaction of EMR with matter, Spectral signatures.
Energy Interaction in the atmosphere and with Earth Surface Features: Scattering, absorption, transmission, atmospheric windows Spectral Reflectance Curve, Concept of signatures.

Unit: 2
Platforms and Sensors:
Introduction:Sensor materials, Sensor System - Framing and Scanning System, Whiskbroom scanners, Push-broom scanners, Side Looking scanner.
Types and Characteristics of Sensor:Imaging and non-imaging sensors, Active and passive sensors, Resolution of Sensors - Spectral, Spatial, Radiometric & Temporal, Scale, Mapping unit, Multi-band concepts and False Colour Composites.
Remote Sensor Platforms and Satellite Orbits: Ground, Airborne and Space borne Platforms, Orbital Characteristics – Coverage, Passes, Pointing Accuracy, Geostationary, Sun synchronous, shuttle orbit.
Space Imaging Satellites:Early history of space imaging; Multispectral and Hyperspectral sensors, Radar, Lidar; Specification of some popular satellites – IRS, Landsat and SPOT series; High resolution satellites – IKONOS, Cartosat, Quickbird, OrbView, GeoEye, Pléiades, WorldView; Other latest earth resource satellites.

Unit: 3
Remote Sensing Applications:
Scope of Remote Sensing Applications - Potentials and Limitations.Applications in land use and land cover analysis.
Resource evaluation - Soils, minerals forest and agriculture.
Water Resource Applications- Mapping, monitoring of surface water bodies, tanks, lakes/reservoirs. Environmental applications.

Unit: 4

Geographic Information System:

Basic Concepts: Definition of GIS, Components of GIS, Variables - points, lines, polygon, Functionality of GIS, Areas of GIS application, Advantage and Limitation of GIS.

Unit: 5

GIS Data:Spatial and Attribute Data, Information Organization and Data Structures - Raster andVector data structures, Data file and database

Creating GIS Database: GIS Software‟s, file organization and formats, Geo-database, Rectification, Digitization and Map Composition.

Unit: 6

GIS Data Input & Editing:Nature and Source of data, Method of spatial and Attribute data capture - Primary and Secondary, digitization and scanning method, Techniques and procedure for digitizing, Errors of Digitization and rectification, Re-projection, Transformation and Generalization, Edge matching and Rubber sheeting, Topology.

TEXT BOOKS:

1. M. Anji Reddy; Text Book of Remote Sensing and Geographic Information System, BS Publication.
2. Lo C.P. & Yeung A.K.W., (2004). Concepts and Techniques of GIS, Prentice-Hall of India, New Delhi.

REFERENCE BOOKS:

1. B.Bhatta; Remote sensing and Geographic Information System, Oxford Publications.
2. Siddiqui, M.A.; 2006, Introduction to Geographical Information System, ShardaPustakBhavan, Allahabad.
3. Curran, Paul J; 1985, Principles of Remote Sensing, Longman, London.
4. NRSA, IRS, Data User Handbook, Hyderabad

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE 303: NEW AND RENEWABLE ENERGY SYSTEMS(NRES)
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme 2013
Internal Assessment 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course objective:

- Familiarize the students with the concept and importance of renewable energy sources.

Course outcomes:
The student will be able

- To analyze the various renewable energy sources like wind, solar, biomass, Ocean energy, Fuel cells and MHD systems
- To exposure on biomass gasification and combustion, Theory of flat plate collectors, photo voltaic, thermal applications and limitations of solar energy are also provided.

Unit: 1

Introduction and Energy Conservation: Classification of energy sources-Importance of renewable energy sources and energy chain-Principles of energy conservation –Energy conservation opportunities
Fundamentals of Solar Energy: Extra terrestrial and terrestrial radiation- Solar constant and solar radiation geometry-Solar time and day length-Estimation of monthly average daily total radiation on horizontal surface and tilted surface-Measurements of radiation data.

Unit: 2
Solar Collecting Devices : Flat plate collector- Losses associated with collector-Method of determination of top loss, side loss and bottom loss coefficient -Performance parameters affectingthe collector performance-Efficiency of flat plate collector-selective surfaces- Air collectors- Classification of concentrating collector-Tracking of CPC collector
Solar Thermal Systems: Methods of storing solar energy-Solar water heating-Solar refrigeration system – Solar thermal power generation-Solar distillation-Solar space heating.

Unit: 3
Solar Voltaic Systems & Emerging Technology: Basic principle of PV cell-Arrangements of PV cell-classification of PV cell-Principle of magneto hydro dynamics-thermo electric and thermionic conversion**,** Introduction to Fuel cell.

Unit: 4
Wind Energy: Origin of wind-Application of wind power –Betz limit-Components of Horizontal axis wind turbine-Types of blades- Classification of vertical axis turbine.

Unit: 5
Biomass Energy: Photosynthesis process- Biomass conversion technologies- Biogas production -Types of digester- Factors affecting the digester performance
Geothermal Energy: Types of geothermal energy resources-Energy conversion throughgeothermal energy resources-Environmental consideration.

Unit: 6

Ocean Thermal Energy Conversion: Principle of OTEC- Anderson and Claude cycles
Tidal energy: Introduction- tidal energy conversion methods,
Wave energy: Introduction, conversion methods

TEXT BOOK:

1. B.H.Khan ,Non-conventional Energy Sources, TMH Publishers, New Delhi.2003.

REFERENCE BOOKS:

1. G.D Rai ,Non-conventional Energy Sources, Khanna Publishers, New Delhi.1989
2. S.Rao and Paulekar, Energy Technology, Khanna Publishers, New Delhi.2000
3. W.R.Murphy&G.Mckay ,Energy Management, Butterworth & Co. Publishers, New Delhi.2001
4. B.Sreenivasa Reddy &K.HemachandraReddy , Thermal data hand book, IK International Publishers, Bangaloore 2007

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE 304: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS(AIES)
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme 2013
Internal Assessment 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To Gain a historical perspective of AI and its foundations.
- To Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
- To Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- To Explore the current scope, potential, limitations, and implications of intelligent systems.

Course Outcomes:
Student will be able to:

- Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems and other machine learning models.
- Gain on working of an expert system.

Unit: 1
Introduction: What Is AI?, The Foundations of Artificial Intelligence, The History of Artificial Intelligence.

Unit: 2
Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

Unit: 3
Solving Problems by Searching: Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies.

Unit: 4
Informed (Heuristic) Search Strategies- Greedy best-first search, A* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions.

Unit: 5
Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search inContinuous Spaces, Searching with Partial Observations.

Unit: 6
Introduction to Expert System: What are Expert Systems, Features of Expert system, Featuresof good expert system, Role of human in Expert system, Expert system organization, Difference between expert system and conventional program, Basic activities of expert system and the areas in which they solve problems, Prospector system features, working.

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, "Artifcial Intelligence: A Modern Approach" Third Edition, 2010. Pearson Education.
2. Donald A.Water man," A Guide to expert systems", Addison Wesley publishing company.

REFERENCE BOOKS:

1. Judea Pearl, "Probabilistic Reasoning in Intelligent Systems", Morgan Kaufmann, 1988.
2. Tom Mitchell, "Machine Learning", McGraw Hill, 1997.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE305:NANOTECHNOLOGY
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme 2013
Internal Assessment 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objective

- The main objective of the course is to provide novel sensing tools that make use of nanotechnology to screen, detect and monitor various events in personal or professional life
- To familiarize with the infinite innovative applications, starting from diagnosis and treatments of diseases, continuing with quality control of goods and environmental aspects, and ending with monitoring security issues.

Course Outcomes

- The students acquire some of the fundamental principles behind nanotechnology and nanomaterials and their vital role in novel sensing properties and applications.
- The students understand the fabrication, characterization, and manipulation of nanomaterials, nanosensors, and how they can be exploited for new applications

Unit: 1

Introduction to Nanotechnology: Definition of nanotechnology; main features of nanomaterials;types of nanostructures (0D, 1D, and 2D structures); nanocomposites; and main chemical/physical/electrical/optical properties of nanomaterials.Methods for characterizing the nanomaterials: Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors by bottom-up and top-down approaches; self-assembly of nanostructures; and examples for nanotechnology application.

Unit: 2

Introduction to Sensors' Science and Technology: Definition of sensors; main elements of sensors; similarities between living organisms and artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) and chemical sensation (smelling and tasting); the parameters used for characterizing the performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic range, selectivity, linearity, resolution, response time, hysteresis, and life cycle.

Unit: 3

Metal nanoparticle-based Sensors: Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physical approach (laser ablation) and chemical approaches (Brust method, seed-mediated growth, etc.).Quantum Dot Sensors. Definition of quantum dot; fabrication techniques of quantum dots; Macroscopic and microscopic photoluminescence measurements; applications of quantum dots as multimodal contrast agents in bioimaging; and application of quantum dots as biosensors.

Unit: 4

Nanowire-based Sensors: Definition of nanowires; features of nanowires; fabrication of individual nanowire by top-down approaches and bottom-up approaches; and fabrication of nanowire arrays (fluidic channel, blown bubble film, contact printing, spray coating, etc.).Carbon Nanotubes-based Sensors: Definition of carbon nanotube; features of carbon nanotubes; synthesis of carbon nanotubes; fabrication and working principles of sensors based on individual carbon nanotube; fabrication and working principles of sensors based on random array of carbon nanotubes.

Unit: 5

Sensors Based on Nanostructures of Metal Oxide: Synthesis of metal oxide structures by dry and wet methods; types of metal oxide gas sensors (0D, 1D, and 2D); defect chemistry of the metal oxide sensors; sensing mechanism of metal-oxide gas sensors; and porous metal-oxide structures for improved sensing applications.

Unit: 6

Mass-Sensitive Nanosensors: Working principle of sensors based on polymeric nanostructures; sensing mechanism and applications of nanomaterial-based of chemiresistors and field effect transistors of (semi-)conductive polymers, w/o inorganic materials.

