Study & Evaluation Scheme

of

Bachelor of Technology (Electronics & Communication)

[Applicable w.e.f. Academic Session 2011-12 till revised]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U. P)

Study & Evaluation Scheme of Bachelor of Technology

SUMMARY

Programme : B. Tech. (Electronics & Communication Engineering)

Duration : Four year full time (Eight Semesters)

Medium : English

Minimum Required Attendance : 75 %

Credit :

Maximum Credit : 258

Minimum credit required for the degree : 250

Assessment :

Internal	External	Total
30	70	100

Internal Evaluation (Theory Papers)

Class Test I	Class Test II	Class Test III	Assignment(s)	Other Activity (including attendance	Total
Best two out of the three					
10	10	10	5	5	30

Evaluation of Practical/ Industrial Training/ Project :

Internal	External	Total
50%	50%	100

Duration of Examination :

External	Internal
3 hrs.	1 ½ hrs

To qualify the course a student is required to secure a minimum of 40 % marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external).

A candidate who secures less than 40% of marks in a course shall be deemed to have failed in that course. The student should have at least 50% marks in aggregate to clear the semester. In case a student has secured more than 40% marks in each course, but less than 50% overall in a semester, he/she shall re-appear in courses where the marks are less than 50% to achieve the required aggregate percentage (of 50%) in the semester.

Question Paper Structure

1. *The question paper shall consist of eight questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 4 marks each).*
2. *Out of the rest seven questions, student shall be required to attempt any five questions. There will be minimum one and maximum two questions from each unit of the syllabus. The weightage of Question No. 2 to 8 shall be 10 marks each.*

Study & Evaluation Scheme
Programme: B.Tech.
Semester I

S. No.	*Course Code*	*Subject*	*Periods*			*Credit*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EAS101	Engineering Mathematics-I	3	2	-	4	30	70	100
2	EAS102	Physics	3	2	-	4	30	70	100
	EAS103	Chemistry							
3	EME101	Engineering Mechanics	3	2	-	4	30	70	100
	EME102	Manufacturing Science							
4	ECS101	Computer Basics & 'C' Programming	3	2	-	4	30	70	100
	EAS 104	Environmental Science							
5	EEE101	Basic Electrical Engineering	3	2	-	4	30	70	100
	EEC101	Basic Electronics Engineering							
6	EHM101	Foundation English-I	2	-	2	3	30	70	100
7	EAS151	Physics (Lab)	-	-	3	2	50	50	100
	EAS152	Chemistry (Lab)							
8	EME151	Engineering Mechanics(Lab)	-	-	3	2	50	50	100
	EME152	Engineering Drawing (Lab)							
9	ECS151	Computer Basics & 'C' Programming (Lab)	-	-	3	2	50	50	100
	EME153	Workshop Practice (Lab)							
10	EEE151	Basic Electrical Engineering (Lab)	-	-	3	2	50	50	100
	EEC151	Basic Electronics Engineering (Lab)							
11	EGP171	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**17**	**10**	**14**	**32**	**480**	**620**	**1100**

Semester II

S. No.	*Course Code*	*Subject*	*Periods*			*Credit*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EAS201	Engineering Mathematics-II	3	2	-	4	30	70	100
2	EAS202	Physics	3	2	-	4	30	70	100
	EAS203	Chemistry							
3	EME201	Engineering Mechanics	3	2	-	4	30	70	100
	EME202	Manufacturing Science							
4	ECS201	Computer Basics & 'C' Programming	3	2	-	4	30	70	100
	EAS204	Environmental Science							
5	EEE201	Basic Electrical Engineering	3	2	-	4	30	70	100
	EEC201	Basic Electronics Engineering							
6	EHM201	Foundation English –II	2	-	2	3	30	70	100
7	EAS251	Physics (Lab)	-	-	3	2	50	50	100
	EAS 252	Chemistry (Lab)							
8	EME251	Engineering Mechanics (Lab)	-	-	3	2	50	50	100
	EME 252	Engineering Drawing (Lab)							
9	ECS251	Computer Basics & 'C' Programming (Lab)	-	-	3	2	50	50	100

	EME 253	Workshop Practice (Lab)							
10	EEE 251	Basic Electrical Engineering (Lab)	-	-	3	2	50	50	100
	EEC 251	Basic Electronics Engineering (Lab)							
11	EGP271	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**17**	**10**	**14**	**32**	**480**	**620**	**1100**

Semester III

S. No.	***Course Code***	***Subject***	***Periods***			***Credit***	***Evaluation Scheme***		
			L	***T***	***P***		***Internal***	***External***	***Total***
1	EEC301	Digital Logic & Circuits	3	2	-	4	30	70	100
2	EAS301	Engineering Mathematics-III	3	2	-	4	30	70	100
3	ECS301	Discrete Structures	3	2	-	4	30	70	100
4	EEE302	Instruments & Measurements	3	2	-	4	30	70	100
5	ECS305	Data Structure using 'C'	3	2	-	4	30	70	100
6	EHM301	Professional Writing	2	-	2	3	30	70	100
7	EEC351	Digital Logic & Circuits (Lab)	-	-	4	2	50	50	100
8	EEE352	Instruments & Measurements(Lab)	-	-	4	2	50	50	100
9	ECS355	Data Structure using 'C' (Lab)	-	-	4	2	50	50	100
10	EGP371	Discipline & General Proficiency	-	-	-	1	100	0	100
		Total	**17**	**10**	**14**	**30**	**450**	**550**	**1000**

Semester IV

S. No.	***Course Code***	***Subject***	***Periods***			***Credit***	***Evaluation Scheme***		
			L	***T***	***P***		***Internal***	***External***	***Total***
1	EEC401	Signal and Systems	3	2	-	4	30	70	100
2	EEE404	Network Analysis & Synthesis	3	2	-	4	30	70	100
3	EEC404	Electronic Devices & Circuits	3	2	-	4	30	70	100
4	EEC405	Analog Communication Systems	3	2	-	4	30	70	100
5	EEC406	Electro Magnetic Field Theory	3	2	-	4	30	70	100
6	EHM401	Technical Communication	2	-	2	3	30	70	100
7	EEE 453	Network Analysis & Synthesis (Lab)	-	-	4	2	50	50	100
8	EEC452	Electronic Devices & Circuits(Lab)	-	-	4	2	50	50	100

9	EEC453	Analog Communication Systems(Lab)	-	-	4	2	50	50	100
10	EGP471	Discipline & General Proficiency	-	-		1	100	-	100
		Total	**17**	**10**	**14**	**30**	**425**	**570**	**1000**

Semester V

S. No.	***Course Code***	***Subject***	***Periods***			***Credit***	***Evaluation Scheme***		
			L	***T***	***P***		***Internal***	***External***	***Total***
1	EEE 501	Control System	3	2	-	4	30	70	100
2	EEC501	Microprocessor & Application	3	2	-	4	30	70	100
3	EEC 502	Microwave Engineering	3	2	-	4	30	70	100
4	EEC503	Linear Integrated Circuits	3	2	-	4	30	70	100
5	EEC504	Digital Communication Systems	3	2	-	4	30	70	100
6	EHM501	Technical Writing	2	-	2	3	30	70	100
7	EEC551	Microwave Engineering (Lab)	-	-	4	2	50	50	100
8	EEE 551	Control System (Lab)	-	-	4	2	50	50	100
9	EEC552	Digital Communication Systems (Lab)	-	-	4	2	50	50	100
10	EEC553	Microprocessor & Application (Lab)	-	-	4	2	50	50	100
11	EEC 591	Industrial Training & Presentation	-	-	-	2	50	50	100
12	EGP571	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**17**	**10**	**18**	**34**	**530**	**670**	**1200**

Semester VI

S. No.	***Course Code***	***Subject***	***Periods***			***Credit***	***Evaluation Scheme***		
			L	***T***	***P***		***Internal***	***External***	***Total***
1	ECS609	Neural Networks	3	2	-	4	30	70	100
2	EEC602	Antenna & Wave Propagation	3	2	-	4	30	70	100
3	EEC603	Analog Integrated Electronics	3	2	-	4	30	70	100
4	EEC604	Design of Electronic Systems	3	2	-	4	30	70	100
5	EEC605	Telecommunication Switching Systems	3	2	-	4	30	70	100
6	EHM601	Communication techniques	2	-	2	3	30	70	100

7	EEC652	Analog Integrated Electronics (Lab)	-	-	4	2	50	50	100
8	EEC653	Design of Electronic Systems (Lab)	-	-	4	2	50	50	100
9	EEC654	Antenna & Wave Propagation (lab)	-	-	4	2	50	50	100
10	EGP671	Discipline & General Proficiency	-	-		1	100	-	100
		Total	**17**	**10**	**14**	**30**	**430**	**570**	**1000**

Semester VII

S. No.	***Course Code***	***Subject***	***Periods***			***Credit***	***Evaluation Scheme***		
			L	***T***	***P***		***Internal***	***External***	***Total***
1	EEC701	Digital Instrumentation	3	2	-	4	30	70	100
2	EEC702	Digital Signal Processing	3	2	-	4	30	70	100
3	EEC703	Mobile & Cellular Communication	3	2	-	4	30	70	100
4	EHM701	Corporate Communication	2	-	2	3	30	70	100
Lab									
5	EEC751	Digital Instrumentation(Lab)	-	-	4	2	50	50	100
6	EEC752	Digital Signal Processing (Lab)	-	-	4	2	50	50	100
Elective I# – Select any one course									
7	EEC707	Embedded Systems	3	2	-	4	30	70	100
	ECS709	Artificial Intelligence							
Elective I# - Lab – Same as one selected from column above									
8	EEC753	Embedded Systems (Lab)	-	-	4	2	50	50	100
	ECS755	Artificial Intelligence (Lab)							
9	**Elective II# – Select any one course**								
	ECS714	Information Theory & Coding	3	2	-	4	30	70	100
	EEE703	Power Electronics and applications							
	ECS706	Data Base Management System							
Elective II # - Lab – Same as one selected from column above									
10	ECS757	Information Theory & Coding (Lab)	-	-	4	2	50	50	100
	EEE753	Power Electronics and applications (Lab)							
	ECS756	Data Base Management System (Lab)							
11	EEC791	Industrial Training & Presentation			-	4	50	50	100

12	EGP771	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**17**	**10**	**18**	**36**	**530**	**670**	**1200**

Lab and elective subject should be same.

Semester VIII

S. No.	*Course Code*	*Subject*	*Periods*			*Credit*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EEC801	VLSI Design & Technology	3	2	-	4	30	70	100
2	EEC802	Satellite Communication	3	2	-	4	30	70	100
3	EHM801	Industrial Sociology & Professional Ethics	2	2	-	3	30	70	100
4	EHM804	Principles of Management	3	2	-	4	30	70	100
Lab									
5	EEC851	VLSI Design & Technology (Lab)	-	-	4	2	50	50	100
Elective I# – Select any one course									
6	EEC803	Optical Fiber Communication	3	2	-	4	30	70	100
	EEC 804	Biomedical Instrumentation							
Elective I# - Lab – Same as one selected from column above									
7	EEC853	Optical Fiber Communication (Lab)	-	-	4	2	50	50	100
	EEC854	Biomedical Instrumentation (Lab)							
8	**Elective II# – Select any one course**								
	EEC805	Television & Consumer Electronics	3	2	-	4	30	70	100
	EEC806	Advance Microprocessor and Microcontroller							
9	EEC899	Project Work	-	-	6	6	50	50	100
10	EGP871	Discipline & General Proficiency	-	-		1	100	-	100
		Total	**17**	**12**	**14**	**34**	**430**	**570**	**1000**

Lab and elective subject should be same.

Semester I

ENGINEERING MATHEMATICS-I

Course Code: EAS101	L	T	P	C
	3	2	0	4

Objective:

- To familiarize the basic of matrix, Differential Calculus, Multiple Integrals, and Vector Calculus.
- To solve all problems related to matrix, calculus, and vectors.

Course Contents

Unit I

Matrices: Elementary row and column trans formation, Rank of matrix, Linear dependence, Consistency of linear system of equations, Characteristic equation, Caley- Hamilton Theorem, Eigen values and Eigen vectors, Diagonalisation, Complex and unitary matrices. **(Lectures 08)**

Unit II

Differential Calculus-I: Leibnitz theorem, Partial differentiation, Euler's theorem, Curve tracing, Change of variables, Expansion of function of several variables **(Lectures 08)**

Unit III

Differential Calculus–II: Jacobian, Approximation of errors, Extrema of functions of several variables, Lagrange's method of multipliers (Simple applications). **(Lectures 08)**

Unit IV

Multiple Integrals: Double and triple integral, Change of order, Change of variables, Beta and Gamma functions, Application to area, volume, Dirichlet integral and applications.

(Lectures 08)

Unit V

Vector Calculus: Point functions, Gradient, divergence and curl of a vector and their physical interpretations, Line, Surface and Volume integrals, Greens, Stokes and Gauss divergence theorem. **(Lectures 08)**

Text Books

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers.
2. Prasad C., *Engineering Mathematics for Engineers*, Prasad Mudralaya
3. Das H.K., Engineering Mathematics Vol-I, S. Chand, New Delhi

Reference Books

1. Kreyszig E., *Advanced Engineering Mathematics*, Wiley Eastern
2. Piskunov N, *Differential & Integral Calculus*, Moscow Peace Publishers.
3. Narayan Shanti, *A Text book of Matrices*, S. Chand
4. Bali N.P., Engineering Mathematics-I.