Arrays of Nanomaterial-based Sensors: A representative example for the imitation of human senses by means of nanotechnology and nanosensors: electronic skin based on nanotechnology.

TEXT BOOKS:

1. Jiří Janata, Principles of Chemical Sensors, Springer, 2d Edition (1989).
2. Roger George Jackson, Novel Sensors and Sensing, CRC Press (2004).

REFERENCE BOOKS:

1. Florinel-Gabriel Banica, Chemical Sensors and Biosensors: Fundamentals and Applications, John Wiley and Sons (2012).
2. Ramsden Jeremy, Nanotechnology, an Introduction. Elsevier (2011).

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE306: INTRODUCTION TO INFORMATION SYSTEMS (IIS)
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme 2013
Internal Assessment 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
2	2	--	3

Course Objectives:

- Students will learn the fundamentals of computer organization , how operating systems are implemented, Assemblers, Compilers, Linkers, loaders, Interpreters, Software Development Life Cycle(SDLC)
- To Interpret an Entity Relationship Diagram(ERD) to express requirements anddemonstrate skills to model data requirements and create Data models in to normalized designs.

Course Outcomes:
Student will be able to:

- learn the concepts of computer organization, operating systems, compiler design including its phases and components and become acquainted with the life cycle of software project and its various phases
- use SQL, to create Database objects

Unit: 1
Fundamentals of Computers & Computer Architecture: Introduction, Organization of a small computer, Central Processing Unit, Execution cycle, Instruction categories, measure of CPU performance Memory, Input/output devices, BUS, addressing modes
System Software: Assemblers, Loaders and linkers, Compilers and interpreters.

Unit: 2
Operating System: Introduction, Process Management, CPU scheduling, Memory ManagementSchemes, Page replacement algorithms.
Software Engineering: Introduction to software engineering, Life cycle of a Software Project, Software Development Models.

Unit: 3
Coding Standards and Best Practices: Introduction to C Programming, Basics of C Language, Data Types in C, Functions, arrays, pointers, structures.
Sorting and Searching Techniques: Searching Algorithms – Linear Search, Binary Search, Sorting Algorithms – Bubble Sort, Selecting Sort and Insertion Sort.

Unit: 4
Relational Database Management System: Introduction to DBMS, the database technology, data models. Database Users.
Entity Relationship (E-R) Modeling: Introduction, Notations, Modeling E-R Diagrams, Case Study1,2& 3, Merits and Demerits of E-R modeling.

Unit: 5
Normalization: Introduction, Need for Normalization, Process Normalization, Types of NormalForms (1 NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization.

Unit: 6

Structured Query languages (SQL): History of SQL, Data Types, Data Definition Language Statements (DDL), Data Manipulation Language (DML), Data Control Language (DCL), writingsimple queries.

TEXT BOOKS:

1. Campus Connect Foundation Program – Computer Hardware and System Software Concepts,Programming Fundamentals- Vol. – 1, INFOSYS**.**
2. Campus Connect Foundation Program – Relational Database management System, Client Server Concepts, Introduction to Web Technologies - Vol. – 2, INFOSYS
3. Campus Connect Foundation Program – Object Oriented Concepts – System Development Methodology, User Interface Design - Vol. – 3, INFOSYS
4. YashwantKanetkar**,** Let us „„„C"""" - bpb Publications 8th ed., 2007.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, *Structured Computer Organization*, PHI, 3rd ed., 1991
2. Silberschatz and Galvin, *Operating System Concepts*, 4th ed., Addision-Wesley, 1995
3. Wilbert O. Galitz, *Essential Guide to User Interface Design*, John Wiley, 1997
4. Alex Berson, *Client server Architecture*, Mc Grew Hill International, 1994
5. Henry F Korth, Abraham Silberschatz, *Database System Concept*, 2nd Edition, McGraw-HillInternational editions, 1991
6. Roser S. Pressman, *Software Engineering-A Practitioners approach*, McGraw Hill, 5th ed., 2001

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE 307: MECHATRONICS (MT)
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme 2013
Internal assessment 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	-	-	3

Course Objectives:

- The aim of this course is dealing with the integration of mechanical devices, actuators, sensors, electronics, intelligent controllers and computers.

Course Outcomes:

- At the end of the course students able to learn & achieve in-depth knowledge in the fundamentals, design, analysis and operation of mechatronic systems.

Unit: 1

Introduction: Definition of Mechatronics, Mechatronics in manufacturing, Products, and design.Comparison between Traditional and Mechatronics approach.

Unit: 2

Review of fundamentals of electronics. Data conversion devices, sensors, microsensors, transducers, signal processing devices, relays, contactors and timers. Microprocessors controllers andPLCs.

Unit: 3

Drives: stepper motors, servo drives. Ball screws, linear motion bearings, cams, systems controlled by camshafts, electronic cams, indexing mechanisms, tool magazines, transfer systems.

Unit: 4

Hydraulic systems: flow, pressure and direction control valves, actuators, and supporting elements, hydraulic power packs, pumps. Design of hydraulic circuits.

Unit: 5

Pneumatics: production, distribution and conditioning of compressed air, system components and graphic representations, design of systems. Description.

Unit: 6

Description of PID controllers. CNC machines and part programming. Industrial Robotics.

TEXT BOOKS:

1. HMT ltd. Mechatronics, Tata Mcgraw-Hill, New Delhi, 1988.
2. G.W. Kurtz, J.K. Schueller, P.W. Claar . II, Machine design for mobile and industrial applications, SAE, 1994.
3. T.O. Boucher, Computer automation in manufacturing - an Introduction, Chappman and Hall, 1996.

REFERENCE BOOKS:

1. R. Iserman, Mechatronic Systems: Fundamentals, Springer, 1st Edition, 2005
2. Musa Jouaneh, Fundamentals of Mechatronics, 1st Edition, Cengage Learning, 2012.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.
End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE308: CONTROL& AUTOMATION (CA)
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme 2013
Internal assessment 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	-	-	3

Course Objectives:

- To help the students understand concept of open loop and closed loop system.
- To study the concept of time response and frequency response of the system and the basics of stability analysis and state variable analysis.
- To Learn the major components of a Programmable Logic Controller (PLC)i.e.,CPU, input modules, and output modules in a PLC.
- To learn programming of PLC; Work with PLC programming using ladder logic.

Course Outcomes:

- Represent the mathematical model of a system
- Determine the response of different order systems for various step inputs
- Analyze the stability of the system.
- Demonstrate an ability to program Programmable Logic Controllers using ladder logic and other programming standards
- Describe the advantages, use and applications of Programmable Logic Controllers (PLC‟s).

Unit: 1

Modeling of Linear Control Systems: open-loop and closed-loop systems, control system components, Advantages, disadvantages & Applications of automated control system. Servo motors, position control systems, Transfer functions, equations of electrical and mechanical systems.

Unit: 2

Block Diagrams: block diagram representation and manipulation, signal flow graphs-mason‟sgain formula to determine overall system gain.
Feedback Characteristics of Control Systems: Feedback and non-feedback systems, effects of feedback.

Unit: 3

Time Response: Types of input, transient response of second order system for step input, time-response specifications, steady state error and error constants, proportional, derivative and integralcontrols.
Concept of Stability: Stability of systems-Routh Hurwitz criterion.
Compensation (Without Design): The necessity of compensation, series and parallel compensation. Realization of basic lead, Lag and lead-Lag compensators.

Unit: 4

Root Locus: Definition of Root Locus, construction Procedure, properties of typical systems analyzed by root locus techniques. Bode Plot

Unit: 5

PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.
PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

Unit: 6

Digital logic gates: Programming with logic gates, programming in the Boolean algebra system, conversion examples.
PLC Functions: Timer functions & Industrial applications, counters, counter function industrialapplications, Arithmetic functions, Number comparison functions, number conversion functions.

TEXT BOOKS:

1. Nagrath and Gopal , "Control systems Engineering", New Age International Publications.2003
2. B.C.Kuo, "Automatic Control Systems", Oxford.2003
3. K. Ogata , "Modern control Engineering", Pearson 2003
4. Naresh - K.Sinha , "Control Systems", New Age International Publishers.1998
5. B.S.Manke , "Linear Control Systems".1996
6. John W. Webb & Ronald A. Reiss, "Programmable Logic Controllers- Principles and Applications" Fifth Edition, PHI

REFERENCE BOOKS:

1. Madan Gopal , "Control Systems", TMH. 2003
2. Dorf, Bishop , "Modern Conrtol systems", Addison Wesley1998
3. (Shaum"sout line series) , "Feedback control systems", TMH1986
4. R.C.Shukla, "Control Systems", Dhanpat Rai.
5. Ashok Kumar, "Control Systems", TMH.
6. JR. Hackworth & F.D. Hackworth Jr. , "Programmable Logic Controllers- Programming Method and Applications", Pearson. 2004

NOTE:
Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.
End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE 309:WEB DEVELOPMENT PROGRAMMING (WDP)
(Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme 2013
Internal Assessment 30
End Exam Marks 70
End Exam Duration : 3 Hrs

L	T/D	P	C
2	2	-	3

Course Objectives:

- To excel in the basic concepts of Website design.
- To understand various considerations in building a website.
- To visualize the concepts of HTML.
- To introduce basic concepts of CSS.
- To develop the concept of web designing.

Course Outcomes:
Student will be able to:

- Develop the skill & knowledge of Web page design.
- Understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other Information technology sectors.

Unit: 1
Introduction To The Web: Understanding The Internet And World Wide Web, History Of The Web, Protocols Governing The Web, Creating Websites For Individuals And The Corporate World, Web Applications, Writing Web Projects, Identification Of Objects, Target Users, Web Team.