*** Latest editions of all the suggested books are recommended.**

Semester I/II
PHYSICS

Course Code: EAS102/EAS 202	L	T	P	C
	3	2	0	4

Objective:

- To understand the fundamentals of physics like interference, diffraction, lasers etc.

Course Contents

Unit I

Relativistic Mechanics: Inertial and Non- inertial Frames, Michelson-Morley Experiment, Postulates of Special Theory of Relativity, Galilean and Lorentz Transformation, Length Contraction and Time Dilation, Addition of Velocities, Mass Energy Equivalence and Variation of Mass with Velocity. **(Lectures 08)**

Unit II

Interference: Coherent Sources, Conditions of Interference, Fresnel's Biprism Experiment, Displacement of Fringes, Interference in Thin Films, Wedge Shaped Film, Newton's Rings.

Diffraction: Single and N-Slit Diffraction, Diffraction Grating, Rayleigh's criterion of resolution, Resolving Power of Telescope, Microscope and Grating. **(Lectures 08)**

Unit III

Polarization: Phenomenon of Double Refraction, Ordinary and Extra-ordinary Rays, Nicol Prism, Production and Analysis of Plane, Circularly and Elliptically Polarized Light, Fresnel Theory, Optical Activity, Specific Rotation, Polari meter.

Laser: Principle of Laser Action, Einstein's Coefficients, Construction and Working of He-Ne and Ruby Laser. **(Lectures 08)**

Unit IV

Electromagnetic: Ampere's Law and Displacement Current, Maxwell's Equations in Integral and Differential Forms, Electromagnetic Wave Propagation in Free Space and Conducting Media, Poynting Theorem. **(Lectures 08)**

Unit V

Magnetic Properties of Materials: Basic Concept of Para, Dia and Ferro-Magnetism, Langevin's Theory of Diamagnetism, Phenomenon of Hysteresis and Its Applications

X-Rays: Diffraction of X-Rays, Bragg's Law, Practical Applications of X-Rays, Compton Effect **(Lectures 08)**

Text Books

1. Malik K. H., Engineering Physics, TMH
2. Subramanyam N, Optics, TMH
3. Vasudeva A S, Engineering Physics, Vol I & II S. Chand.

Reference Book

1. Gupta S. K., Engineering Physics, Krishna Prakashan.
2. Yadav V. S., Engineering Physics, TMH.
3. Mehta Neeraj, Engineering Physics Vol. I & II, PHI

*** Latest editions of all the suggested books are recommended.**

Semester I/II
CHEMISTRY

Course Code: EAS103/EAS203

L	T	P	C
3	2	0	4

Objective:

- To understand the fundamentals of chemistry like Bonding, Pollution, Polymers, Water Chemistry, etc.

Course Contents

Unit I

Molecular theory of diatomic hetero-molecules, Band theory of bonding in metals, Hydrogen bonding.

Solid state Chemistry: Radius Ratio Rule, Space lattice (only cubes), Type of unit cell, Bragg's Law, Calculation of Density of unit cell. One & Two Dimensional solids, graphite as two dimensional solid and its conducting properties. Fullerene & its applications.

(Lectures 08)

Unit II

Introduction of Polymers: Structures of the following polymers, viz., Natural and synthetic rubbers, Polyamide and Polyester fibres, polymethylmethacrylate, poly acrylonitrile and polystyrene. A brief account of conducting polymers (polypyrrole & polytriphene) & their applications. Order & Molecularity of reactions. First & Second order reactions. Energy of activation. Phase Rule: Its application to one component system (Water). Equilibrium Potential, Introduction of electrochemical cells & Types: Galvanic & Concentration cells, Electrochemical theory of corrosion & protection of corrosion. **(Lectures 08)**

Unit III

Water Chemistry: Hardness of water, softening of water by Lime Soda Process & Reverse osmosis. Treatment of boiler feed water by Calgon process, Zeolites and ion-exchange resins. Classification of fuels, Coal, Biomass & Biogas. Determination of gross and net calorific values using Bomb Calorimeter. **(Lectures 08)**

Unit IV

Environmental pollution: Types of pollution & pollutants, Air Pollution. Formation and depletion of ozone, smog and Acid rain.

Toxic chemicals in Environment: Basic concepts, Brief idea about the environmental impact of toxic chemicals specially, CO, NxOx, SOx, O_3, Pesticides, Environmental Management

(Lectures 08)

Unit V

Lubricants: Introduction to lubricants, Mechanism of lubrication, Classification of lubricants, Flash and fire points, Selection of lubricants. **(Lectures 08)**

Text Books

1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
2. Morrison & Boy, *Organic Chemistry*
3. Lee I.D., *Inorganic Chemistry*
4. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books

1. Barrow, *Physical Chemistry*
2. Manahan, *Environmental Chemistry*

*** Latest editions of all the suggested books are recommended.**

Semester I/II
ENGINEERING MECHANICS

Course Code: EME101/EME201	L	T	P	C
	3	2	0	4

Objective:

- To study about mechanics, force system, torsion, beams, trusses, frames etc.

Course Contents

Unit I

Force system and Analysis: Basic concept: Laws of motion. Transfer of force to parallel position. Resultant of planer force system. Free Body Diagrams, Equilibrium and its equation.

Friction: Introduction, Laws of Coulomb, friction, Equilibrium of bodies involving dry fiction-Belt Friction. **(Lectures 08)**

Unit II

Structure Analysis: Beams; Introduction, Shear force and Bending Moment, shear force and Bending Moment Diagram for statically determinate beams.

Trusses: Introduction, Simple Trusses, Determination of Forces in simple trusses members, methods of joints and method of section. **(Lectures 08)**

Unit III

Centroid and Moment of Inertia:

Centroid of plane, curve, area, volume and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem, Perpendicular axes theorems, Principal Moment Inertia, Mass Moment of Inertia of Circular Ring, Disc, Cylinder, Sphere and Cone about their Axis of Symmetry.

(**Lectures 08)**

Unit IV

Stress and Strain Analysis: Simple stress and strain; Introduction, Normal shear stresses, stress-strain diagrams for ductile and brittle materials, Elastic constants, one dimensional loading of members of varying cross sections. **(Lectures 08)**

Unit V

Pure Bending of Beams: Introduction, Simple Bending theory, Stress in Beams of different cross sections.

Torsion: Introduction, Torsion of Shafts of circular section, Torque and Twist, Shear stress due to Torque. **(Lectures 08)**

Text Books

1. Bansal R. K., *Engineering Mechanics,* Laxmi Publications
2. Kumar D. S., *Engineering Mechanic,*
3. Kumar K. L., Kumar V., *Engineering Mechanics,* Tata McGraw Hill Publication
4. Khurmi R. S., *Engineering Mechanics,* S. Chand Publications

Reference Books

1. Shames, *Engineering Mechanics,* Prentice Hall of India Pvt. Ltd.
2. Ryder G. H., *Strength of Materials,* MACMILLAN Publishers India Ltd.
3. Ramamrutham s., *Strength of materials,* Dhanpat Rai Publications

*** Latest editions of all the suggested books are recommended.**

Semester I/II
MANUFACTURING SCIENCE

Course Code: EME102/EME202	L	T	P	C
	3	2	0	4

Objective:

- To create awareness among students about manufacturing process like casting, metal forming, welding etc.

Course Contents

Unit I

Basic Metals & Alloys: Properties and Applications, Properties of Materials: Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness, and hardness. Elementary ideas of fracture fatigue & creep. **(Lectures 08)**

Unit II

Introduction to Metal Forming & Casting Process and its applications.

Metal Forming: basic metal forming operations & uses of such as: Forgoing, Rolling, Wire & Tube-drawing/making and Extrusion, and its products/application. Press-work, die & punch assembly, cutting and forming, its application. Hot-working versus cold-working.

Casting: Pattern & allowance. Molding sands its desirable properties. Mould making with the use of core. Gating system, Casting defects & remedies. Cupola Furnace, Die-casting and its uses.

(Lectures 08)

Unit III

Introduction to machining & Welding and its applications.

Machining: basic principles of Lathe-machine and operations performed on it. Basic description of machines and operations of Shaper-Planner, Drilling, Milling & Grinding.

Welding: Importance & basic concepts of welding, classification of welding processes, Gas-welding, types of flames. Electric-Arc welding. Resistance welding, Soldering, & Brazing and its uses.

(Lectures 08)

Unit IV

Introduction & Orthographic Projection: Graphics as a tool to communicate ideas, Lettering and Dimensioning, Construction of geometrical figures like pentagon and hexagon. Principles of orthographic projections, Principal and auxiliary planes, first and third angle projections. Projection of points, Lines and solids. **(Lectures 08)**

Unit V

Principles of isometric projection, Isometric projection using box and offset methods.

(Lectures 08)

Text Books

1. Hajra & Bose, *Workshop Technology, Vol 1 & 2*, Roy Media Promoters
2. Bhatt, N.D., *Elementary Engineering Drawing*, Charothar Publishing

Reference Books

1. Raghuvanshi, B.S., *Workshop Technology, Vol 1 & 2*, Dhanpat Rai & Sons
2. Laxmi Narayan & Vaish W, *A Text Book of Practical Geometrical Drawing*

*** Latest editions of all the suggested books are recommended.**

Semester I/II
COMPUTER BASICS & 'C' PROGRAMMING

Course Code: ECS101/ECS201	L	T	P	C
	3	2	0	4

Objective:

- To know the basics of computers & C programming language.

Course Contents:

Unit I

Concepts in Computer Application: Definition of Electronic Computer, History, Generations, Characteristics and Application of Computers, Classification of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware.

Data and data types: definitions, data, data types: Integer, Character, Float, String, etc., Constants and Variable Declaration, Token, Keyboard, Identifier. **(Lectures 08)**

Unit II

Programming Language Classification & Computer Languages: Generation of Languages, Introduction to 4GLs. Translators: Assemblers, Compilers, Interpreters. Number System: Decimal, Octal, Binary and Hexadecimal &their Conversions. Various Code: BCD, ASCII and EBCDIC and Gray Code.

Operators and Expressions: Using numeric and relation operator, logical operator, bit operator, operator precedence and associativity. **(Lectures 08)**

Unit III

Internet and Web Technologies: Hypertext Markup Language, WWW, Gopher, FTP, Telnet, Web Browsers, Search Engines, Email.

Control Structure: while statement, if, else, Nested if else statement. Nested logic: for loop, do- while loop, loop inside a loop structure, Switch Statement. Use of break and default with switch.

(Lectures 08)

Unit IV

Concepts in Operating System: Elementary Concepts in Operating System, textual Vs GUI Interface.

Arrays: notation and representation, manipulating array elements, using multidimensional arrays.

(Lectures 08)

Unit V

Functions & Strings: definition, declaration, Call by Value, Call by Reference, returns values and their types. Function calls. **(Lectures 08)**

Text Books

1. Sinha P. K., Computer Fundamental
2. Yadav, DS, Foundations of IT, New Age, Delhi
3. Curtin, Information Technology: Breaking News, Tata Mc Graw Hill
4. Rajaraman, Introduction to Computers, Prentice-Hall India

Reference Books

1. Peter Nortans, Introduction to Computers, TME
2. Leon & Leon, Fundamental of Information Technology, Vikas Publishing
3. Kanter, Managing Information System,
4. CISTems, Internet: An Introduction, Tata McGraw Hill.

*** Latest editions of all the suggested books are recommended.**

Semester I/II
ENVIRONMENTAL SCIENCE

Course Code: EAS104/EAS204

L	T	P	C
3	2	0	4

Objective:

- To create awareness among students about environment protection.

Unit I

General: Definition, Scope, Segments of Environment and its Multidisciplinary Nature, Some Major Environmental Problems, Definition and Scope of Ecology. **(Lectures 08)**

Unit II

Ecology And Environment: Concept of an Ecosystem- its components and functions, Trophic Levels- Producer, Consumer and Decomposer, Energy Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and Ecological Pyramid. **(Lectures 08)**

Unit III

Air pollution: Various segments of Atmosphere and their Significance, Sources and Effects of Air Pollution, Classification of Air Pollutants, Stationary and Mobile Sources of Air Pollution, Photochemical Smog, Acid Rain, Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, El-Nino. **(Lectures 08)**

Unit IV

Water pollution: Water Resources of the Earth and Indian Scenario, Point and non-Point sources of Water Pollution, Treatment of Water Pollution, Eutrophication,
Bio-Diversity- Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Deforestation- causes and effects, Biogeographical Classification of India. **(Lectures 08)**

Unit V

Soil pollution:-Sources and Consequences, Noise, Thermal - sources and consequences, Sustainable Development, Dams and Reservoirs- Their Benefits and Problems, Solid Wastes - Pollution, Treatment & Disposal, Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation, Biological Magnification. **(Lectures 08)**

Text Books

1. De A.K., *Environmental Chemistry*, New Age Publishers Pvt. Ltd.
2. Masters, G.M., *Introduction to Environmental Engineering and Science*, Prentice Hall India Pvt. Ltd.
3. Odum, E.P., *Fundamentals of Ecology*, W. B. Sannders Co.