Unit: 2
Planning and process development:Planning And Process Development, Web Architecture, Major Issues In Web Solution Development, Web Servers, Web Browsers, Internet Standards, TCP/IP Protocol Suite, IP Addresses, Cyber Laws.

Unit: 3
Hypertext Transfer Protocol: Introduction, Web Servers And Clients, Resources, URL And Its Anatomy, Message Format, Persistent And Non Persistent Connections, Web Caching, Proxy.

Unit: 4
Hypertext Markup Language (HTML): History Of HTML And W3C, Html and Its Flavors , Html Basics, Elements Attributes And Tags, Basic Tags, Advanced Tags, Frames, Images, Meta Tag, Planning Of Web Page, Model And Structure For A Website, Designing Web Pages,Multimedia Content Frames.

Unit: 5
Cascading Style Sheet(CSS): Introduction, Advantages, Adding CSS, Browser Compatibility, CSS and Page Layout, Selectors.

Unit: 6

Hosting And Promoting Websites: Structure of Websites, Web Development Tools, Web FilesUsing Microsoft Word, Microsoft Front Page, Adobe Dreamweaver, GIF Animator, Hosting Websites, Getting A Domain Name, Redirectors On The Web, Server Software, Submitting For Search Engines, Visitor Analysis And Statistics, Website Promoting Methods.

TEXT BOOKS:

1.UtamK.Roy, "Web Technologies", Oxford Higher Education.
2.K.L.James, "The Internet- A User Guide", 2nd Edition, PHI Publications.

REFERENCE BOOKS:

1.Kognet Learning Solutions inc., "HTML5 in Simple Steps". Dreamtech press.2.Steven M.Schafer, "HTML,XHTML and CSS Bible 5th Edition", Wiley India.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.
End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

IDE 310:ENVIRONMENTALAnd WATER RESOURCES ENGINEERING
(Inter disciplinary Elective for B. Tech. – VI Semester)

Scheme : 2013
Internal Assessment : 30
End Exam Marks : 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	-	-	3

Course Objectives :

This course has the objective of introducing the students to various aspects of sources of waste water, their characterization and disposal system of liquid and solid waste without harmful to public, Hydrological cycle, flood management, Financial analysis of water resources project, Geological formations of ground water, Hydro power development.

Course Outcomes :
Students shall be able to identify the source of waste water and solid waste, identifying the physical, chemical and biological properties of waste water, India‟s water budget, Irrigation methods, fundamentals of Hydro power development.

Unit : 1

Water Supply System :Need for protected water supply system – Objectives of Water supply system –Routine water analysis for physical, chemical and bacteriological characteristics and their significance – Standards for drinking water – Water borne diseases and their control.

Unit: 2

Sanitation: Aim and objectives of sanitation – Conservancy and water carriage systems – Classification of sewerage systems – Separate, combined and partially combined systems – disposal of domestic waste water.

Unit: 3

Urban Solid Waste Management: Types, sources, quantity and composition of urban solid waste – Collection, transportation, recovery & reuse – Disposal methods such as composting, incineration, sanitary land fill.

Unit: 4

Hydrology: Hydrologic cycle – Global water budget – India‟s water budget – Practical applications of Hydrology – Climate and weather seasons of India – Floods – Flood management.

Unit: 5

Water Resources Development: Planning for WRD – Purposes of WRD project multipurpose project – Functional requirements – Financial analysis of a project – Irrigation methods – Ground water – Geological formations – other sources of ground water – Water wells.

Unit: 6

Water Power Engineering: Sources of energy – Classification – Types of power planning for water power development – History – Advantages – Comparison – Layout of hydro power plant –Economics of Hydro power development.

TEXT BOOKS:

1. Santosh Kumar Garg [1992], *Environmental Engineering Vol.1*, Khanna Publications.
2. P. Jaya Rami Reddy, *A Text book of Hydrology (3rd Edition*, 2011), Laxmi Publications, New Delhi.
3. Dr. P.N. Modi [2014], *Irrigation and water Resources Engineering*, Standard Book House

REFERENCE BOOKS:

1. S.K.Hussain [1994], *Water supply and sanitary Engineering*, Oxford & IBH.
2. H.M. Raghunath [2009], *Groundwater*, Wiley Eastern Ltd
3. K.Subramanya, *Engineering Hydrology*, Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.
4. M.M. Dandekar and K.N. Sharma [2010], *A Text Book of Water Power Engineering*, Vikas Publications.
5.R.K.Sharma and T.K.Sharma [2003], *A Text book of Water Power Engineering including Dams, Engg. Hydro & Fluid Power Engg.*, S. Chand Company Ltd., New Delhi–110 055

NOTE:

Internal Assessment: The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

GE401: INTRODUCTION TO PSYCHOLOGY (IPY)
(Global Elective for B. Tech. – VII Semester)

Scheme **2013**
Internal assessment **100**

L	T/D	P	C
2	-	-	2

Course Objectives:

- To explain the primary objectives of psychology: describing, understanding, predicting and controlling behavior and mental processes.

Course Outcomes:

- Be able to articulate the general history of psychology by explaining depth and breadth of the field from the field from the perspective of a future educator or researcher.

Unit – I

Introduction: Defining Psychology & Behavior-Branches and fields of Psychology,Utility ofPsychology
Methods of Psychology: Introspection Method, Naturalistic observation, Experimental Method-Differential Method, Clinical Method,Psycho Physical Methods

Unit – II

Physiological Basis of Behavior: The Neuron-Central Nervous system, Brain and localization of Brain functions, Spinal chord Influence of Nervous system on human behaviour, Endocrinesystem and it‟s impact, The role of heredity and environment in the development of personality

Unit – III

Instincts, Emotions Senses and Sensitivity: Instincts and Reflex actions-Emotion & it‟s characteristics-Physiology of Emotions-Sensation and Sensitivity

Unit – IV

Thinking, Reasoning and Problem solving : Nature of thinking-Elements of thoughts, Tools ofThinking, Rigidity, Types of thinking, Reasoning & types, Problem solving and it‟s methods

Unit – V

Motivation and Behavior & Attention & Learning: Biological and socio psychological Needs, Drives and Incentives, Motives and Types of Motives, Types & Effect of attention, Types of Learning, Problem Solving, Mechanism of Memorization

Unit – VI

Intelligence, Aptitude, Personality : Nature of Intelligence-Concept of Metal age and IQ-Constantly of IQ-IQ Classification, Aptitude Ability & Achievement, Measurement of Aptitude, Features and Characteristics of Personality, Personality Assessment, Walters social Learning Theory

TEXT BOOKS:

1. S.K. Mangal, *“General Psychology”*, Sterling Publishers Private Limited

REFERENCE BOOK:

1. Saundra K.Ciccarelli&Gkenn E.Meyer, *"Psychology"*, Dorliing Kindersley (I) Pvt Limited

NOTE:

INTERNAL ASSESSMENT: Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

GE402: RESEARCH METHODOLOGY (RM)
(Global Elective for B. Tech. – VII Semester)

Scheme **2013**
Internal assessment **100**

L	T/D	P	C
2	-	-	2

Course Objectives:

- To know the meaning and objectives of research.
- To know the various types of research.
- To understand the limitations of research in social science.
- To familiarize the students with the significance of economic research.
- To develop a thorough understanding of the issues involved in planning, designing, executing, evaluating and reporting research.

Course Outcomes:

- Able to understand overview of research process, state research problem and conduct a preliminary literature review of the concepts comprising the research questions.
- Student able to study the features and uses & evaluation of data.
- Able to understand the organization structure and style of report writing.
- Able to understand that precautions which are to be taken while writing research report.

Unit – I

Research Methodology: Introduction –Meaning-Objectives & Motivation of Research-Types &Significance of Research-Research Methods (Vs) Methodology.
Researching process-Technique involved in defining a problem- Definition of a HypothesisRole of Hypothesis-Types of Hypothesis-Criteria of Good Hypothesis.

Unit – II

Research Design and Sampling Design: Need for Research Design-Features of good Design-Concepts Related to Research Design-Different research designs-Basics Principles of Experimental Designs-Steps in sampling design-Characteristics of good sample design-Various types of sample designs-Complex Random sampling designs

Unit-III

Measurement and Scaling Techniques: Errors in Measurement, Tests of Sound Measurement, Scaling and Scale Construction Techniques, Forecasting Techniques, Time Series Analysis, Interpolation and Extrapolation.

Unit – IV

Data Collection and Processing:
Primary Data: Data Collection through observation method & Interview Method-Data Collection through Questionnaires & schedules- Comparison of data collection methods- -Collection of Secondary data.
Processing: Measures of Central Tendency-Measures of Dispersion-Measures of Asymmetry - Measures of Relationship-Simple Regression Analysis-Chi-square Test for comparing valiance

Unit – V

Correlation and Regression Analysis: Method of Least Squares, Regression Vs. Correlation, Correlation Vs Determination, Types of Correlation and Their Specific Applications.
Sampling Fundamentals: Central Limit Theorem-Sampling Theory-Concept of standard error- Estimating population Mean-Sample size & Determination

Unit – VI

Interpretation of Data and Report Writing: Meaning-Technique & precautions of Interpretation Significance of Report writing, Steps- Layout of a Research report, -Types of Reports-Mechanics of writing a Research Report- Precautions of Report Writing.

TEXT BOOKS:

1. C.R. Kothari, *"Research Methodology (Methods & Techniques)"*, New Age International Publishers.

REFERENCE BOOKS:

1. R. Cauvery, V. K. Sudha Nayak, M. Girija, *"Research Methodology"*, S. Chand Publications.

NOTE:

INTERNAL ASSESSMENT: Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

GE403: ENTREPRENEURSHIP DEVELOPMENT (ED)
(Global Elective for B. Tech. – VII Semester)

L	T/D	P	C
2	-	-	2

Scheme **2013**
Internal assessment **100**

Course Objectives:

- To promote entrepreneurial culture amongst students and help them acquire competencies needed for setting up small enterprises.

Course Outcomes:

- Be able to build on personal as well as external resources with a view to successfully launching and subsequently managing their enterprises.

Unit - I

Introduction: Concept of an entrepreneur; Definition of an entrepreneur; Types of entrepreneurs; Characteristics of an entrepreneur.
Entrepreneurship: Definitions; Theories of entrepreneurship; Key elements of entrepreneurship; Six important segments of entrepreneurship environment; Advantages of entrepreneurship; Barriers to entrepreneurship; Role of entrepreneurship in economic development.

Unit – II

Rural Entrepreneurship: Meaning; Need; Retrospection of rural industrialization in India; Problems of rural entrepreneurship; Development plan for rural entrepreneurship.
Small Enterprises : Definition of SSI; Types, Characteristics of SSI; Role of SSI in economic development; Problems faced by SSI.

Unit – III

Project Planning: Project Identification; Project Selection; Project Report – Contents & Formulation; Methods of Project Appraisal.

Unit – IV

Ownership Structures: Sole Proprietorship; Partnership; Company; Co-operative; Selection of appropriate ownership structure.

Unit – V

Institutional Finance: Commercial banks; Other Financial Institutions – IDBI, IFCI, ICICI, IRBI, SFC, SIDC,
SIDBI & EXIM Bank.

Unit – VI

Institutional Support: Need; Support to Small Entrepreneurs – NSIC, SIDO, SSIB, SSIDC, SISI, DICs

TEXT BOOKS:

1. Prof. Satish C. Ailawadi & Mrs. Romy Banerjee, *"Principles of Entrepreneurship"*, Everest Publishing HousePub.

REFERENCE BOOKS:

1. S.S. Khanka, *"Entrepreneurial Development"*, S. Chand & Company Ltd. Pub.

NOTE:

INTERNAL ASSESSMENT: Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

GE404: INTELLECTUAL PROPERTY & PATENT FILING (IPPF)
(Global Elective for B. Tech. – VII Semester)

Scheme **2013**
Internal assessment **100**

L	T/D	P	C
2	-	-	2

Course Objectives:

- To develop IPR awareness among the students and to improve their exposure to IP basic legal concepts.

Course Outcomes:

- Be able to acquire fundamental competencies with regard to intellectual property rights.

Unit – I

Basics of IPR: Introduction to intellectual property right (IPR) -Need for IPR in India-Systems-Benefits of IPR-Various Types of IPR-Violation of IPR

Unit – II

Patents: Introduction to Patents-Various kinds of Patents-Patenting Process-Patent and kind of inventions protected by patent- Patent documents- How to protect your inventions? -Granting of patent Rights of a patent -How extensive is patent protection-Searching a patent -Drafting of a patent

Unit – III

Copy Right: What is copyright?- What is covered by copyright?- Fair use of copyrighted works (e.g., for classroom use)-Contributory copyright infringement -Rights covered by copyright?- Critical differences between patent and copyright protection-Copyright infringement distinguished from plagiarism- Remedies against Infringement

Unit – IV

Method of Designing Registrations: Designing Registrations-How Chart for Registration-TradeMark-Geographical Indications Integrated Circuits-Trade Secrets

Unit – V

IPR Policy: IP in various sectors like Government and Nation-R &D organizations-IT, Media,Entertainment.

Unit – VI

Management of Intellectual Property Rights-Trademarks, Geographical Indications and Domain Names-Chemical Engineering & Services Sector-Industries & Small Scale Industry

TEXT BOOKS:

1. *"Intellectual Property Rights: Key to New Wealth"*, National Research Development Corporation
2. Prabuddha Ganguli , *" Intellectual Property Rights"*, TMH

REFERENCE BOOKS:

1. P. Narayanan; *"Law of Copyright and Industrial Designs"* ;Eastern law House, Delhi , 2010

NOTE:

INTERNAL ASSESSMENT: Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

GE405: CONSTITUTION OF INDIA (CI)
(Global Elective for B. Tech. – VII Semester)

Scheme **2013**
Internal assessment **100**

L	T/D	P	C
2	-	-	2

Course Objectives:

- To create a meaningful understanding of basic philosophical tenets of Indian Constitutional Law.

Course Outcomes:

- Be able to know how constitution governs the allocation of power in society and the way in which the Indian constitution was made.

Unit – I

Historical back ground,Significance of Constitution, Making of the constitution, Role of the constituent Assembly, Salient features, the Preamble, Citizenship, procedure for amendment of Constitution Fundamental rights-Derivative principles of state policy-Elections in India.

Unit – II

Union Executive: Structures of Union Government & Functions, President, Vice President, Prime Minister, Cabinet Parliament-Supreme Court of India

Unit – III

State Executive: Structures and Functions, Governor, Chief Minister, Cabinet, State Legislature, High Courts & Sub ordinate courts

Unit – IV

Central, State Relations, President‟s Rule, Constitutional Amendments [42, 44, 74, 76, 86 & 91]- Constitutional functionaries, Working of Parliamentary system in India

Unit – V

Nature, Meaning & Definition, Indian Social Structure, Language in India-Political Parties & Presume groups, Right of Women-S.C‟s, S.T‟s & other weaker sections.

Unit – VI

Judiciary: Structure, Organisation of Judiciary, independence of the Judiciary, role and functions of Supreme Court, Judicial Review.

TEXT BOOKS:

1. Durga Das Basu, *"Introduction to the Constitution of India"*, Wedwe & Company
2. Macivel, Page, *"An Introduction Analysis"*, Society
3. M.V. Pylee, *"Indian Constitution"*, S. Chand Publications
4. Subhash C Kashyao : *"Our Constitution"*,National Bank,Trust, India.

REFERENCE BOOKS:

1. Durga Das Basu, *"Introduction to the Constitution of India"*, Wedwe & Company
2. Macivel, Page, *"An Introduction Analysis"*, Society

NOTE:
INTERNAL ASSESSMENT: Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

GE 406: ETHICAL HACKING (EH)
(Global Elective for B. Tech. – VII Semester)

Scheme **2013**
Internal assessment **100**

L	T/D	P	C
2	-	-	2

Course Objectives:

- To quantitatively assess and measure threats to information assets.
- To evaluate where information networks are more vulnerable.
- To investigate and mitigate data risks.
- To design security plans at protecting data assets.

Course Outcomes:

- Students will be able to provide security to their own systems.
- Students will learn how to crack the system passwords.
- Students will able to perform penetration tests.
- Students will able to develop an ongoing security strategy.

UNIT I:

Introduction To Ethical Hacking :Basic Terminology, Defining Hacker, Defining Malicious User,Recognizing How Malicious User Beget Ethical Hacker, Ethical Hacking Vs Auditing, Policy Considerations, Compliance And Regulatory Concerns, Understanding The Need To Hack Your Own Systems, Understanding The Dangers Your Systems Face, Non Ethical Attacks, Network Infrastructure Attacks, Operating System Attacks, Application And Other Specialized Attacks.

UNIT II:

Attacks And Ethical Hacking Commandments: Non Ethical Attacks, Network Infrastructure Attacks, Operating System Attacks, Applications And Other Specialized Attacks, Working Ethically, Respecting Privacy, Not Crashing Your Systems, Using The Ethical Hacking Process, Formulating Your Plan, Selecting Tools, Executing The Plan, Evaluating Results.

UNIT III:

Cracking The Hackers Mindset And Ethical Hacking Plan :Think Like Bad Guys, Who Breaks Into Computer Systems, Why They Do It, Planning And Performing Attacks, Maintaining Anonymity, Establishing Your Goals, Determining Which System Hack, Creating Testing Standards, Timing, Running Specific Tasks, Blind Vs Knowledge Assessments, Picking Your Location, Respond The Vulnerabilities, Selecting Security Assessment Tools.

UNIT IV:

Hacking Methodology : Setting The Stage For Testing, Gathering Public Information, Mapping The Networks, Scanning Systems, Determining What‟s Running On Open Ports, AssessingVulnerabilities.

UNIT V:

Passwords: Understanding Password Vulnerabilities, Organizational Password Vulnerabilities, Technical Password Vulnerabilities, Cracking Passwords, Cracking The Passwords The Old Fashioned Way, Cracking The Passwords With High-Tech Tools, Cracking Password Protected Files, Understanding Other Ways To Crack Passwords, General Password Cracking Countermeasures.

UNIT VI:

Mobile Devices: Cracking Laptop Passwords, Cracking Phones And Tablets, Cracking iosPasswords.

Text Books:

1. Kevin Beaver, *"Hacking for dummies"*, 4th Edition, Wiley India Pvt.Ltd.

Reference Books:

1. Rafay Baloch *"A Beginners guide to ethical hacking"*, www.hacking-book.com.

NOTE:
INTERNAL ASSESSMENT: Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

GE 407: INFORMATION SECURITY AND CYBER LAWS (ISCL)
(Global Elective for B. Tech. – VII Semester)

Scheme **2013**
Internal Assessment **100**

L	T/D	P	C
2	0	0	2

Course Objectives:

- To learn the basics of information systems and information security.
- To gain comprehensive understanding of achieving security using firewalls and Virtual Private Networks.
- To understand security implementation in Emails, Databases and Operating Systems.
- To gain knowledge about cyber laws and their impact on IT.

Course Outcomes:

- Students will understand different threats related to information systems.
- Students will learn about firewall and VPN techniques.
- Students will analyze the security aspects of Databases, OS and Email.
- Students will be aware of the cyber laws, patents and copyright terms.

Unit: I

Information Systems in Global Context: Basics and importance of Information Systems, Changing Nature of Information Systems, Global Information Systems: Role of Internet and Web Services.