Reference Books

1. Bryant,P.J., *Biodiversity and Conservation*, Hypertext Book
2. Tewari, Khulbe & Tewari, *Textbook of Environment Studies*, I.K. Publication
3. Trivedi, R.K., *Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II*, Environment Media

*** Latest editions of all the suggested books are recommended.**

Semester I/II
BASIC ELECTRICAL ENGINEERING

Course Code: EEE101/EEE201

L	T	P	C
3	2	0	4

Objective

- To understand the fundamental concept of Electrical Engineering like DC Network, AC Network, Measuring Instruments, Energy Conversion Devices etc.

Course Contents

Unit I

D.C. Network Theory: Circuit theory concepts-Mesh and node analysis. Network Theorems- Super-position theorem. Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Star Delta transformation. **(Lectures 08)**

Unit II

Steady State Analysis of A.C. Circuits: Sinusoidal and phasor representation of voltage and current: single phase A.C. circuit behaviour of resistance, inductance and capacitance and their combination in series & parallel and power factor, series parallel resonance-band width and quality factor: magnetic circuit. **(Lectures 08)**

Unit III

Measuring Instruments: Construction and principles of operation of voltage and current measuring instruments; introduction to power and energy meters.

Three Phase A.C. Circuits: Star-Delta connections, line and phase voltage/current relations, three phase power and its measurement. **(Lectures 08)**

Unit IV

Transformer: Principles of operation, types of construction, phasor diagram, equivalent circuit, efficiency and voltage regulation of single phase transformer, O.C. and S.C. tests.

D.C. Machines: Principles of electromechanical energy conversion, types of D.C. machines, E.M.F. equation, Magnetization and load characteristics, losses and efficiency, Starter and speed control of D.C. Motors, their applications. **(Lectures 08)**

Unit V

Three phase induction Motor: Principle of operation, types and methods of starting, slip-torque characteristics, applications.

Synchronous Machines: Principle of Operation of Alternator and synchronous motor

Single phase Motors: Principle of operation and methods of starting of induction motor,

(Lectures 08)

Text Books

1. V. Del Toro, *Principles of Electrical Engineering*, Prentice-Hall International.
2. W.H. Hayt & J.E. Kemmerly, *Engineering Circuit Analysis*, McGraw Hill.

Reference Books

1. Nagrath I.J., *Basic Electrical Engineering*, Tata McGraw Hill.
2. Fitgerald A.E., D.E., Higginbotham and A Grabel, *Basic Electrical Engineering*, McGraw Hill.
3. Cotton H., *Advanced Electrical Technology*, Wheeler Publishing.

*** Latest editions of all the suggested books are recommended.**

Semester I/II
BASIC ELECTRONICS ENGINEERING

Course Code: EEC101/EEC201

L	T	P	C
3	2	0	4

Objective

- To understand the basic concept of Electronics Engineering like PN Junction, Bipolar Junction Transistor, Field Effect Transistor, Operational Amplifier etc.

Course Contents

Unit I

PN Junction: Properties of Elements, Crystal Structure, Energy band diagram , Introduction to PN-Junction, Depletion layer, V-I characteristics Diode Ratings (average current, peak-inverse voltage) p-n junction as rectifiers (half wave and full wave), filter, calculation of ripple factor and load regulation, clipping and clamping circuits. Zener diode and its application as shunt regulator.

(Lectures 08)

Unit II

Bipolar Junction Transistor (BJT): Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors, Fixed bias, emitter bias, potential divider bias, Graphical analysis of CE amplifier, concept of Voltage gain current gain, λ-parameter model (low frequency). Computation of Ai, Av, Ri , Ro of single transistor CE amplifier configuration. **(Lectures 08)**

Unit III

Field Effect Transistor (FET): Basic construction of JFET, Principle of working, concept of pinch-off maximum drain saturation current, input and transfer characteristics, Characteristics equation, CG, CS and CD Configuration, fixed and self biasing of JFET amplifier Introduction of MOSFET, Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.

(Lectures 08)

Unit IV

Operational Amplifier (Op-Amp): Concept of ideal operational amplifier, ideal and practical Op-Am parameters, inverting, non-inverting and unity gain configurations. Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator. **(Lectures 08)**

Unit V

Switching Theory: Number system, conversion of bases(decimal, binary, octal and hexadecimal numbers), Adder & Subtraction, BCD numbers, Seven Segment Display, Boolean Algebra, Logic gates, Concept of universal gates, Canonical forms, minimization using K-Map **(Lectures 08)**

Text Books

1. Robert Boylestad *Electronic Circuit and Devices*
2. Millman & Halkias, *Integrated Electronics*, McGraw Hill
3. Millman & Halkias, *Electronics Devices and Circuits*, McGraw Hill
4. Morris Mano M., *Digital Design*.

Reference Books

1. Sedra and Smith, *Microelectronic Circuits*
2. Gayakwad, R A, *Operational Amplifiers and Linear Integrated circuits*, PHI
3. Chattopadhyay D and P C Rakshit, *Electronics Fundamentals and Applications*, New Age International.

*** Latest editions of all the suggested books are recommended.**

Semester-I
FOUNDATION ENGLISH - I

Course code: EHM101
(Common with BPH105/BED105/BAL101/AR107/BHM101/BFS106/BCA106/BBA106/ BCH106/ BFA103)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Functional Grammar: Patterns & Parts of speech Subject, Predicate, Noun, Pronoun, Adjective, Adverb, Verb, Verb phrases, Conjunction, Interjection. **(10 Hours)**

Unit II

Vocabulary: Word formation, Prefix, Suffix, Compound words, Conversion, Synonyms, Antonyms, Homophones and Homonyms, How to look up a dictionary. **(10 Hours)**

Unit III

Communication: Meaning & importance of communication, Barriers to effective communication, Channels of communication, Language as a tool of communication. **(10 Hours)**

Unit IV

Requisites of Sentence writing: Fragmented sentences, A good sentence, expletives, Garbled sentences, Rambling sentences, Loaded sentences, Parallel Comparison, Squinting construction, Loose & periodic sentences. **(10 Hours)**

Text Books:

1. Martin & Wren - *High School English Grammar & Composition,* S.Chand & Co. Delhi.
2. Lewis Norman - *Word Power made easy,* W.R.Goyal. Publication & Distributors Delhi.
3. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
3. Rosen Blum M., *How to Build Better Vocabulary* – Bloomsbury Publication. London.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester I/II
PHYSICS (LAB)

Course Code: EAS151/EAS251

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. To determine the wavelength of Sodium light by Newton's rings.
2. To determine the wavelength of Sodium light by Fresnel's Biprism.
3. To determine the Specific Rotation of the Cane sugar solution with the help of Polari meter.
4. To determine the wavelength of the sodium light by Michelson's interferometer.
5. To study the PN junction characteristics.
6. To determine the high resistance by Leakage method.
7. To study the energy band gap by four probe method.
8. To study the variation of magnetic field using Stewart and Gee's apparatus.
9. To determine the frequency of A.C. mains by means of a Sonometer.
10. To study the Hall Effect.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

<table>
<tr><td colspan="3">PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)</td><td rowspan="2">ATTENDANCE (5 MARKS)</td><td rowspan="2">QUIZ (5 MARKS)</td><td rowspan="2">VIVA (10 MARKS)</td><td rowspan="2">TOTAL INTERNAL (50 MARKS)</td></tr>
<tr><td>EXPERIMENT (10 MARKS)</td><td>FILE WORK (10 MARKS)</td><td>VIVA (10 MARKS)</td></tr>
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External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I/II
CHEMISTRY (LAB)

Course Code: EAS152/EAS252

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. To determine total alkalinity in the given water sample.
2. To determine the temporary and permanent hardness in water sample using EDTA as standard solution.
3. To determine the available chlorine in bleaching powder solution.
4. To determine the chloride content in the given water sample by Mohr's method.
5. To determine the pH of the given solution using pH meter and pH-metric titration.
6. To determine the Equivalent weight of Iron by the chemical displacement method.
7. To determine the Viscosity of an addition polymer like polyester by Viscometer.
8. To determine the dissolved oxygen present in a water sample.
9. To prepare the Bakelite resin polymer.
10. To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer.
11. To determine the carbon dioxide content in polluted water sample.
12. To find chemical oxygen demand of waste water sample by potassium dichromate.
13. To determine the total hardness in water sample using complexometric method.
14. To determine the iron content in the given sample using external indicator.
15. To determine the strength of given HCL solution by titrating against N/10 Standard Sodium hydroxide solution.

Note: Minimum of 10 experiments has to be completed for completion of curriculum.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I/II
ENGINEERING MECHANICS (LAB)

Course Code: EME151/EME251

L	T	P	C
0	0	3	2

(Any 10 experiments of the following or such experiments suitably designed)

LIST OF EXPERIMENTS

1. To conduct the tensile test and determine the ultimate tensile strength, percentage elongation for a steel specimen.
2. To determine the compression test and determine the ultimate compressive strength for a specimen
3. To conduct the Impact-tests (Izod / Charpy) on Impact-testing machine to find the toughness.
4. To determine the hardness of the given specimen using Vicker/ Brinell/Rockwell hardness testing machine.
5. Friction experiment(s) on inclined plane and/or on screw-jack.
6. Worm & worm-wheel experiment for load lifting.
7. Torsion of rod/wire experiment.
8. Experiment on Trusses.
9. Study of 2-stroke and 4 -stroke I.C.E. models.
10. To determine the velocity ratio, mechanical advantage & efficiency of a single purchase crab apparatus & draw a graph of load vs. effort, mechanical advantage and efficiency.
11. To determine the velocity ratio, mechanical advantage & efficiency of a double purchase crab apparatus.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I/II
ENGINEERING DRAWING (LAB)

Course Code: EME152/EME252

L	T	P	C
0	0	3	2

Introduction: Graphics as a tool to communicate ideas, Lettering and' dimensioning, Construction of geometrical figures like pentagon and hexagon.

Orthographic Projection: Principles of orthographic projections, Principal and auxiliary planes, First and Third angle projections. Projection of points. Pictorial view.
Projection of lines parallel to both the planes. Parallel to one and inclined to other, Inclined to both the planes. Application to practical problems.
Projection of solid in simple position, Axis or slant edge inclined to one and parallel to other plane, Solids lying on a face or generator on a plane.
Sectioning of solids lying in various positions, True shape of the section.
Development of lateral surfaces, sheet metal drawing.

Isometric Projection: Principles of isometric projection, Isometric projection using box and offset methods.

Reference Books

1. Bhatt. N.D., *Elementary Engineering Drawing*, Charothar Publishing.
2. Laxmi Narayan V & Vaish W., *A Text Book of Practical Geometry on Geometrical Drawing*.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I/II
COMPUTER BASICS &'C' PROGRAMMING (LAB)

Course Code: ECS151/ECS251	L	T	P	C
	0	0	3	2

Course Contents

1. WAP to calculate Sum & average of N numbers.
2. WAP to convert integer arithmetic to a given number of day and month.
3. WAP to find maximum and minimum out of 3 numbers a, b & c.
4. WAP to find factorial of positive integer.
5. WAP to find sum of series up to n number, 2+5+8+……+n.
6. WAP to print all the number between 1 to 100 which are dividing by 7.
7. WAP to generate Fibonacci series up to n.
8. Write a function to calculate area of circle.
9. Write a recursive function to calculate factorial of given number.
10. WAP to find whether number is prime or not.
11. WAP to find that the enter character is a letter or digit.
12. WAP to find addition of two matrix of n*n order.
13. WAP to find multiplication of two matrix of n*n order.
14. WAP to add 6 digit numbers in even case & multiple 6 digit number in odd case.
15. WAP to find even or odd up to a given limit n.
16. WAP to find whether a given no is palindrome or not.
17. WAP to joining & Comparing the 2 string.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I/II
WORKSHOP PRACTICE (LAB)

Course Code: EME153/EME253

L	T	P	C
0	0	3	2

List of Experiments

Carpentry Shop:
1. Study of tools & operations and carpentry joints.
2. Simple exercise using jack plane.
3. To prepare half-lap corner joint, mortise & joints.
4. Simple exercise on woodworking lathe.

Fitting Bench Working Shop:
1. Study of tools & operations
2. Simple exercises involving fitting work.
3. Make perfect male-female joint.
4. Simple exercises involving drilling/tapping

Black Smithy Shop:
1. Study of tools & operations
2. Simple exercises based on black smithy operations such as upsetting, drawing down, punching, bending & swaging.

Welding Shop:
1. Study of tools & operations of Gas welding & Arc welding
2. Simple butt and Lap welded joints.
3. Oxy-acetylene flame cutting.

Sheet-metal Shop:
1. Study of tools & operations.
2. Making Funnel complete with 'soldering'.
3. Fabrication of tool-box, tray, electric panel box etc.