Threats to Information Systems: New Technologies Open Door to the Threats, Information-Level Threats versus Network-Level Threats, Threats and Attacks, Classifications of Threats and Assessing Damages, Protecting Information Systems Security.

Unit: II

Building Blocks of Information Security: Principles of Information Systems Security, Three Pillars of Information Security.

Intrusion Detection for Securing the Networks: Intrusion Monitoring and Detection, Intrusion Detection for Information Systems Security.

Unit: III

Firewalls for Network Protection: Firewalls, Demilitarized Zone (DMZ), Need and Protection provided by Firewalls, Proxy Servers, Topologies for Different Types of Firewalls.

Virtual Private Networks for Security: VPN, Need and Role of a VPN for an Enterprise, Working of VPN, VPN Architecture.

Unit: IV

Security of Electronic Mail Systems: Today‟s Email Usage Scenario, Email SystemMechanism, Security Threats posed by Emails, Protection from Threats, Governance for Emails Systems.

Security of Databases: Database Security Issues, Federated Databases: Need and Security Issues,Securing the Mobile Databases, Securing Connectivity with Enterprise Databases, Data Integrity as a parameter for security, Database Security Policy.

Unit: V

Security of Operating Systems: Operating Systems role in Information Systems Application, Operating System Types, Functions and Tasks, Network Operating Systems and Security, Host Security and OS Hardening, Patched Operating System, OS hardening fundamentals.

Security Models, Frameworks, Standards and Methodologies: Terminology, Methodologies for Information Systems Security.

Unit: VI

Introduction To Cyber Laws: Introduction to Indian Cyber Law, Objective and Scope of the IT Act, 2000, Intellectual Property Issues, Overview of Intellectual-Property- Related Legislation in India, Patent, Copyright, Law Related to Semiconductor Layout and Design, Software License

Text Books:

1. Nina God bole, *"Information Systems Security: Security Management, Metrics, Frameworks and Best Practices"*, Wiley India Pvt.Ltd., 2013.
2. Surya Prakash Tripati, Ritendra Goel, Praveen Kumar Shukla *"Introduction To Information Security And Cyber Laws"*, Wiley India Pvt.Ltd.,2014.

Reference Books:

1. Michael E. Whitman and Hebert J Mattord, *"Principles of Information Security"*, 4th edition Ed. Cengage Learning 2011

NOTE:

INTERNAL ASSESSMENT: Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

EC412: REAL TIME OPERATING SYSTEMS(RTOS)
(For B.Tech. ECE - VII Semester)
(Professional Elective-I)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide basics on Operating systems.
- To provide knowledge on UNIX and RTOS.
- To provide knowledge on Vxworks and µcos.

Course Outcomes:

- Student will be able to gain Knowledge on differentiation between OS and RTOS.
- Student will be able to get key idea on UNIX.
- Student will be able to acquire Knowledge on applications of RTOS.

Unit-I

Introduction to OS and RTOS : Architecture of OS (Monolithic, Microkernel, Layered, Exo-kernel and Hybrid kernel structures), Operating system objectives and functions, Virtual Computers, Interaction of O. S. & hardware architecture, Evolution of operating systems, Batch, multi programming. Multitasking, Multiuser, parallel, distributed & real –time O.S.

Unit-II

Process Management of OS/RTOS :Uniprocessor Scheduling: Types of scheduling, scheduling algorithms: FCFS, SJF, Priority, Round Robin, UNIX Multi-level feedback queue scheduling, Thread Scheduling, Multiprocessor Scheduling concept, Real Time Scheduling concepts.

Unit-III

Process Synchronization: Concurrency: Principles of Concurrency, Mutual Exclusion H/W Support, software approaches, Semaphores and Mutex, Message Passing, Monitors, Classical Problems of Synchronization: Readers-Writers Problem, Producer Consumer Problem, Dining Philosopher problem. Deadlock: Principles of deadlock, Deadlock Prevention, DeadlockAvoidance, Deadlock Detection, An Integrated Deadlock Strategies.

Unit-IV

Memory & I/O Management:Memory Management requirements, Memory partitioning: Fixed, dynamic, partitioning, Buddy System Memory allocation Strategies (First Fit, Best Fit, Worst Fit, Next Fit), Fragmentation, Swapping, Segmentation, Paging, Virtual Memory, Demand paging, Page Replacement Policies (FIFO, LRU, Optimal, clock) ,Thrashing, Working Set Model.

Unit-V

Memory & I/O Management:I/O Management and Disk Scheduling: I/O Devices, Organization of I/O functions, Operating System Design issues, I/O Buffering, Disk Scheduling (FCFS, SCAN,C-SCAN, SSTF), Disk Caches.

Unit-VI

RTOS Application Domains :Comparison and study of RTOS: Vxworks and µCOS – Case studies: RTOS for Image Processing – Embedded RTOS for voice over IP – RTOS for fault Tolerant Applications – RTOS for Control Systems.

Text Books:

1. Wayne Wolf, *Computers as Components: Principles of Embedded Computing System Design,* 2/e, Kindle Publishers, 2005.
2. Andrew Tanenbaum, *Modern Operating Systems,* 3/e, Pearson Edition, 2007.

Reference Books:

1. Jean J Labrosse, *Embedded Systems Building Blocks Complete and Ready-to-use Modules in C,* 2/e, 1999.
2. C.M. Krishna and G.Shin, *Real Time Systems,* McGraw-Hill International Edition, 1997.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC413: DSP PROCESSORS AND ARCHITECTURES (DSPPA)
(For B.Tech ECE VII Semester)
(Professional Elective-I)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To acquire knowledge about Fundamentals of DSP Processors.
- To study the design of various building blocks of DSP processors

Course Outcomes:

- Student will be able to use DSP processors for real time systems.
- Student will be able Design and implement signal processing modules in DSP processors.

Unit - I

Architectures for Programmable Digital Signal-Processors: Introduction, Basic Architectural Features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Features for External Interfacing.

Unit - II

Programmable Digital Signal Processors: Introduction, Commercial digital Signal-processing Devices, Data Addressing Modes of TMS32OC54xx., Memory Space of TMS32OC54xx Processors, Program Control.

Detail Study of TMS320C54X & 54xx Instructions and Programming, On-Chip peripherals, Interrupts of TMS32OC54XX Processors, Pipeline Operation of TMS32OC54xx Processor.

Unit - III

Implementation of Basic DSP Algorithms: Introduction, The Q-notation, FIR Filters, IIR Filters, Interpolation and Decimation Filters (one example in each case).

Unit - IV

Implementation of FFT Algorithms: Introduction, An FFT Algorithm for DFT Computation, Overflow and Scaling, Bit-Reversed Index Generation & Implementation on the TMS32OC54xx.

Unit - V

Interfacing Memory and Parallel I/O Peripherals to DSP Devices: Introduction, Memory Space Organization, External Bus Interfacing Signals. Memory Interface, Parallel I/O Interface, Programmed I/O, Interrupts and I / O Direct Memory Access (DMA).

Unit - VI

Interfacing and Applications of DSP Processor: Introduction, Synchronous Serial Interface, A CODEC Interface Circuit. DSP Based Bio-telemetry Receiver, A Speech Processing System, An Image Processing System.

Text Books :

1. B Venkataramani and M Bhaskar, *Digital Signal Processors*, TMH, 2002.
2. Avatar Singh and S. Srinivasan, *Digital Signal Processing*, Thomson Learning, 2004.

Reference Books:

1. Ifeachor E. C., Jervis B. W, *Digital Signal Processing : A practical approach*, Pearson-Education, PHI, 2002.
2. Sen M. Kuo & Woon-Seng S. Gan, *Digital Signal Processors, Architectures, Implementations, and Applications*, Prentice Hall, 2004
3. Peter Pirsch**,** *Architectures for Digital Signal Processing*, John Weily, 2007.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC414: RADAR ENGINEERING (RE)
(For B.Tech ECE VII Semester)
(Professional Elective-I)

Scheme 2013
Internal Assessment 30
End Exam 70
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To achieve acquaint knowledge about radar subsystems, their performance and key functions.
- To provide in depth knowledge and issues related various tracking radars.

Course Outcomes:

- Student will be able to know about the all radar systems, design of radar systems and requirements of radar systems
- Student will be able to characterize the performance of radar systems.

Unit-I

Introduction to Radar: Description of basic radar system and its elements, Radar equation,Radar block diagram and operation, Radar frequencies, Application of radar. Displays:A-Scope, B-Scope and PPI radar displays.

Unit-II

The Radar Equation: Predictions of range performance, Minimum detectable signal, Receiver- noise and Signal to noise ratio. Probability of detection and false alarm, Radar cross-section of target. Transmitter power, Pulse repetition frequency and range ambiguities.

Unit-III

CW and FMCW Radar: Doppler effect, CW radar, FM CW radar, Multiple frequency CW radar.

Unit –IV

MTI and Pulse Doppler Radar: Description of operation, MTI radar with power amplifier transmitter, MTI radar with power oscillator transmitter, Delay line cancelers, Blind speeds, multiple or staggered PRFs, MTI radar using range gated Doppler filters, Limitations to MTIperformance, Non-coherent MTI, Pulse Doppler radar.

Unit-V

Tracking Radar: Tracking with radar, Sequential lobbing, Conical scan, Monopulse amplitude Comparison and phase comparison tracking radars, Tracking in range, Acquisition, Comparisonof tracking radars.

Unit-VI

Radar Antennas: Antenna parameters, Parabolic reflector antennas, Cassigrain antennas. Radar Receivers: Radar receiver, Noise figure, Low noise front ends, Duplexers and receiver protectors.