Machine Shop:
1. Study of machine tools and operations.
2. Plane turning.
3. Step turning
4. Taper turning.
5. Threading

Foundry Shop:
1. Study of tools & operations
2. Pattern making.
3. Mould making with the use of a core.
4. Casting

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I/II
BASIC ELECTRICAL ENGINEERING (LAB)

Course Code: EEE151/EEE251

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. To study the KCL & KVL.
2. To study the Super position theorem.
3. To study the Thevenin theorem.
4. To study the Norton's theorem.
5. To study the Maximum Power theorem.
6. To determine the efficiency of single phase transformer by load test.
7. To determine the external characteristics of DC Shunt generator.
8. Speed control of D.C Shunt Motor.
9. To measure the power in a 3- ø system by two-wattmeter method
10. To improve the power factor in an RLC circuit using capacitor.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I/II
BASICS ELECTRONICS ENGINEERING (LAB)

Course Code: EEC151/EEC251

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. V-I characteristics of P-N junction diode.
2. Application of diode as clipper and clamper.
3. Half wave & Full wave rectifier.
4. I/P & O/P characteristics of transistor in CB configuration.
5. I/P & O/P characteristics of transistor in CE configuration.
6. Verify the truth table of half adder & full adder.
7. OP-amp as inverting & non Inverting amplifier using IC 741.
8. OP-amp as differentiator & Integrator.
9. Zener diode as a Shunt Regulator.
10. Verify the truth table of logic gates.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester I
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP171/271/371/471/571/671/771/871

L	T	P	C
0	0	0	1

Guidelines

There shall be continuous evaluation of the students on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, talks by the invitees and special technical sessions organized from time to time.
4. Participation in community projects including NCC and NSS.
5. Exhibiting team spirit in different activities of the University and College organized from time to time.
6. Observance of rule &regulations in the College/University.
7. Behavior in hostel mess and hostel.
8. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
9. General behavior.

The above mentioned observational are an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation.

There shall be no external examination for this course; however the marks shall be included for calculation of Cumulative Performance Index (CPI).

Semester II
ENGINEERING MATHEMATICS- II

Course Code: EAS201

L	T	P	C
3	2	0	4

Objective:

- To familiarize the basic concept of Differential Equations, Laplace Transform, Fourier series and Partial Differential Equations etc.

Course Contents

Unit I

Differential Equations: Ordinary differential equations of first order, Exact differential equations, Linear differential equations of first order, Linear differential equations of nth order with constant coefficients, Complementary functions and particular integrals, Simultaneous linear differential equations, Solutions of second order differential equations by changing dependent and independent variables, Method of variation of parameters, Applications to engineering problems (without derivation). **(Lectures 08)**

Unit II

Series Solutions and Special Functions: Series solutions of ODE of 2nd order with variable coefficients with special emphasis to differential equations of Legendre, and Bessel. Legendre polynomials, Bessel's functions and their properties. **(Lectures 08)**

Unit III

Laplace Transform: Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step function. Diracth delta function, Laplace transform of periodic functions, Convolution theorem, Application to solve simple linear and simultaneous differential equations. **(Lectures 08)**

Unit IV

Fourier Series and Partial Differential Equations: Periodic functions, Trigonometric series, Fourier series of period 2p , Euler's formulae, Functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series.

Introduction of partial differential equations, Linear partial differential equations with constant coefficients of 2nd order and their classifications - parabolic, elliptic and hyperbolic with illustrative examples. **(Lectures 08)**

Unit V

Applications of Partial Differential Equations: Method of separation of variables for solving partial differential equations, Wave equation up to two dimensions, Laplace equation in two-dimensions, Heat conduction equations up to two-dimensions, Equations of transmission Lines. **(Lectures 08)**

Text Books

1. Grewal B.S., *Higher Engineering Engineering Mathematics*, Khanna Publishers.
2. Prasad C., *Engineering Mathematics for Engineers*, Prasad Mudralaya
3. Das H.K., Engineering Engineering Mathematics Vol-II, S. Chand, New Delhi

Reference Books

1. Kreyszig E., *Advanced Engineering Engineering Mathematics*, Wiley Eastern
2. Piskunov N, *Differential & Integral Calculus*, Moscow Peace Publishers.
3. Narayan Shanti, *A Text book of Matrices*, S. Chand
4. Bali N.P., Engineering Engineering Mathematics-II.

*** Latest editions of all the suggested books are recommended.**

Semester-II
FOUNDATION ENGLISH - II

Course code: EHM 201
(Common with BPH206/BBA206/BCA206/BHM201/AR207/BCH206/BFA203)

L	T	P	C
2	0	2	3

Unit I
Functional Grammar: Articles, Preposition, Tenses: Functions, Synthesis, Transformation, Spotting errors and correction of sentences. **(10 Hours)**

Unit II
Pre- Requisites of Technical written Communication: One word substitution, Spelling rules, Words often confused & misused, Phrases. **(10 Hours)**

Unit III
The Structure of sentences/ clauses: Adverb clause, Adjective clause, Noun clause. Sentences: Simple, Double, Multiple and complex, Transformation of sentences: simple to complex & vice versa, simple to compound & vice-versa, Interrogative to assertive & negative & vice-versa. **(10 Hours)**

Unit IV
Technical Communication: Nature, Origin and Development, Salient features, Scope & Significance, Forms of Technical Communication, Difference between Technical Communication & General writing, Objective Style vs. Literary Composition. **(10 Hours)**

Text-Books:
1. Wren & Martin, *High School English Grammar & Composition* – S. Chand & Co. Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.
4. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:
1. Horn A.S., *Guide to Patterns & Usage in English* – O.U.P. New Delhi.

NOTE:
This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester III
DIGITAL LOGIC & CIRCUITS

Course Code: EEC301

L	T	P	C
3	2	0	4

Objective:

- To understand the digital system and how the digital system has been developed.
- To study about the various logic families used to build up the digital system.

Unit 1 **(Lectures 08)**

Binary, Octal, Hexadecimal number systems and their inter-conversion, Binary Arithmetic (Addition, Subtraction, Multiplication and Division), Diminished radix and radix compliments, BCD codes, 8421 code, Excess-3 code, Gray code, error detection and correction, Hamming code.

Unit 2 **(Lectures 08)**

Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard forms, Digital Logic Gates. The map method, Two, Three, Four and Five variable maps, Sum of products and Product of Sums Simplification, NAND and NOR implementation, Ex-OR functions, The tabulation method, Determination of Prime implicants, Selection of Essential Prime implicants.

Unit 3 **(Lectures 08)**

Various Logic Families like TTL, IIL, DTL and ECL etc., working and their characteristics, MOS and CMOS devices. Binary adder and subtractor, Multiplexers, Decoders / Demultiplexers, Programmable Logic Arrays, Programmable Array Logic. Implementation of Combinatorial Logic using these devices.

Unit 4 **(Lectures 08)**

Introduction, S-R Flip-flops, JK flip-flop, D flip-flop, T flip-flop, master slave flip-flop. Flip-flop excitation table, Classification of sequential circuits, Registers, Counters, Sequence Detector and Sequence Generator.

Unit 5 **(Lectures 08)**

Introduction, Memory organization, Classification and characteristics of memories, Sequential memories, ROMs, R/W memories. Content addressable memories, Charged-Coupled device memory.

Text Books :

1.Godse A.P, *Switching Theory Technical Publication*.
1. M. Morris Mano*, Digital Design, Prentice Hall of India*.
2. Thomas Downs and Mark F Schulz, *Logic Design with Pascal, Van Nostrand Reinhold*.

Reference Books :

1. Digital principle and applications *Malvino and Leach- (TMH)*
2. Modern digital systems design Cheung (WPC)

Semester III

ENGINEERING MATHEMATICS –III

Course Code: EAS301

L	T	P	C
3	2	0	4

Objective

- To understand the basic of function of complex variables, Statistical Techniques, Numerical Technique etc.

Course Contents

Unit I **(Lectures 08)**

Function of Complex variable: Analytic function, C-R equations, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic function, Taylor's and Laurent's series, singularities, Residue theorem, Evaluation of real integrals of the type and 10

Unit II **(Lectures 08)**

Statistical Techniques – I: Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves etc., Correlation, Linear, non –linear and multiple regression analysis, Probability theory.

Unit III **(Lectures 08)**

Statistical Techniques – II: Binomial, Poisson and Normal distributions, Sampling theory (small and large), Tests of significations: Chisquare test, t-test, Analysis of variance (one way) , Application to engineering, medicine, agriculture etc. Time series and forecasting (moving and semi-averages), Statistical quality control methods, Control charts, R, p, np, and c charts.

Unit IV **(Lectures 08)**

Numerical Techniques – I: Zeroes of transcendental and polynomial equation using Bisection method, Regula-falsi method and Newton-Raphson method, Rate of convergence of above methods. Interpolation: Finite differences, difference tables, Newton's forward and backward interpolation , Lagrange's and Newton's divided difference formula for unequal intervals.

Unit V **(Lectures 08)**

Numerical Techniques –II: Solution of system of linear equations, Gauss- Seidal method, Crout method. Numerical differentiation, Numerical integration , Trapezoidal , Simpson's one third and three-eight rules, Solution of ordinary differential (first order, second order and simultaneous) equations by Euler's, Picard's and forth-order Runge-Kutta methods.

Text Books:

1. Peter V. O'Neil, *Advance Engineering Mathematics Thomson (Cengage) Learning*, 2007.
2. Das H.K., Engineering Mathematics Vol-III, S. Chand, New Delhi
3. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 2005.

Reference Books:

1. R.K. Jain & S.R.K. Iyenger, *Advance Engineering Mathematics*, Narosa Publication House, 2002.
2. Chandrika Prasad, *Advanced Engineering Mathematics for Engineers*, Prasad Mudralaya, 1996.
3. E. Kreysig, *Advanced Engineering Mathematics*, John Wiley & Sons, 2005.
4. Devi Prasad, *An introduction to Numerical Analysis*, Narosa Publication house, New Delhi 2006.
5. T. Veerajan & T. Ramchandrandran, *Theory & Problems in Numerical Methods*, TMH, New Delhi, 2004.
6. S.P.Gupta, *Statistical Methods*, Sultan and Sons, New Delhi, 2004.
7. Bali N.P., Engineering Mathematics-III.

Semester III
DISCRETE STRUCTURE

Course Code: ECS301

L	T	P	C
3	2	0	4

Objective: Discrete mathematics has become popular in recent decades because of its applications to computer science. Concepts and notations from discrete mathematics are useful in studying and describing objects and problems in computer algorithms and programming languages, and have applications in cryptography, automated theorem proving, and software development.

Unit I

Propositional Calculus: Propositions, Truth tables, Logical Equivalence, Logical implications, Algebra of propositions, Conditional propositions, Converse, Inverse, Contra-positive, Bi conditional statements, Negation of Compound statements, Tautologies and Contradiction, Normal Form, Arguments, Fallacies, Quantifiers, Mathematical Induction.

(Lectures 08)

Unit II

Boolean Algebra and Circuits: Boolean Algebra, Boolean Expression, Logic Gates, Logic Circuits, Boolean Functions, Sum of Product and Product of Sum Forms, Canonical Forms, Simplification of functions using K-Map.

(Lectures 08)

Unit III

Set Theory: Basic concepts of Set theory, some operations on sets, Venn diagram, Basic Set identities, Cartesian product. Relation Definition, Types of relation, Pictorial representation of relation, Composition of Relation, Equivalence relation. Function Definition, Classification of function, Types of function (one to one, many to one, into, onto, bijective), Composition of function, Inverse function, Identity function.

(Lectures 08)

Unit IV

Combinatorics: Fundamental principles, Permutation and Combination, Recurrence Relation, Generating Function, Binomial Theorem.

(Lectures 08)

Unit V

Graphs and Trees: Introduction to graphs, Graph terminology, Application of Graphs, Finite and Infinite graphs, Incidence and Degree, Isolated vertex, Pendent Vertex, and Null graph. Trees and their properties, Rooted and Binary trees, Tree traversal (Pre order, Post order, in order).

(Lectures 08)

Text Books

1. Rawool Vinay & Raul Bhakti, *Discrete Mathematics*, Tech Max Publication.
2. Sarkar Swapan Kumar, *Discrete Mathematics,* S Chand.
3. Deo Narsingh, *Graph Theory with Applications to Engineering and Comp. Sci.*, PHI.

Reference books

1. Lipchitz Seymour & Schaum Marc Lipson, *Discrete Mathematics*, Outline series TMH.
2. Liu C.L., *Elements of Discrete Mathematics*.
3. Dean Neville, *Essence of Discrete Mathematics*, Prentice Hall.
4. Rosen Kenneth H., *Discrete Mathematics and Its Applications*, McGraw Hill.
5. Johnsonbaugh Richard, *Discrete Mathematics*, Macmillan.

Semester III
INSTRUMENTS & MEASUREMENTS

Course Code: EEE302

L	T	P	C
3	2	0	4

Objective:

- To study Electrical Instruments like Ammeters, Voltmeters, Wattmeters, AC Potentiometer, CRO etc.

Course Contents

Unit I

Philosophy of Measurement: Methods of Measurement, Measurement System, Classification of instrument system, Characteristic of instrument & measurement system, Errors in Measurement & its Analysis, Standards. **(Lectures 08)**

Unit II

Analog Measurement of Electrical Quantities: Electrodynamic, Thermocouple Electrostatic & rectifier type Ammeters & Voltmeters, Electrodynamic Wattmeter, Three Phase Wattmeter, Power in three Phase System, Errors & remedies in Wattmeter and energy meter. (**Lectures 08)**

Unit III

Measurement of Parameter: Different methods of measuring low, medium and high resistances, Measurement of Inductance & Capacitance with the help of AC Bridge, Q Meter. (**Lectures 08)**

Unit IV

AC Potentiometer: Polar type & Co-ordinate type AC potentiometer, Application of AC Potentiometers in Electrical measurement.