Text Books:

1. Skolnik, *Introduction to Radar Systems*, 2nd Edition, TMH, 2004
2. Skolnik, *Introduction to Radar Systems*, 3rd Edition, TMH, 2008

Reference Books:

1.Kulkarni M, *Microwave and Radar Engineering*, 4th Edition, Umesh Pub, 2010.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC415: SOFTWARE DEFINED RADIO (SDR)
(For B.Tech ECE VII Semester)
(Professional Elective-I)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To Expertise in the area of wireless communications
- To Know the Internal Architecture of software radio that will exemplify different communication Systems.
- To provide knowledge how to Interface between Analog Circuits, DSP Architectures & FPGA

Course Outcomes:

- Student will be able to conceptualize the SDR and its implementation.
- Student will be able to Design SDR for a specific application.
- Student will be able to identify the challenges in the maintenance of SDR.
- Student will be able to analyze the transmitter and receiver architectures.

Unit-I

Introduction: Software Defined Radio – A Traditional Hardware Radio Architecture – Signal Processing Hardware History – Software Defined Radio Project Complexity.

UNIT-II

A Basic Software Defined Radio Architecture:–Introduction – 2G Radio Architectures- Hybrid Radio Architecture- Basic Software Defined Radio Block Diagram- System Level Functioning Partitioning-Digital Frequency Conversion Partitioning.

RF System Design – Introduction- Noise and Channel Capacity- Link Budget- Receiver Requirements- Multicarrier Power Amplifiers- Signal Processing Capacity Tradeoff.

Unit-III

Analog-To-Digital And Digital-To-Analog Conversion: Introduction – Digital Conversion Fundamentals- Sample Rate- Band pass Sampling- Oversampling- Anti-alias Filtering – Quantization – ADC Techniques-Successive Approximation- Figure of Merit-DACs- DAC Noise Budget- ADC Noise Budget.

Unit-IV
Digital Frequency Up and Down Converters: Introduction- Frequency Converter Fundamentals-Digital NCO- Digital Mixers- Digital Filters- Halfband Filters- CIC Filters-Decimation, Interpolation, and Multirate Processing-DUCs - Cascading Digital Converters and Digital Frequency Converters.

Unit-V

Signal Processing Hardware Components: Introduction- SDR Requirements for Processing Power- DSPs- DSP Devices- DSP Compilers- Reconfigurable Processors- Adaptive Computing Machine- FPGAs

Software Architecture and Components – Introduction- Major Software Architecture Choices – Hardware – Specific Software Architecture- Software Standards for Software

Unit-VI

Smart Antennas Using Software Radio : Smart Antennas Using Software Radio- Introduction- 3G smart Antenna Requirements Phased Antenna Array Theory- Applying Software Radio Principles to Antenna Systems Smart Antenna Architectures- Optimum Combining/ Adaptive Arrays- DOA Arrays- Beam Forming for CDMA- Downlink Beam Forming

Text Books:

1. Paul Burns, "*Software Defined Radio for 3G*", Artech House, 2002.
2. Tony J Rouphael, "*RF and DSP for SDR"*, Elsevier Newnes Press, 2008

Reference Books:

1. JoukoVanakka, "*Digital Synthesizers and Transmitter for Software Radio*", Springer, 2005.
2. P Kenington, "*RF and Baseband Techniques for Software Defined Radio*", Artech House, 2005.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC416: NEURAL NETWORKS AND FUZZY LOGIC (NNFL)
(For B.Tech ECE VII Semester)
(Professional Elective-I)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide introduction to Artificial Neural Networks and Fuzzy logic
- To make students familiar with different Artificial neural networks
- To provide basics of fuzzy logic

Course Outcomes:

- Student will be able to acquire the knowledge about the different Artificial neural networks.
- Student will be able to design Artificial Neural Networks for different applications
- Student will be able to get the knowledge about the basics of fuzzy logic, systems and memories

Unit-I

Artificial Neural Networks: Biological neuron model Artificial neuron, Mc Culloah-Pitts neuron model, Characteristics, activation functions, Architectures(single layer and multi layer) and applications of ANNs. Training: supervised and unsupervised, Different learning rules.

Perceptrons: Perceptron representation, Ex – OR problem, Linear separability, Learning, Training algorithm, Advanced algorithm(Back propagation) and applications.

Unit-II

Counter Propagation Networks: Introduction, Network structure, Normal operation, Weight selection, Training Kohenen and Grossberg layers, Full counter propagation network, applications.

Hopfield Networks: Recurrent network configurations, Applications

Unit-III

Statistical Methods: Training, application, Boltzman training, Back propagation and Cauchy`s training.

Unit-IV

Bidirectional Associative Memories (BAM): BAM structure, Retrieving a stored association, Encoding association, Memory capability, Types of BAM: Continuous, Adaptive, Competitive.
Adaptive Resonance Theory: ART architecture, Implementation, Training example, Characteristics.

Unit-V

Introduction To Fuzzy Systems: Classical (Crisp) sets, Notation, Basic concepts, Fuzzy sets , basic concepts, Properties of fuzzy sets, Fuzzy operations: Compliment, Union, Intersection.

Fuzzy Relations: Binary relations review, Equivalence and similarity relations, Compatibility relations, Orderings and Morphisms.

Fuzzy Measures: Belief and plausibility measures, Probability, Possibility and necessity measures.

Unit-IV

Adaptive Fuzzy Systems: Neural and fuzzy machine intelligence, Fuzzyness as multi-variance, Fuzzyness in probabilistic world, randomness Vs ambiguity, Sets as points in cube.

Fuzzy Associative Memories (FAM): Fuzzy systems as between cube mappings, Fuzzy and neural function estimators, Neural Vs fuzzy representation of structured knowledge, FAMs as mappings, Fuzzy Hebb FAMS: Bidirectional FAM theorem, Superimposing FAM rules, FAM system architecture.

Text Books:

1. Laurence Fausett, *Fundamentals of Neural Networks, Architectures, Algorithms and Applications*, Pearson Ed, 2004.
2. George I. Klir and Tina A. Folger, Fuzzy Sets, Uncertainty and Information , PHI, 1998.
3. Bart Kosko, Neural Networks and Fuzzy Systems, PHI, 1992.
4. Philip D. Wasserman, Neural Computing, Theory and Practice, Van Nostrand Reinhold.

Reference Books:

1. Jacek M. Zurada, *Introduction to Artificial Neural Systems*, Jaico Publishing House, 1992.
2. Timothy Ross, *Fuzzy Logic with Engineering Applications*, TMH, 2000.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC417: CPLD AND FPGA ARCHITECTURES (FPGA)
(For B.Tech ECE VIII Semester)
(Professional Elective-II)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To objective is to learn methods and techniques of CPLD & FPGA design with EDA technology.
- To understand & analyze Physical design of FPGAs.
- To learn the development of Digital Circuits Design with FPGA.
- To understand Floor Planning, P&R for XILINX, ALTERA etc…

Course Outcomes:

- Student will be able to design their projects utilizing various FPGAs and CPLDs
- Student will be able to expose to industry standard FPGAs like XILINX, ALTERA etc..
- Student will be able to understand the configuration of FPGA and familiar with the device chips of ALTERA & XILINX.

Unit-I

Introduction to Programmable Logic Devices (PLD): Programmable logic, Programmable readonly memory (PROM), programmable logic array (PLA), Programmable array logic (PAL).Sequential programmable logic devices (SPLDS), Programmable gate arrays (PGAS), CPLD.

Unit-II

Introduction to FPGA: Programmable logic FPGA, Configuration logic blocks, Function Generator, ROM implementation, RAM implementation, time skew buffers, FPGA Design tools, Network-on-chip, Adaptive System-on-chip, AES ASIC Implementation, Advanced FPGA Design

Unit-III

FPGA logic cell for XILINX, ALTERA and ACTEL ACT: Technology trends, AC/DC IO Cells, Clock and power inputs, FPGA interconnect: Routing resources, Elmore‟s constant, RC delay and parasitic capacitance FPGA design flow, Low level design entry.

Unit-IV

FPGA physical design: CAD tools, Power dissipation, FPGA Partitioning, Partitioning methods.
Floor planning: Goals and objectives, I/O, Power and clock planning, Floor Planning tools.

Unit-V

Placement and Routing: Goals and objectives, Placement algorithms, Min-cut based placement, simulated annealing, Routing, introduction, Global routing, Goals and objectives, Global routing methods, Back-annotation, Detailed Routing, Goals and objectives, Channel density, Segmented channel routing, Maze routing, Clock and power routing, Circuit extraction and DRC.

Unit-VI

Verification and Testing: Verification, Logic simulation, Design validation, Timing verification, Testing Concepts, Failures, Mechanism and faults, Fault coverage, ATPG methods, Design for testability, Scan Path Design, Boundary Scan design, BIST Design guidelines, Design of aTesting machine.

Text Books:

1. Pak and Chan, SamihaMourad, *Digital Design using Field Programmable Gate Arrays*,1st Edition Pearson Education, 2009.
2. Michael John Sebastian Smith, *Application specific Integrated Circuits*, 3rd Edition,Pearson Education Asia, 2001.

Reference Books:

1. S. Trimberger, Edr, *Field Programmable Gate Array Technology*, 1st Edition Kluwer Academic Publications,1994.
2. John V.Oldfield, Richard C Dore, *Field Programmable Gate Arrays*, 1stEdition,Wiley Publications,1999.
3. S. Brown, R. Francis, J. Rose, Z.Vransic, *Field Programmable Gate array*, 1st Edition, Kluwer Publications, 1992.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC418: LOW POWER VLSI DESIGN (LVD)
(For B.Tech. ECE VIII Semester)
(Professional Elective-II)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To study various sources of power dissipation in CMOS circuits
- To understand various techniques to design for minimum power
- To provide understanding of low voltage circuits and low power SRAM design
- To make students understand designing software for low power.

Course Outcomes:

- Students will be able to grasp various power components and their minimization.
- Students will be able to know power minimization in adiabatic circuits
- Students can write software for low power consumption in DSPs atc.