Magnetic Measurement: Ballistic Galvanometer, Flux meter, Determination of Hysteresis loop, Measurement of iron losses. **(Lectures 08)**

Unit V

Digital Measurement of Electrical Quantities: Concept of digital Measurement, Block Diagram Study of digital voltmeter, frequency meter, power analyzer and harmonics analyzer; Electronic Multimeter.

Cathode Ray Oscilloscope: Basic CRO circuit (Block Diagram), Cathode ray tube (CRT) & its component, Application of CRO in measurement, Lissajous Pattern., Dual trace &dual beam Oscilloscope. (**Lectures 08)**

Text Book:

1. "*Electrical & Electronic Measurement & Instrument*", A.K. Sawhney, Dhanpat Rai & Sons, India.
2. "*Electrical Measurement & Measuring Instrument*", E.W. Golding & F.C. Widdis, A.W. Wheeler& Co. Pvt. Ltd. India.

Reference Books:

1. "*Electrical Measurement*", Forest K. Harries, Willey Eastern Pvt. Ltd. India.
2. *"Basic Electrical Measurement*" M.B. Stout, Prentice hall of India, India.
3. "*Electronic Instrument & Measurement Technique",* W.D. Cooper, prentice hall International.
4. "*Electrical Measurement &Measuring Instrument*", Rajendra Prashad, Khanna Publisher.
5. "*Electrical Measurements and Measuring Instruments*", J.B. Gupta S.K. Kataria & Sons.

Semester III
DATA STRUCTURE USING 'C'

Course Code: ECS-305

L	T	P	C
3	2	0	4

Objective: The objective of the paper is to give the practical knowledge and the concept of how the data is exactly stored in memory. It also gives knowledge to perform different operations on them using concept of C programming .This is the core technical paper of Computer science.

Course Contents

Unit I

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Ordered List, Sparse Matrices.

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. **(Lectures 08)**

Unit II

Queues

Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque, and Priority Queue.

Linked List: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Garbage Collection and Compaction. **(Lectures 08)**

Unit III

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm.

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions. **(Lectures 08)**

Unit IV

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting.

Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees. **(Lectures 08)**

Unit V

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons. **(Lectures 08)**

Text Books

1. Lipschutz , *Data Structure*, TMH
2. Tenenbaum etal A M, *Data Structures using C & C++*, PHI
3. Yashwant Kanitkar, *Data Structure using C++*.

Reference Books

1. Sahani and Horowitz, *Fundamentals of Data Structures*, Galgotia
2. Kruse etal R., *Data Structures and Program Design in C*, Pearson Education
3. Cormen T. H., *Introduction to Algorithms*, PHI
4. Loudon K., *Mastering Algorithms With C,* Shroff Publisher & Distributors
5. Bruno R Preiss, *Data Structures and Algorithms with Object Oriented Design Pattern in C++*, Jhon Wiley & Sons, Inc.

Semester-III
Professional Writing

Course code: EHM 301
(Common with BBA306/BCA305/BHM301/AR307/BCH306/BFA303)

L	T	P	C
2	0	2	3

Course Contents:

Unit I
Functional Grammar: Active and passive voice, Conditional sentences, Syntax, Concord, Common errors. **(10 Hours)**

Unit II
Requisites of Paragraph writing: Structure of Paragraph, Coherence & Unity, Development of paragraph, Inductive order, Deductive order, Spatial order, Linear, Chronological orders, Expository writing, and Argumentative writing, Factual description of objects, process, experiments. **(10 Hours)**

Unit III
Précis Writing: Techniques of Précis writing, Writing a précis. **(10 Hours)**

Unit IV
Comprehension skills: Role of listening, Reading comprehension; Reasons for poor comprehension, Improving comprehension skills. **(10 Hours)**

Text Books:
1. Ruther Ford A., *Basic Communication Skills* – Pearson Education, New Delhi.

References Books:
1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.

NOTE:
This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester III
DIGITAL LOGIC & CIRCUITS (LAB)

Course Code: EEC351

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1) Study of following combinational circuits: Multiplexer, Demultimplexer and Encoder. Verify truth tables of various logic functions.
2) Study of various combinational circuits based on: AND/NAND Logic blocks and OR/NOR Logic blocks.
3) To study various waveforms at different points of a transistor bistable multivibrator and its frequency variation with different parameters.
4) To design a frequency divider using IC-555 timer.
5) To study various types of registers and counters.
6) To study Schmitt trigger circuit.
7) To study transistor as table multi-vibrator.
8) Experimental study of characteristics of CMOS integrated circuits.
9) Interfacing of CMOS to TTL and TTL to CMOS.
10) BCD to binary conversion on digital IC trainer.
11) Testing of digital IC by automatic digital IC trainer.
12) To study OP-AMP as Current to Voltage & Voltage to Current converters & comparator.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Course Code: EEE352

L	T	P	C
0	0	4	2

Note: Minimum ten experiments should be performed from the following

LIST OF EXPERIMENTS

1. To calibrate the ammeter and voltmeter.
2. To measure the self inductance by Maxwell's Bridge.
3. To measure the self inductance by Hay's Bridge.
4. To measure the self inductance by Anderson's Bridge.
5. To measure the self inductance by Owen's Bridge.
6. To measure the self capacitance by Schering Bridge.
7. To measure the self capacitance by De-Saudy's Bridge.
8. To measure the low resistance by Kelvin's Double Bridge.
9. Study of storage oscilloscope and determination of transient response of RLC circuit.
10. Measurement of sine, triangular, square wave signal of function generator and verify its frequency at 100 Hz tap point using "labview" software.
11. Measurement of voltage and current signal of programmable power supply.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.
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Semester III
DATA STRUCTURE USING 'C' (LAB)

Course Code: ECS-355

L	T	P	C
0	0	4	2

Write Program in 'C' for following:

1. Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort.
2. Searching programs: Linear Search, Binary Search.
3. Array implementation of Stack, Queue, Circular Queue, Linked List.
4. Implementation of Stack, Queue, Circular Queue, Linked List using dynamic memory allocation.
5. Implementation of Binary tree.
6. Program for Tree Traversals (preorder, inorder, postorder).
7. Program for graph traversal (BFS, DFS).
8. Program for minimum cost spanning tree, shortest path.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester IV
Signal and Systems

Course Code: EEC401

L	T	P	C
3	2	0	4

Objective: To study about the properties and characteristics of signals, systems and their analysis.

Course Contents

Unit I **(Lectures 08)**

Signals: Definition, types of signals and their representations: continuous-time/discrete-time, periodic/non-periodic, even/odd, energy/power, deterministic/ random, one-dimensional/multi-dimensional; commonly used signals (in continuous-time as well as in discrete-time): unit impulse, unit step, unit ramp (and their inter-relationships), exponential, rectangular pulse, sinusoidal; operations on continuous-time and discrete-time signals (including transformations of independent variables).

Unit II **(Lectures 08)**

Laplace-Transform (LT) and Z-transform (ZT):

(i) One-sided LT of some common signals, important theorems and properties of LT, inverse LT, solutions of differential equations using LT, Bilateral LT, Regions of convergence (ROC)
(ii) One sided and Bilateral Z-transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using one-sided ZT, s- to z-plane mapping.

Unit III **(Lectures 08)**

Fourier Transforms (FT):

(i) Definition, conditions of existence of FT, properties, magnitude and phase spectra, Some important FT theorems, Parseval's theorem, Inverse FT, relation between LT and FT.
(ii) Discrete time Fourier transform (DTFT), inverse DTFT, convergence, properties and theorems, Comparison between continuous time FT and DTFT.

Unit IV **(Lectures 08)**

Systems: Classification, linearity, time-invariance and causality, impulse response, characterization of linear time-invariant (LTI) systems, unit sample response, convolution summation, step response of discrete time systems, stability.
convolution integral, co-relations, signal energy and energy spectral density, signal power and power spectral density, properties of power spectral density.

Unit V **(Lectures 08)**

Time and frequency domain analysis of systems

Analysis of first order and second order systems, continuous-time (CT) system analysis using LT, system functions of CT systems, poles and zeros, block diagram representations; discrete-time system functions, block diagram representation, illustration of the concepts of system bandwidth and rise time through the analysis of a first order CT low pass filter.

Text Book:

1. P. Ramakrishna Rao, *"Signal and Systems"*, 2008 Edn., Tata MGH, New Delhi

Reference Books:

1. Chi-Tsong Chen, `*Signals and Systems'*, 3rd Edition, Oxford University Press, 2004
2. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, "*signals & System"*, PEARSON Education, Second Edition, 2003.

Semester IV
NETWORK ANALYSIS AND SYNTHESIS

Course Code: EEE404

L	T	P	C
3	2	0	4

Objective:

- To gain the knowledge about Network Theorems, Network Functions, filters etc.

Course Contents

Unit I **(Lectures 08)**

Graph Theory: Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Node methods of analysis.

Unit II **(Lectures 08)**

Network Theorems (Applications to ac networks): Super-position theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Reciprocity theorem. Millman's theorem, compensation theorem, Tellegen's theorem.

Unit III **(Lectures 08)**

Network Functions: Concept of Complex frequency, Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot, frequency response and Bode plots.

Unit IV **(Lectures 08)**

Two Port Networks: Characterization of LTI two port networks ZY, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks, T & π Representation.

Unit V **(Lectures 08)**

Network Synthesis: Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.

Filters: Image parameters and characteristics impedance, passive and active filter fundamentals, low pass, high pass, band pass, band elimination filters.

Text Books:

1. "*Network Analysis*", M.E. Van Valkenburg, Prentice Hall of India
2. "*Networks and Systems",* D.Roy Choudhary, Wiley Eastern Ltd.
3. "*An Introduction to Circuit analysis: A System Approach*", Donald E. Scott : McGraw Hill Book Company.
4. "*Circuit Theory*", A.Chakrabarti, Dhanpat Rai & Co.

Reference Books:

1. "*An Introduction to Modern Network Synthesis*", M.E. Van Valkenburg, Wiley Eastern Ltd.
2. "*Engineering Circuit analysis*", W.H. Hayt & Jack E-Kemmerly, Tata McGraw Hill.
3. "*Circuit Analysis*", Soni, Gupta, Dhanpat Rai & Sons.

Semester IV
ELECTRONIC DEVICES AND CIRCUITS

Course Code: EEC404

L	T	P	C
3	2	0	4

Objective:

- To know about the Electronic Devices like Diodes, Light Emitting Diodes (LED), Liquid Crystal Display (LCD), Junction Field Effect Transistor (JFET), Metal Oxide Semi Conductor Field Effect Transistor (MOSFET) etc.

Course Contents

Unit I **(Lectures 08)**

Electron Dynamics and Properties: Motion of charged particles in electric and magnetic fields. Simple problems involving electric and magnetic fields only. Electrostatic and magnetic focusing. Principles of CRT deflection sensitivity (Electrostatic and magnetic deflection), Parallel Electric and Magnetic fields, Perpendicular Electric and Magnetic fields.

Unit II **(Lectures 08)**

Junction diode characteristics: Mass Action Law, Continuity Equation, Hall Effect, Fermi level in intrinsic and extrinsic semiconductors, Open-circuited p-n junction, The p-n junction Energy band diagram of PN diode, PN diode as as a rectifier (forward bias and reverse bias), Law of junction, Diode equation, Volt-ampere characteristics of p-n diode, Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Step graded junction, Breakdown Mechanisms in Semi Conductor (Avalanche and Zener breakdown) Diodes, Zener diode characteristics, Characteristics of Tunnel Diode with the help of energy band diagrams, Varactar Diode, LED, LCD. And photo diode.

Unit III **(Lectures 08)**

Rectifiers, filters and regulators: Half wave rectifier, ripple factor, full wave rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- ?section filter, P- section filter Multiple L- section and Multiple Psection filter, and comparison of various filter circuits? In terms of ripple factors, Simple circuit of a regulator using zener diode, Series and Shunt voltage regulators.

Unit IV **(Lectures 08)**

Transistor and fet characteristics: Junction transistor, Transistor current components, Transistor as an amplifier, Transistor construction, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha and Beta, JFET characteristics (Qualitative and Quantitative discussion), Small signal model of JFET, MOSFET characterisitics (Enhancement and depletion mode), Symbols of MOSFET, Comparison of Transistors, Introduction to SCR and UJT.

Unit V **(Lectures 08)**

Amplifiers: Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of AI, Ri , Av , Ro, FEEDBACK AMPLIFIERS: Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on input and output characteristics, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components and their analysis.

Oscillators: Condition for oscillations. RC-phase shift oscillators with Transistor and FET, Hartley and Colpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of oscillators,

Text Books:

1. "*Electronic Devices and Circuits*", J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2007.
2. "*Electronic Devices and Circuits*", R.L. Boylestad and Louis Nashelsky, Pearson, Prentice Hall, 2006.

Reference Books:

1. *"Electronic Devices and Circuits*", T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 2004.
2. "*Principles of Electronic Circuits*", S.G.Burns and P.R.Bond, Galgotia Publications, 1998.
3. "*Microelectronics*", Millman and Grabel, Tata McGraw Hill, 1988.
4. "*Electronic Devices and Circuits*", Dr. K. Lal Kishore, B.S. Publications, 2005.
5. *"Electronic Devices and Circuits*", Prof GS N Raju I K International Publishing House Pvt. Ltd. 2006

Semester IV
ANALOG COMMUNICATION SYSTEM

Course Code: EEC405

L	T	P	C
3	2	0	4

Objective: To study about the different types of communication systems.

Course Contents

Unit I **(Lectures 08)**

Introduction: Overview of Communication system, Communication channels, Need for modulation, Baseband and Pass band signals, Amplitude Modulation: Double side band with Carrier (DSB-C), Double side band without Carrier, Single Side Band Modulation, DSB-SC, DSB-C, SSB Modulators and Demodulators, Vestigial Side Band (VSB, Radio Transmitter and Receiver.

Unit II **(Lectures 08)**

Angle Modulation, Tone Modulated FM Signal, Arbitrary Modulated FM, Signal, FM Modulators and Demodulators, Approximately Compatible SSB Systems, Stereophonic FM Broadcasting

Unit III **(Lectures 08)**

Noise in Amplitude Modulation: Analysis, Signal to Noise Ratio, Figure of Merit, Noise in various AM systems, threshold effect in AM, Noise in AM system- small noise case and large noise case.

Unit IV **(Lectures 08)**

Noise in Frequency Modulation: noise performance of FM compared to AM, Phasor representation of FM noise, Pre emphasis ,De Emphasis and SNR Improvement, Phase Locked Loops , capture effect, threshold improvement in discriminators,

Unit V **(Lectures 08)**

Pulse Modulation Digital Transmission of Analog Signals: Sampling Theorem , and its applications, Pulse Amplitude Modulation (PAM), Pulse Width Modulation, Pulse Position Modulation. Their generation and Demodulation, Digital Representation of Analog Signals, Time Division Multiplexing, Line Coding and their Power Spectral density

Text Books:

1. "Communication Systems", Simon Haykin, John Wiley & Sons 4th Edition
2. "Electronic Communication Systems", G.Kennedy and B. Davis, Tata McGraw Hill
3. "Digital Communications", Simon Haykin, John Wiley & Sons

Reference Books:

1. "Modern Analog & Digital Communication Systems", B.P. Lthi, Oxford University Press.
2. "Communication System: Analog and Digital", Taub & Schilling, Tata Mc Graw Hill
3. "Communication Systems Analog and Digital", R.P.Singh & S.D. Sapre, Tata McGraw Hill.

Semester IV
ELECTROMAGNETIC FIELD THEORY

Course Code: EEC406

L	T	P	C
3	2	0	4

Objective:

- To study about Electromagnetic Field Theory Comprising of Electrostatics, Electrodynamics, Magneto Statics etc.

Unit-I **(Lectures 08)**

Coordinate systems and transformation: Cartesian coordinates, circular cylindrical coordinates, spherical coordinates Vector calculus: Differential length, area and volume, line surface and volume integrals, del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stoke's theorem, Laplacian of a scalar.

Unit-II **(Lectures 08)**

Electrostatics: Electrostatic fields, Coulombs law and field intensity, Electric field due to charge distribution, Electric flux density, Gausses's Law – Maxwell's equation, Electric dipole and flux lines, energy density in electrostatic fields.

Electric field in material space: Properties of materials, convection and conduction currents, conductors, polarization in dielectrics, dielectric constants, continuity equation and relaxation time, boundary condition.

Electrostatic boundary value problems: Poission's and Laplace's equations, general procedures for soling Poission's or Laplace's equations, resistance and capacitance, method of images.

Unit-III **(Lectures 08)**

Magneto-statics: Magneto-static fields, Biot-Savart's Law, Ampere's circuit law, Maxwell's equation, application of ampere's law, magnetic flux density, Maxwell's equation, Maxwell's equation for static fields, magnetic scalar and vector potential. Magnetic forces, materials and devices: Forces due to magnetic field, magnetic torque and moment, a magnetic dipole, magnetization in materials, magnetic boundary conditions, inductors and inductances, magnetic energy.

Unit-IV **(Lectures 08)**

Waves and applications: Maxwell's equation, Faraday's Law, transformer and motional electromotive forces, Displacement current, Maxwell's equation in final form.

Electromagnetic wave propagation: Wave propagation in lossy dielectrics, plane waves in lossless dielectrics, plane wave in free space, plain waves in good conductors, power and the pointing vector, reflection of a plain wave in a normal incidence.

Unit-V **(Lectures 08)**

Transmission lines: Transmission line parameters, Transmission line equations, input impedance, standing wave ratio and power, The Smith chart, Some applications of transmission lines.

Text books :

1. E.C.*Jordan*, K.G. *Balmain*: "E.M.Waves & Radiating Systems", Pearson Education, 2006

2. Engineering ,William H. Hayt, John A. Buck McGraw-Hill Publishing Co.; 6th Edition edition (July 1, 2001)

Reference Book:

1. Kaduskar, Principles of Electromagnetics, Wiley India

2. IDA, Engineering Electromagnetics, Springer

3.Kodali, Engineering Electromagnetic Compatability, John Wiley & sons

Semester-IV
Technical Communication

Course code: EHM 401
(Common with BPH406/BBA406/BCA406/BHM401/BCH406/BFA403)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Communication: Objectives of Communication, Need for Communication, Types of communication, written & Verbal communication, Formal and informal communication (The grapevine), upward and downward communication. **(10 Hours)**

Unit II

Business communication: Importance of written business correspondence, General principles and essentials of good commercial correspondence, Different types of commercial correspondence & their drafting, Types of Business letters, Official letters, electronic communication process. **(10 Hours)**

Unit III

Project, Thesis and Dissertation writing: Project Report, Thesis & Dissertation writing Structure of Thesis writing. **(10 Hours)**

Unit IV

Modern Technology and Communication: Globalization of Business, Role of Information Technology, Tele- communication, Internet, Tele-conferencing and Video-conferencing. **(10 Hours)**

Text Books:

1. Mishra Sunita & Muraliksishra C., *Communication Skills for Engineers* – Pearson Education, New Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Chabbra T N, Business Communication, Sun India Pub. New Delhi.

Reference Books:

1. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
2. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester IV
NETWORK ANALYSIS & SYNTHESIS (LAB)

Course Code: EEE453

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

Note: Minimum eight experiments are to be performed from the following list.

1. Verification of principle of superposition with DC and AC sources.
2. Verification of Thevenin's Theorems with DC & AC sources.
3. Verification of Norton's Theorems with DC & AC sources.
4. Verification of Maximum power transfer theorems in DC & AC circuits.
5. Verification of Tellegin's theorem for two networks of the same topology.
6. Determination of transient response of current in RL and RC circuits with step voltage input critically damped and over damped cases.
7. Determination of frequency response of Voltage/Current in RLC circuit with sinusoidal AC input Signal.
8. Study loading effect in the cascade connected Networks.
9. Determination of frequency response of a Twin – T notch filter.
10. To determine attenuation characteristics of a low pass/high pass active filters.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Semester IV

ELECTRONIC DEVICES & CIRCUITS (LAB)

Course Code: EEC452

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note: Select any 10 out of the following:

1. **Study of lab equipments and components:** CRO, Multimeter, Function Generator, Power supply- Active, Passive Components & Bread Board.
2. **Properties of junctions** Zener diode characteristics. Heavy doping alters the reverse characteristics. Graphical measurement of forward and reverse resistance.
3. **Characteristic of BJT**: BJT in CB and CE configuration- Graphical measurement of h parameters from input and output characteristics. Measurement of A_v, A_I, R_o and R_i of CE amplifier with potential divider biasing.
4. **Characteristic of FET**: FET in common source configuration. Graphical measurement of its parameters gm, rd & m from input and output characteristics.
5. **Applications of Op-amp**- Op-amp as summing amplifier, Difference amplifier, Integrator and differentiator
6. **Field Effect Transistors**-Single stage Common source FET amplifier –plot of gain in dB Vs frequency, measurement of, bandwidth, input impedance, maximum signal handling capacity (MSHC) of an amplifier
7. **Bipolar Transistors**- Design of single stage RC coupled amplifier –design of DC biasing circuit using potential divider arrangement –Plot of frequency vs gain in dB. Measurement of bandwidth of an amplifier, input impedance and Maximum Signal Handling Capacity of an amplifier.
8. **Two stage Amplifier**. Plot of frequency vs gain. Estimation of Q factor, bandwidth of an amplifier
9. **Common Collector Configuration-Emitter Follower** (using Darlington pair)-Gain and input impedance measurement of the circuit.
10. **Power Amplifiers**-Push pull amplifier in class B mode of operation –measurement of gain.
11. **Differential Amplifier** –Implementation of transistor differential amplifier .Non ideal characteristics of differential amplifier
12. **Oscillators** -Sinusoidal Oscillators- (a) Wein bridge oscillator (b) phase shift oscillator
13. **Simulation of Amplifier** circuits studied in the lab using any available simulation software and measurement of bandwidth and other parameters with the help of simulation software.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester IV
ANALOG COMMUNICATION SYSTEM (LAB)

Course Code: EEC453

L	T	P	C
0	0	4	2

1. To study Amplitude modulation using transistor and determine depth of modulation.
2. To develop detector for demodulation of AM signal and observe diagonal peak clipping effect
3. Frequency modulation using voltage controlled oscillator.
4. Generation of DSB- SC signal using balanced modulator.
5. Generation of side band signal.
6. Study of phase lock loop and detection of FM signal using PLL.
7. Measurement of noise figure using a noise generator.
8. Study of super heterodyne AM receiver and measurement of sensitivity, selectivity and fidelity.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

<table>
<tr><td colspan="3">PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)</td><td rowspan="2">ATTENDANCE (5 MARKS)</td><td rowspan="2">QUIZ (5 MARKS)</td><td rowspan="2">VIVA (10 MARKS)</td><td rowspan="2">TOTAL INTERNAL (50 MARKS)</td></tr>
<tr><td>EXPERIMENT (10 MARKS)</td><td>FILE WORK (10 MARKS)</td><td>VIVA (10 MARKS)</td></tr>
</table>

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
CONTROL SYSTEM

Course Code: EEE501

L	T	P	C
3	2	0	4

Objective:

- To know about the open and closed loop Control Systems.
- To understand the Time Response Analysis, Frequency Response Analysis and Control System component etc.

Course Contents

Unit I **(Lectures 08)**

The Control System: Open loop & closed control; servomechanism, Physical examples. Transfer functions, Block diagram algebra, Signal flow graph, Mason's gain formula Reduction of parameter variation and effects of disturbance by using negative feedback.

Unit II **(Lectures 08)**

Time Response analysis: Standard test signals, time response of first and second order systems, time response specifications, steady state errors and error constants. Design specifications of second order systems: Derivative error, derivative output, integral error and PID compensations, design considerations for higher order systems, performance indices.

Unit III **(Lectures 08)**

Control System Components: Constructional and working concept of AC servomotor, synchronous and stepper motor. Stability an Algebraic Criteria concept of stability and necessary conditions, Routh- Hurwitz criteria and limitations Root Locus Technique: The root locus concepts, construction of root loci.

Unit IV **(Lectures 08)**

Frequency response Analysis: Frequency response, correlation between time and frequency responses, polar and inverse polar plots, Bode plots. Stability in Frequency Domain: Nyquist stability criterion, assessment of relative stability: gain margin and phase margin, constant M&N circles.

Unit V **(Lectures 08)**

Introduction to Design: The design problem and preliminary considerations lead, lag and lead-lag networks, design of closed loop systems using compensation techniques in time domain and frequency domain.

Review of state variable technique: Review of state variable technique, conversion of state variable model to transfer function model and vice-versa, diagonalization, Controllability and observability and their testing.

Text Book:

1. "*Control System Engineering*", Nagrath & Gopal, New age International.
2. "*Modern Control Engineering*", K. Ogata, Prentice Hall of India.

Reference Books:

1. "*Control System Engineering*", Norman S. Mise, Wiley Publishing Co.
2. "*Control System; Principle and design*", M.Gopal, Tata McGraw Hill.
3. *"Modern Control system*", M.Gopal, Tata McGraw Hill.

Semester V
MICROPROCESSORS & APPLICATIONS

Course Code: EEC501

L	T	P	C
3	2	0	4

Objective

- To study about the Microprocessor and it is Peripheral Interfacing.

Course Contents

Unit I **(Lectures 08)**

Introduction to Microprocessor: 8085 Evolution of Microprocessor, Register Structure, ALU, Bus Organization, Timing and Control, instruction set. Architecture of 16-bit Microprocessors: Architecture of 8086; (Bus Interface Unit, Execution unit) Register Organization, Bus operation, Memory segmentation.

Unit II **(Lectures 08)**

Assembly Language Programming: Addressing Modes and instruction set of 8086, Arithmetic and Logic instructions, Program Control Instructions (jumps, conditional jumps, subroutine call) Loop and string instructions, Assembler Directives.

Unit III **(Lectures 08)**

CPU Module: Signal Description of pins of 8086 and 8088, Clock generator, Address and Data bus Demultiplexing, Buffering Memory Organization, Read and Write cycle Timings, Interrupt Structures, Minimum Mode, and Maximum Mode Operation.