UNIT-I:

Introduction to low power VLSI: Sources of power dissipation, designing for low power, classification of power dissipations. Silicon on Insulator (SOI), FinFET, High level techniques forVLSI for power reduction, Gate induced drain leakage, Short channel effect.

UNIT-II:

Power dissipation in CMOS: short circuit dissipation, Dynamic dissipation load capacitance. VLSI design limits- fundamental limits, material limits, device limits, circuit limits, Modeling of signals, Signal Probability Calculations, Power Estimation at the Circuit Level.

UNIT-III:

Low Voltage CMOS Circuits: Introduction, Circuit Design Style, Leakage Currents in Deep Sub-micrometer Transistors, Deep Sub-micrometer Device Design Issues, Key to Minimizing SCE, Low Voltage Circuit Design Techniques, Multiple Supply Voltages.

UNIT-IV:

Low Power SRAM: Introduction, organization of a Static RAM, MOS Static RAM Memory Cell, Banked Organization of SRAMs, Reducing Voltage Swings on Bit Lines, reducing Power inthe write Driver Circuits, Reducing Power in Sense amplifier Circuits,
Method for Achieving Low Core Voltages from a Single Supply.

UNIT-V:

Energy Recovery Techniques: Energy Recovery Circuit Design, designs with Partially Reversible logic, Supply Clock Generation.

UNIT-VI:

Software for Low Power:
Introduction, Sources of Software Power Dissipation, Software power Estimation, Software Power Optimizations, Automated Low Power Code Generation, Co-design for Low Power, Summary.

Text Books:

1. Kaushik Roy and Sharat Prasad, *Low-Power CMOS VLSI Circuit Design*, Wiley Inter-science Publications, 2000.

Reference Books:

1. Christian Piguet, *Low Power CMOS Circuits Technology, Logic Design and CAD Tools*, 1st Indian Reprint, CRC Press, 2010.
2. J. Rabaey, *Low Power Design Essentials*, 1st Edition, Springer Publications, 2010.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC419: TELECOMMUNICATION SWITCHING SYSTEMS (TCSS)
(For B.Tech ECE VIII Semester)
(Professional Elective-II)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To introduce fundamentals functions of a telecom switching office, namely, digital multiplexing, digital switching and digital subscriber access.
- To introduce ISDN, DSL / ADSL, and fiber optic systems in subscriber loop.

Course Outcomes:

- Student will be able to learn the fundamental functions of a telecom switching office, various multiplexing techniques.
- Student will be able to know about the various networks like SONET / SDH, ISDN
- Student will be able to acquired knowledge about switching systems.
- Student will be ability to analyze the characteristics of the telephone systems.

Unit-I

Telecommunication Switching Systems: Introduction, Elements of switching systems, switchingnetwork configuration, principles of cross bar switching. Electronic space division switching, Time division switching, Combination switching.

Unit-II

Telephone Networks:Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

Signaling Techniques: In channel signaling, common channel signaling. Networktraffic load andparameters, grade of service and blocking probability.

Unit-III

Data Communication Networks:Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits.

Unit-IV

Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching and virtual circuit switching concepts, OSI reference model, LAN, WAN, MAN & Internet. Repeaters, Bridges, Routers and gate ways.

Unit-V

Integrated Services Digital Network (ISDN) : Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

Unit-VI

DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing,CM & CMTS and DOCSIS.
SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

Text Books:

1. ThyagarajanViswanath, *Tele Communication Switching System and Networks*, PHI, 2nd edition, 2010.
2. Wayne Tomasi, *Advanced electronic communications systems*, PHI, 6th edition 2004.

References:

1. J. Bellamy, *Digital Telephony* -John Wiley, 2nd edition, 2001.
2. Achyut. S.Godbole, *Data Communications & Networks*, TMH, 2nd edition, 2004.
3. H. Taub & D. Schilling, *Principles of Communication Systems*, TMH, 2nd Edition, 2003.
4. B.A. Forouzan, *Data Communication & Networking*, TMH, 3rd Edition, 2004.
5. J E Flood, *Telecommunication switching, Traffic and Networks*, Pearson Education,2002.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC420: SATELLITE COMMUNICATIONS (SCM)
(For B.Tech ECE VIII Semester)
(Professional Elective-II)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide an overview of various Satellite Systems, Orbits, Satellite System Parameters and various Satellite Services
- To make the Student familiar with Satellite Communications.

Course Outcomes:

- The Student will be able to know various concepts of Satellite Communications & Services.

Unit-I

Over View of Satellite Systems: Introduction, frequency allocation, INTEL Sat.

Unit-II

ORBITS: Introduction, Kepler laws, definitions, orbital element, apogee and perigee heights, orbit perturbations, inclined orbits, calendars, universal time, side real time, orbital plane, local mean time and sun synchronous orbits, Geostationary orbit: Introduction, antenna, look angles, polar mix antenna, limits of visibility, earth eclipse of satellite, sun transit outage, leandiag orbits.

Unit-III

Propagation Impairments And Space Link: Introduction, atmospheric loss, ionospheric effects,rain attenuation, other impairments. SPACE LINK: Introduction, EIRP, transmission losses, link power budget, system noise, CNR, uplink, down link, effects of rain, combined CNR.

Unit-IV

Space Segment: Introduction, power supply units, altitude control, station keeping, thermal control, TT&C, transponders, antenna subsystem.

Unit-V

Interference and Satellite Access: Introduction, interference between satellite circuits, satellite access, single access, preassigned FDMA, SCPC (spade system), TDMA, pre-assigned TDMA, demand assigned TDMA, down link analysis, and comparison of uplink power requirements for TDMA& FDMA, on board signal processing satellite switched TDMA.

Unit-VI

DBS, Satellite Mobile and Specialized Services: Introduction, orbital spacing, power ratio, frequency and polarization, transponder capacity, bit rates for digital TV, satellite mobile services,USAT, Radar Sat, GPS, orb communication and iridium.

Text Book:

1. Dennis Roddy, *Satellite Communications*, 4th Edition, McGraw- Hill International Edition, 2006.
2. Sapna Katiyar, *Satellite Communications*, 3rd Edition, S.K. Kataria & Sons, 2013.

References Books:

1. Timothy Pratt, Charles Bostian and Jeremy Allnutt , *Satellite Communications*, 2nd Edition, John Wiley & Sons, 2003.
2. W. L. Pitchand, H. L. Suyderhoud, R. A. Nelson, *Satellite Communication Systems Engineering*, 2nd Ed., Pearson Education, 2007.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC421: ADVANCED MICROPROCESSORS (AMPR)
(For B.Tech ECE VIII Semester)
(Professional Elective-II)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide an overview of Advanced Microprocessors from 80186 to Pentium 4.
- To make the Student familiar with Advanced Microprocessors.

Course Outcomes:

- Student will be able to know the Architectures and features of Advanced Microprocessors from 80186 to Pentium 4.
- Student will be able to understand hardware and operation of latest computer systems.

Unit-I

The 80186 & 80286 Microprocessors: 80186: Block Diagram, Pin definitions **80286**: Block diagram, pin definitions, Real address mode, Protected mode, New and enhanced instructions.

Unit-II

The 80386 Microprocessors: Architecture, Pins and signals, Register Organization, Operatingmodes, Memory organization, Registers, New addressing modes.

Unit-III

The 80386 Memory Management: Memory management, Paging Mechanism.

The 80486 Microprocessors: Block diagram & Pin definitions. Cache level description.

Unit-IV

Pentium Processor: Salient features of Pentium, Architecture, branch prediction, MMXarchitecture.

Pentium Pro and Pentium II processor: Salient features of Pentium pro and Pentium II Processor.

Unit-V:

Pentium IV Microprocessor: Salient features of PIV, Block diagram, Hyper threading in Pentium.

Unit-VI:

Advanced Peripherals: CRT Controller 8275, Floppy disc controller 8272, Keyboard and display controller 8279.

Text Books:

1. Barry B. Brey, *The Intel Microprocessor 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro Processor Architecture, Programming and Interfacing*, 8th Edition, Princeton Hall India,2009.

Reference Book :

1. A.K.Ray & K M Bhuruchandi, *Advanced Microprocessors & Peripherals*, 2nd Edition, Tata McGraw Hill, 2010.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC422: WIRELESS COMMUNICATIONS AND NETWORKS (WCN)
(For B.Tech ECE VIII Semester)
(Professional Elective-III)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To analyze different propagation models & parameters of wireless multipath channels.
- To understand major concepts involved in WLANs, WANs & Mobile IP.
- To understand equalization and diversity concepts in Wireless Communications.

Course outcomes:

- Students will be able to design Wireless Communication systems that provide high quality of service.
- Students will be able to design equipment in area of Wireless Networking that yields optimum performance.
- Students will be capable of handling various technical challenges in Wireless domain.

Unit-I

Mobile Radio Propagation: Large-Scale Path Loss: Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geometry, Knife- edge Diffraction Model, Multiple knife-edge Diffraction, Scattering.

Unit-II

Mobile Radio Propagation: Small –Scale Fading: Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel-Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum, Sliding Correlator, Channel Sounding, Frequency Domain Channels Sounding,

Unit-III

Parameters of Wireless Multipath Channels: Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Rayleigh & Ricean Distributions.

Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke‟s model for flat fading, spectral shape due to Doppler spread in Clarke‟s model.
Unit -IV

Equalization and Diversity: Introduction, Fundamentals of Equalization, Training a Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non linear Equalization, Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation

(MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Diversity Techniques-Maximal Ratio Combining, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

Unit-V

Wireless Networks: Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks MANs, and WANs, Switching Techniques, Circuit Switching, Packet Switching, Asynchronous Transfer Mode

Unit-VI

Mobile IP and IEEE 802.11 protocol : Mobile IP ,Wireless LAN Technology -Infrared LANs, Spread Spectrum LANs, Narrowband Microwave LANs, Wi-Fi and the IEEE 802.11 Wireless LAN Standard, IEEE 802.11 Architecture and Services, IEEE 802.11 Medium Access Control .