Unit IV **(Lectures 08)**

Peripheral Interfacing: Programmed I/O, Interrupt Driven, I/O, DMA, Parallel I/O, (8255-PPI, Parallel port), 8253/8254 programmable Timer/Counter Interfacing with ADC.

Unit V **(Lectures 08)**

Peripheral Interfacing (Contd.): 8259 Programmable Interrupt controller, 8237 DMA controller Concept of Advanced 32 bit Microprocessors: Pentium Processor.

Text Books:

1. "*Microprocessor Architecture, Programming, and Applications with the 8085*", Gaonkar, Ramesh S., Pen Ram International Publishing.
2. "*Advanced Microprocessors and Peripherals: Architecture Programming and Interfacing*", Ray, A.K. & Burchandi, K.M. Tata McGraw Hill.
3. "*Microprocessors Interfacing",* Hall D.V., Tata McGraw Hill.
4. *"Microprocessors and Microcontrollers*", B.P. Singh & Renu Singh, New Age International.

Reference Books:

1. "*Microcomputer Systems: The 8086/8088 Family*", Liu and Gibson G.A., Prentice Hall (India).
2. "*INTEL microprocessors*", Brey, Barry B., Prentice Hall (India).
3. "*Advanced Microprocessor & Interfacing*", Ram B., Tata McGraw Hill.
4. "*Microprocessors and Interfacing & Application*s", Renu Singh & B.P. Singh, New Age International.

Semester V
MICROWAVE ENGINEERING

Course Code: EEC502

L	T	P	C
3	2	0	4

Objective: To understand the operation of microwave sources, amplifiers and transmission lines and analysis of microwave components.

Course Contents

Unit 1 **(8 Lectures)**

Limitations of the conventional tubes, frequency allocations and frequency plans, letter designation for microwave bands**.** Klystrons, Two and multi cavity klystron, reflex klystron amplifiers and oscillators, TWT, backward wave oscillators, Magnetrons, the MASER (Microwave Amplification By Stimulated Emission of Radiations).

Unit 2 **(8 Lectures)**

Gunn diode and its modes of operation, Avalanche diode, Tunnel diode, Schottky diode, Backward diode, Varactor diodes, Step recovery diode, PIN diode, their principles, operation and applications.

Unit 3 **(8 Lectures)**

Rectangular wave guide of its mathematical analysis, circular wave guide, modes of propagation, dominant modes, cut off wave length scattering matrix of microwave junction, properties of scattering matrix of loss-less junction, cavity resonators, E-plane tee, Hplane tee, magic tee, phase shifters, attenuators, directional couplers, ferrite devices, Faraday rotation, gyrator, isolator, circulators, detector.

Unit 4 **(8 Lectures)**

Measurement of standing wave ratio, Measurement of frequency, Measurement of power, phase shift, attenuation, VSWR, Impedance measurement. Antenna pattern measurement.

Unit 5 **(8 Lectures)**

Introduction, Micro strip lines, parallel strip lines, coplanar strip lines, shielded strip lines, characteristic impedance of micro strip lines, losses in micro strip lines, quality factor of micro strip lines.

Text Books

1. Foundations for microwave engineering, international student edition, R E.Collins
2. Microwave devices and circuits '3rd edition' Samuel Y Liao.
3. Microwave Engineering by A Dass and S K Dass
4. Microwave by K.C.Gupta
5. Microwave engineering Rajeswari Chatterjee
6. D. Pozar - Microwave Engineering , John Wiley

Semester V
LINEAR INTEGRATED CIRCUITS

Course Code: EEC503

L	T	P	C
3	2	0	4

Objective: To learn about the circuits, transistors, amplifiers, etc.

Course Contents

Unit I **(Lectures 08)**

BJT differential amplifier analysis - concept of CMRR - methods to improve CMRR - constant current source - active load - current mirror - Darlington pair - differential input impedance - various stages of an operational amplifier - simplified schematic circuit of Opamp 741 - need for compensation - lead, lag and lead lag compensation schemes - typical Opamp parameters - slew rate - power supply rejection ratio - open loop gain - unity gain bandwidth - offset current & offset voltage.

Unit II **(Lectures 08)**

MOS differential amplifier – current mirrors - current source load and cascode loads – wide swing constant transconductance differential amplifier - CMOS Opamp with and without compensation - cascode input Opamp - typical CMOS Opamp parameters

Unit III **(Lectures 08)**

Linear opamp circuits - inverting and noninverting configurations - analysis for closed loop gain - input and output impedances - virtual short concept - current to voltage and voltage to current converters - instrumentation amplifier - nonlinear Opamp circuits - log and antilog amplifiers - 4 quadrant multipliers and dividers - phase shift and wein bridge oscillators - comparators - astable and monostable circuits - linear sweep circuits

Unit IV **(Lectures 08)**

Butterworth approximation to ideal low pass filter characteristics – features of Chebychev and Bessel approximations - frequency transformations to obtain HPF, BPF and BEF from normalized prototype LPF – Realization of LPF & HPF using Sallen-Key configuration – BPF realization using the Delyannis configuration - BEF using twin T configuration - all pass filter (first & second orders) realizations - inductance simulation using Antoniou's gyrator.

Text books:

1. "*CMOS- Circuit Design, Layout & Simulation*", Jacob Baker R., Li H.W. & Boyce D.E., PHI
2. "*Design with Operational Amplifiers and Analog Integrated Circuits*", Sergio Franco, McGraw Hill Book Company
3. "*Operational Amplifiers and Linear Integrated Circuits"*, Fiore J.M., Jaico Publishing House

Reference books:

1. "*Principles of Active Network Synthesis & Design*", Gobind Daryanani, John Wiley
2. "*Microelectronic Circuits*", Sedra A.S. & Smith K.C., Oxford University Press
3. "*Operational Amplifiers and Linear Integrated Circuits*", Coughlin R.F. & Driscoll F.F., Pearson Education
4. "*Microelectronic Circuits & Devices",* Horenstein M.N., PHI
5. "*Operational Amplifiers*", Gaykward, Pearson Education

Semester V

DIGITAL COMMUNICATION SYSTEM

Course Code: EEC504

L	T	P	C
3	2	0	4

Objective: the objective behind this subject is to get knowledge about modulation & coding

Course Contents

Unit I **(Lectures 08)**

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Compading in PCM systems. Differential PCM systems (DPCM).

Unit II **(Lectures 08)**

Delta Modulation: Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

Unit III **(Lectures 08)**

Digital Modulation Techniques: Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

Data Transmission: Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK.

Unit IV **(Lectures 08)**

Information Theory: Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties.

Unit V **(Lectures 08)**

Source Coding: Introductions, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

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.

Text Books:

1. "*Digital communications*", Simon Haykin, John Wiley, 2005
2. "*Principles of Communication Systems*", H. Taub and D. Schilling, TMH, 2003

Reference Books:

1. "*Digital and Analog Communication Systems*", Sam Shanmugam, John Wiley, 2005.
2. "*Digital Communications*", John Proakis, TMH, 1983.
3. "*Communication Systems Analog & Digital*", Singh & Sapre, TMH, 2004.
4. "*Modern Analog and Digital Communication*", B.P.Lathi, Oxford reprint, 2004

Semester-V
Technical Writing

Course code: EHM 501
(Common with BPH506/BHM501)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Forms of Technical Communication: Report writing, Definition and characteristics, Steps towards report writing, Structure, style of Report writing, Types & forms of Reports, Presentation of Reports, Importance of Report writing. **(10 Hours)**

Unit II

Technical Paper writing: Definition and purpose, Essentials of a good technical paper/Article, Scientific Article writing, Difference between Technical paper/Article and scientific article, Methods of writing technical paper & Scientific article. **(10 Hours)**

Unit III

Technical Proposal: Definition and meaning of Technical Proposal, Significance of Proposal, Characteristics of a good Proposal, Format of Proposal, Uses of Proposals. **(10 Hours)**

Unit IV

Writing Skills: Reporting events, Writing newspaper reports, Essentials of essay writing –writing an essay of about 300 words on a given topic. Bio-Data Making, Writing of CV & Resumes, Difference between CV and Resume, Writing Job application etc. **(10 Hours)**

Text Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Monippally Matthukutty M., *Business Communication Strategies* – Tata- Mc Graw Hill Publications Company, New Delhi.
2. Mohan K. & Sharma R.C., *Business Correspondence of Report Writing* –TMH, New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester V
MICROWAVE ENGINEERING (LAB)

Course Code: EEC551

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1) Measurement of guide wavelength and frequency of the signal in a rectangular waveguide.
2) Measurement of VSWR using slotted line.
3) Study of mode characteristics of reflex Klystron and determination of mode number, transit time & electronic tuning sensitivity.
4) Study of characteristics of Gunn oscillator.
5) Study of Gunn diode as modulated source (PIN modulation) and determination of modulation depth.
6) Measurement of coupling coefficient and directivity of a directional coupler.
7) Study of insulation & coupling coefficient of a magic T.
8) Measurement of attenuation using substitution method and plot of attenuation versus frequency characteristics.
9) Study of waveguide horn and its radiation pattern and determination of the beam width.
10) Study of a ferrite circulator and measurement of isolation, insertion loss, cross coupling and input VSWR.
11) Measurement of microwave power using power meter.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
CONTROL SYSTEM (LAB)

Course Code: EEE-551

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note: The minimum of 10 experiments are to be performed from the following, out of which at least three should be software based.

1. To determine response of first order and second order systems for step input for various values of constant 'K' using linear simulator unit and compare theoretical and practical results.
2. To study P, PI and PID temperature controller for an oven and compare their performance.
3. To study and calibrate temperature using resistance temperature detector (RTD)
4. To design Lag, Lead and Lag-Lead compensators using Bode plot.
5. To study DC position control system
6. To study synchro-transmitter and receiver and obtain output V/S input characteristics
7. To determine speed-torque characteristics of an AC servomotor.
8. To study performance of servo voltage stabilizer at various loads using load bank.
9. To study behaviour of separately excited dc motor in open loop and closed loop conditions at various loads.
10. To study PID Controller for simulation proves like transportation lag.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
DIGITAL COMMUNICATION (LAB)

Course Code: EEC552

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1) Study of Sampling and reconstruction techniques.
2) Study of Pulse code modulation and demodulation.
3) Study of delta modulation and demodulation and observe effects of slope overload.
4) Study of Adaptive Delta modulation and demodulation
5) Study of data coding techniques.
6) Study of amplitude shift keying modulator and demodulator.
7) Study of frequency shift keying modulator and demodulator.
8) Study of phase shift keying modulator and demodulator.
9) Study of TDM PCM Transmitter and receiver.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

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<tr><td>EXPERIMENT (10 MARKS)</td><td>FILE WORK (10 MARKS)</td><td>VIVA (10 MARKS)</td></tr>
</table>

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
Microprocessor LAB

Course Code: EEC553

L	T	P	C
0	0	4	2

1. Study of 8085 Microprocessor kit.
2. Write a program using 8085 and verify for addition of two 8-bit numbers.
3. Write a program using 8085 and verify for addition of two 8-bit numbers (with carry).
4. Write a program using 8085 and verify for 8-bit subtraction (display borrow).
5. Write a program using 8085 and verify for 16-bit subtraction (display borrow)
6. Write a program using 8085 for multiplication of two 8- bit numbers by successive addition method.
7. Study of 8086 microprocessor kit.
8. Write a program using 8086 for multiplication of two 8- bit numbers.
9. Write a program using 8086 for multiplication of two 16- bit numbers.
10. Write a program using 8086 and verify for finding the smallest number from an array.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
INDUSTRIAL TRAINING & PRESENTATION

Course Code: EEC591

L	T	P	C
0	0	0	2

Students will go for Industrial training of four weeks in any industry or reputed organization after the IV semester examination in summer. The evaluation of this training shall be included in the V semester evaluation.

The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the IV semester and shall be coordinator of the training.

Students will also be required to prepare an exhaustive technical report of the training during the V semester which will be duly signed by the officer under whom training was taken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Director of the college.

The student at the end of the V semester will present his report about the training before a committee constituted by the Director of the College which would be comprised of at least three members- Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately to the Director in a sealed envelope.

The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.

Not more than three students would form a group for such industrial training/ project submission.

The marking shall be as follows.

Internal: 50 marks
By the Faculty Guide - 25 marks
By Committee appointed by the Director – 25 marks

External: 50 marks
By Officer-in-charge trainee in industry – 25 marks
By External examiner appointed by the University – 25 marks

Semester VI
NEURAL NETWORKS

Course Code: ECS609

L	T	P	C
3	2	0	4

Objective: To know about Networking system, and control information & algorithms.

Course Contents

Unit I **(Lectures 08)**

Introduction to Neural Network: Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

Unit II **(Lectures 08)**

Essentials of Artificial Neural Networks: Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

Unit III **(Lectures 08)**

Single Layer Feed Forward Neural Networks: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Limitations of the Perceptron Model.

Unit IV **(Lectures 08)**

Multilayer Feed forward Neural Networks: Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

Unit V **(Lectures 08)**

Associative Memorie: Paradigms of Associative Memory, Pattern Engineering Mathematics, Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function.

Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis.

Text Books:

1. "*Neural Networks, Fuzzy logic*, *Genetic algorithms: synthesis and applications*", S. Rajasekharan and G. A. Vijayalakshmi pai, PHI Publication, 2004.
2. *"Fuzzy Logic: Intelligence, Control and Information*", John Yen and Reza Langan, Pearson Education, 2004.