Text books:

1. T.S. Rappaport, *Wireless Communications – Principles & Practice*, PHI , 2nd Ed., 2002.
2. William Stallings, *Wireless communications & Networks,*Pearson Education, 2nd Ed., 2002.

References:

1 Andrea Goldsmith, *Wireless Communications*, Cambridge University Press, 2nd Ed., 2005
2. William C.Y. Lee, *Mobile Cellular Tele Communication*, McGraw-Hill, 2nd Ed., 1995.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC423: SPEECH SIGNAL PROCESSING (SSP)
(For B.Tech. ECE - VIII Semester)
(Professional Elective-III)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course objectives:

- To provide students with the knowledge of basic characteristics of speech signal in relation to production and hearing of speech by humans.
- To describe basic algorithms of speech analysis common to many applications.

Course Outcomes:

- Students will be able to acquire the knowledge about the Acoustic theory and speech coding with design
- Students will be able to Design Linear Predictive Coding of speech and vocoders.

Unit I

Digital Models for the Speech Signal. The process of speech production, Acoustic theory of speech production, Lossless tube models, and digital models for speech signals

Unit II

Time domain models for speech processing: Time dependent processing of speech, short time energy and average magnitude, zero crossing rate, pitch period estimation, short time auto-correlation function, median smoothing and speech processing

Unit III

Digital representation of speech waveform, Quantization, instantaneous and adaptive delta modulation, DPCM, comparison of systems.

Unit IV

Short time Fourier Analysis: Basic model for short time analysis and synthesis of speech, implementation of filter bank summation method using FFT, pitch detection, analysis-by-synthesis. Analysis – synthesis systems.

Unit V

Homomorphic speech processing: complex cepstum approach, pitch detection, Formatdetection, homomorphic vocoder.

Unit VI

Linear Predictive coding of speech: Principles of linear predictive analysis, solution of LPC Equation; Prediction error signal, frequency domain representation of LPC analysis; Relation between the various speech parameters, synthesis of speech from LP parameters and applications.

Speech Coding: Sub–band coding, transform coding, channel Vocoder, Formant Vocoder, ceptral Vocoder, LP Vocoders. Vector quantizer coders. Man-machine communication, speakerrecognition system, speech recognition systems.

Text Books :

1. L.R.Rabiner& R.W. Schafer, *Digital processing of Speech Signals*, PHI, 2005.
2. Paramichalis, *Practical Approach to Speech Coding*, PHI, 2006.

Reference Books:

1. Owens, *Signal Processing of Speech, 2003.*
2. Dellar&Proakis, *Digital Speech Processin, 2007.*
3. Philipos C. Loizou Speech Enhancement Theory and Practice, second edu CRC press 2013

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC424: ANALOG VLSI DESIGN (AVLSI)
(For B.Tech. ECE - VIII Semester)
(Professional Elective-III)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course objectives:

- To make Student familiar with advanced current mirrors and their behavior at high frequency and low frequencies.
- To make Student familiar with design of OP-AMPs, comparators in BiCMOS.
- To make Student familiar with S&H, ADC,DAC etc..
- To give in detail view of filters used in sampling, Analog Multipliers.

Course Outcomes:

- Student will be able to design current mirrors and high impedance current mirrors.
- Student will be able to design Differential OP-AMP,S&H Circuits
- Student will be able to design analog multipliers and able to analyze their operation.

Unit-I

Basic current mirrors and single stage amplifiers: Simple CMOS current mirror, common source, Common gate amplifier with current mirror active load, Source follower with current mirror to supply bias current, High output impedance current mirrors and bipolar gain stages,.

Unit-II

Frequency response of Amplifiers:Advanced current mirrors,Frequency response of single ended amplifiers.

Unit-III

Operational amplifier design and compensation: Two stage CMOS operational amplifier, feedback and operational amplifier compensation, Folded-cascode operational amplifier, Current mirror operational amplifier, Fully differential operational amplifier, common mode feedback circuits, Current feedback operational amplifier.

Unit-IV

Sample and hold and switched capacitor circuits:BiMOS sample and hold circuits, Switched capacitor circuits, Basic operation and analysis first order and biquad filters,Switched capacitor gain circuit, Correlated double sampling techniques.

Unit-V

Data converters: Ideal D/A and A/ D converters, Quantization noise, Performance limitations. Nyquist rate D/A converters, Decoder based converters, Binary scaled converters, Hybrid Converters, Nyquist rate A/ D converters, Successive approximation, Cyclic flash type, Two step interpolating, Folding and pipeline, A/D converters.

Unit-VI

Over sampling converters and filters: Over sampling with and without noise hopping, Digital decimation filter, High order modulators, Band pass over sampling converters, Practical Considerations, Continuous time filters.

Text Books:

1. BehzadRazavi, *Design of Analog CMOS Integrated Circuits*, Tata McGrah Hill. 2002.
2. David Johns, Ken Martin, *Analog Integrated Circuit Design*, John Wiley & sons. 2004.

Reference Books:

1. Paul.R. Gray & Robert G. Major, *Analysis and Design of Analog Integrated Circuits*, John Wiley & sons, 2004.
2. Jacob Baker.R.et.al., *CMOS Circuit Design, IEEE Press*, Prentice Hall, India, 2000.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC 425: BIOMEDICAL INSTRUMENTATION (BMI)
(For B.Tech. ECE - VIII Semester)
(Professional Elective-III)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To provide knowledge of the principle of operation and design of biomedical instruments.
- To render a broad and modern account of biomedical instruments.

Course Outcomes:

- Students will be able to have a clear knowledge about medical instruments.
- Students will be able to have knowledge of the principle operation and design and the background knowledge of biomedical instruments and specific applications of biomedical engineering

Unit-I

Components of Medical Instrumentation System, Bio – amplifier, Static and dynamic characteristics of medical instruments, Biosignals and characteristics, Problems encountered with measurements from human beings.

Unit-II

Organization of cell, Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential, Conduction through nerve to neuro-muscular junction.
Bio Electrodes – Biopotential Electrodes-External electrodes, Internal Electrodes, Biochemical Electrodes.

Unit-III

Mechanical function, Electrical Conduction system of the heart, Cardiac cycle, Relation between electrical and mechanical activities of the heart.

Unit-IV

Cardiac Instrumentation Blood pressure and Blood flow measurement, Specification of ECG machine, Einthoven triangle, Standard 12-leadconfigurations, Interpretation of ECG waveform with respect to electromechanical activity of the heart, Therapeutic equipment, Pacemaker, Defibrillator, Shortwave diathermy, Hemodialysis machine.

Unit-V

Neuro-Muscular Instrumentation Specification of EEG and EMG machines, Electrode placement for EEG and EMG recording, Interpretation of EEG and EMG. Respiratory Instrumentation Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

Unit-VI
Patient electrical safety, types of hazards, natural protective mechanism, leakage current, patient isolation, hazards in operation rooms, grounding conditions in hospital environment.

Text books:

1. Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, *Biomedical Instrumentation and Measurements*, PHI, 2nd Ed, 1980.
2. John G.Webster, *Medical Instrumentation, Application and Design*, John Wiley, 3rd Ed., 1998.

References:

1. L.A. Geoddesand L.E. Baker, *Principles of Applied Biomedical Instrumentation*, John Wiley, 2nd Edition, 1975.
2. R.S. Khandpur , *Hand-book of Biomedical Instrumentation*, TMH,2nd Ed., 2003.
3. Mackay, Stuart R , *Biomedical Telemetry*, John Wiley, Third Edition, 1968.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

EC426: OPTICAL NETWORKS (ON)
(For B.Tech. ECE - VIII Semester)
(Professional Elective-III)

Scheme **2013**
Internal Assessment **30**
End Exam **70**
End Exam Duration : 3 Hrs

L	T/D	P	C
3	0	0	3

Course Objectives:

- To make the students understand the network model of optical networks.
- To provide the students with the knowledge about various optical elements used in the construction of optical networks.
- To gives sufficient information about various design constraints in designing the optical networks.

Course Outcomes:

- Students will be able to gain the knowledge about various optical elements used in optical networks
- Students will be able to gain the knowledge about the system model and various constraints involved in designing of optical networks.
- Students will be able to gain the knowledge about the Network Architectures of existing Optical Networks.

Unit-I

Introduction:
Services, Circuit Switching, Packet Switching, Optical Networks, Optical Layer, Transparencyand All Optical Networks, Optical Packet Switching, Transmission Basics, Network Evolution.

Unit-II

Components: Principle of operationofCouplers, Isolators & Circulators, Multiplexers & Filters,Optical Amplifiers,Tunable Lasers, Switches, Wavelength Converters

Unit-III

Networks: SONET/SDH- Multiplexing, SONET/ SDH Layers, Frame Structure, Frame Structure,Physical Layer, Elements of a SONET/SDH Infrastructure.

Unit-IV

WDM Network Elements: Optical Line Terminals, Optical Line Amplifiers, Optical Add/ Drop Multiplexers, Optical Cross Connects.

Unit-V

WDM Network Design: Cost Trade-offs, Light path Topology Design, and Routing and wavelength assignment problems, Dimensioning Wavelength Routing Networks, Network Survivability Basic Concepts.

Access Networks: Architecture Overview, Enhanced HFC, FTTC.

Unit-VI
Optical Switching: OTDM, Synchronization, Header Processing, Buffering, Burst Switching.

Text Books:

1. Ramaswami, Rajiv & Sivarajan, Kumar N. *Optical Networks a Practical perspective,* MorganKaufmann Publishers, 2nd Ed,.

Reference Books:

1. Black Uyless, *Optical Networks Third Generation Transport Systems,* Pearson Educations,1/e, 2002.

NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.