Reference Books:

1. "*Neural Networks- A comprehensive foundation*", Simon Haykin, Pearson Education, 2001.
2. "*Introduction to Neural Networks using MATLAB 6.0*", S.N.Sivanandam, S.Sumathi,S. N. Deepa TMH, 2006.
3. "*Neural Networks Pearson Education",* James A Freeman and Davis Skapura, 2002.
4. "*Fuzzy Logic With Engineering Applicatio*ns", Timothy J. Ross, McGraw-Hill Inc. 1997

Semester VI

ANTENNA & WAVE PROPAGATION

Course Code: EEC602

L	T	P	C
3	2	0	4

Objectives: To study working and types of antennas and wave guides.

Course Contents

Unit I **(Lectures 08)**

Antenna Principles: Potential Functions & Electromagnetic Field, Current Elements, Radiation from Monopole & Wave Dipole Network Theorems, Directional Properties of Dipole Antenna, Antenna gain, effective area, antenna Terminal impedance, antenna as an opened out Transmission Line, Practical Antennas and Methods of Excitation, Transmission Loss between Antennas, Antenna Temperature and Signal to Noise Ratio.

Unit II **(Lectures 08)**

Antennas Arrays: Two Element Array, Horizontal Patterns in Broadcast Arrays, Linear Arrays, Binomial Array Tchebyscheyff Distribution

Unit III **(Lectures 08)**

Wave Propagation: Modes of Propagation, Plane Earth Reflection, Space wave and Surface Wave, Elevated Dipole Antennas above a Plane Earth, Wave Tilt of the Surface Wave, Spherical Earth Propagation. Tropospheric Wave. Ionosphere Propagation, Sky Wave Transmission Calculations, Effects of the Earth's Magnetic Field, Wave Propagation in the Ionosphere, Virtual Height, MUF/LUF, Skip Distance, Duct Propagation, Space wave

Unit IV **(Lectures 08)**

Wave Guides: Rectangular, Circular, Transmission Line Analogy for Wave guides, Dielectric Slab Wave guide

Unit V **(Lectures 08)**

Microwave Generation: Conventional Vacuum Tubes, Klystrons; Reflex & Multicavity, TWT, Magnetrons, FWCFA,BWCFA & BWO, IMPATT, Parametric Devices, Gunn, InP, CdTe Diodes

Text Books:

1. "*Electromagnetic Waves and Radiating Systems*", Jordan Edwards C. and Balmain Keith G., Prentice Hall of India.
2. "*Microwave Devices & Circuits*", Liao,S.Y., Prentice Hall of India Third Edition.

Reference Books:

1. "*Antennas: For All Applications*", Kraus, John D. & Mashefka, Ronald J., Tata McGraw Hill,
2. "*Antennas and Wave Propagation*", Prasad, K.D., Khanna Publications
3. "*Antennas and Radio wave Propagation*", Collin, R., Tata Mc Graw-Hill
4. "*Engineering Electromagnetic*", Hayt Jr. William H., Tata McGraw-Hill
5. "*Microwave Engineering*", Das, Annaparna & Das, Sisir K, Tata McGraw Hill.
6. "*Microwave Semiconductor Devices*", Roy, Sitesh Kumar & Mitra, Monojit, Prentice Hall of India.

Semester VI
ANALOG INTEGRATED ELECTRONICS

Course Code: EEC603

L	T	P	C
3	2	0	4

Objective: To study analog integrated circuits, design and analysis method of analog circuits.

Course Contents

Unit I **(Lectures 08)**

Frequency response & stability of an Op-Amp: Frequency response, compensating Networks, Frequency response of internally compensated and uncompensated Op-Amps, High frequency Op-Amps. Equivalent circuit, stability in constant GBP Op-Amp. Circuits

Unit II **(Lectures 08)**

Op-Amp Circuits: Linear Applications Current to voltage converters, V to I converters, current amplifier, difference Amplifiers, Instrumentation Amplifiers, Integrators & Differentiator.

Unit III **(Lectures 08)**

Active filters & Converters: First and second order low pass & High pass filters, Band Pass & Band-Reject filters, All-Pass filter, Filter using MATLAB. Voltage to Frequency and Frequency to voltage Converters, Analog to Digital and Digital to Analog Converters.

Unit IV **(Lectures 08)**

Non Linear Circuits & Regulators: Voltage Comparators, Schmitt Triggers, Precision Rectifiers, Analog Switches Peak detectors, sample and Hold circuit, square and Triangular Wave Generators, Linear Regulators Switching Regulators.

Unit V **(Lectures 08)**

Non linear Amplifiers & Phase-Locked Loops: Log/Antilog Amplifiers, Analog Multipliers, Operational Trans conductance Amplifiers (OTA), Phase-Locked Loops, Monolithic PLLs, Noise in Integrated Circuits.

Text Books:

1. "*Design with Operational Amplifiers and Analog Integrated Circuits*", Franco Sergio, Tata McGraw-Hill
2. "*Op-Amps and Linear Integrated Circuits*", Ramakant A. Gayakwad, Prentice Hall of India.

Reference Books:

1. "*Op-Amps and Linear Integrated Circuits*: Theory and Applications", James M.Fiore,/Thomson Asia Pvt. Ltd. Singapore
2. "*Integrated Electronics Analog and Digital Circuits & Systems*", Millman J.&Halkias C.C., Mc Graw Hill.
3. "*Application of Analog Integrated Circuits*", Soclof,S., Prentice Hall of India.
4. "*Operational Amplifiers & Linear ICS*", Bell, David A., Prentice Hall of India.

Semester VI

DESIGN OF ELECTRONICS SYSTEMS

Course Code: EEC604

L	T	P	C
3	2	0	4

Objective: This course aims at designing of power supplies, amplifiers, oscillators and various filters.

Course Contents

Unit I **(Lectures 8)**

Design of Power Supplies: Design of Unregulated power supply, selection of transformer, diodes, capacitors, calculation of surge resistance (using bridge rectifier) Design of Discrete series regulated power supply with protection circuit, design of regulated power supply using IC LM- 340 series, design of Dual power supply using LM-317 and LM 337 IC's., Design of switching regulators, Buck regulator, Boost regulator, and Buck – Boost using switching regulator IC – LM 1577 / 2577. Heat sink calculations for power supplies.

Unit II **(Lectures 8)**

Design of Small Signal (Voltage) Amplifier BJT/FET: Design of Bias circuits (BJT/FET) Design of single stage amplifiers (CE/CS, CG/CB/CC/CD).

Use of Negative Feedback: Feedback amplifier design. Designing of negative feedback amplifiers: voltage series, voltage shunt, current series, current shunt.

Unit III **(Lectures 8)**

Design of Large Signal (power) Amplifiers: Class - A, class - B, Class - AB , Push-pull amplifier, complementary symmetry amplifiers , Monolithic power amplifier design using IC LM-379.

Unit IV **(Lectures 8)**

Design of High Frequency Amplifier: Design of Tuned amplifier BJT/FET single tuned, double tuned. Use of auto transformer (Tapped - inductor) High frequency, cascode amplifier.

Design of Oscillator Circuits: Clapp, Colpitt , Hartley oscillaotor, Design of switching circuits: Astable multivibrator, Monostable multivibrator, Bistable multivibrator.

Unit V **(Lectures 8)**

Design using Analog Integrated Circuits: Single supply amplifiers (AC inverting, AC Non inverting amplifiers), instrumentation amplifier AD – 620, V - I converter, I - V converter, V - F, F - V, converters. Current amplifiers.

Design of Non-linear Circuits: Voltage comparators, peak detectors, True RMS converter.

Sallen-key active filter design: Second order Sallen-key low pass, high pass, band pass, band reject, unity gain and equal component circuit design for Butterworth, Chebyshev response. Higher order filter design.

Text Books

1. M.M. Shah - *Design of Electronics Circuits and Computer Aided Design*, Wiley Eastem
2. Goyal , Khetan - *Monograph on Electronics Design Principles*, Khanna Pub.

Reference Books:

1. Michael Jacob - *Application and Design with Analog Integrated Circuits*, PHI 2/e
2. Sergio Franco – *Design with OP-AMP and Analog Integrated Circuits*, TMH , 3/e.
3. Bell - *Electronics Devices and Circuits*, PHI or Pearson 4/e
4. Martin S Roden, Gordon – *Electronics Design*, Shroff Pub. - 4/e.
5. Bell – *Solid State Pulse Circuits*, PHI 4/e
6. K.V.Ramanan - *Functional Electronics*, TMH

Semester VI
TELECOMMUNICATION SWITCHING SYSTEMS

Course Code: EEC605

L	T	P	C
3	2	0	4

Objective: To know switching systems, signaling techniques, network protocols and technologies such as DSN and SONET.

Course Contents

Unit I **(Lectures 08)**

Telecommunication Switching Systems: Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching. Electronic space division switching, Time division switching, Combination switching.

Unit II **(Lectures 08)**

Telephone Networks: Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

SIGNALING TECHNIQUES: In channel signaling, common channel signaling. Network traffic load and parameters, grade of service and blocking probability.

Unit III **(Lectures 08)**

Data Communication Networks: Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits.

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 IV **(Lectures 08)**

Integrated Services Digital Network (Isdn) : Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

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. "*Tele communication switching system and networks*", Thyagarajan Viswanath, PHI, 2000.
2. "*Advanced electronic communications systems*", Wayne Tomasi, PHI, 2004.

Reference Books:

1. "*Digital telephony*", J. Bellamy, John Wiley, 2001.
2. "*Data Communications & Networks*", Achyut. S.Godbole, TMH, 2004.
3. "*Principles of Communication Systems*", H. Taub & D. Schilling, TMH, 2nd Edition, 2003.
4. "*Data Communication & Networking*", B.A. Forouzan, TMH, 3rd Edition, 2004.
5. "*Telecommunication switching, Traffic and Networks*", J E Flood, Pearson Education, 2002

Semester-VI
Communication Technique

Course code: EHM601
(Common with BPH606/BBA603/BCA604/BCH606/BHM601)

L	T	P	C
2	0	2	3

Course Contents:

Unit I
Oral Communication: Principles of effective oral communication, Features, Vitals of communication, Interpersonal communication, Persuasive communication. **(10 Hours)**

Unit II
Presentation Strategies: Purpose, Audience & Locale, Organizing contents, Preparing outlines. Audio- Visual aids, Body Language, Voice dynamics. **(10 Hours)**

Unit III
Listening Skills: The Listening process, Hearing & listening, Types of listening, Listening with a purpose, Barriers to listening, Telephonic conversation. **(10 Hours)**

Unit IV
Speaking Skills: Improving voice & speech, Art of public speaking, Using visual aids, Job interview being interviewed by the media, Dealing with the boss. Dealing with subordinates, How to run a meeting. **(10 Hours)**

Text Book:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Ruther Ford A., *Basic Communication Skills* – Pearson Education, New Delhi.
2. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:
This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester VI
ANALOG INTEGRATED ELECTRONICS (LAB)

Course Code: EEC652

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note: Select at least any five out of the following experiments:

1. To Plot V-I characteristics of junction diode and zener diode.
2. To draw wave shape of the electrical signal at input and output points of the half wave, full wave and bridge rectifiers.
3. To Plot input/output characteristics for common base transistor.
4. To Plot input/output characteristics of FET and determine FET parameters at a given operating point.
5. To determine voltage gain, current gain, input impedance and output impedance of common emitter amplifier.
6. To determine voltage gain, current gain, input impedance and output impedance and frequency response of R-C coupled common emitter amplifier.
7. To design R-C Phase shift/Wein Bridge oscillator and verify experimentally the frequency of oscillation.
8. To study transistor as a switch and determine load voltage and load current when the transistor is ON.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva Voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI
DESIGN OF ELECTRONIC SYSTEMS (LAB)

Course Code: EEC653

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1) Op-Amp characteristics and get data for input bias current, measure the output-offset voltage and reduce it to zero and calculate slew rate.
2) Op-Amp in inverting and non-inverting modes.
3) Op-Amp as scalar, summer and voltage follower.
4) Op-Amp as differentiator and integrator.
5) Design LPF and HPF using Op-Amp 741
6) Design Band Pass and Band reject Active filters using Op-Amp 741.
7) Design Oscillators using Op-Amp (i) RC phase shift (ii) Hartley (iii) Colpitts
8) Design (i) Astable (ii) Monostable multivibrators using IC-555 timer
9) Design Triangular & square wave generator using 555 timer.
10) Design Amplifier (for given gain) using Bipolar Junction Transistor.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI
ANTENNA AND WAVE PROPAGATION (LAB)

Course Code: EEC654

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

I) To plot and analyses the radiation pattern of following antennas
a) Dipole
b) Half wave Dipole
d) Yagi Antenna
e) Log Antenna
f) Crossed Dipole
g) Log Periodic Antenna
h) Slot Antenna
i) Helix Antenna
j) Microstrip Antenna

II) Experiments on Coaxial Line section:
m) Measurement of a VSWR
n) Measurement of Unknown impedancce
o) Stub Matching

III) Design and Testing of RF circuits
1. RF Tuned Amplifier
2. RF Oscillator
3. RF Crystal Oscillator
4 .IF Amplifier
5 .RF mixer
6. RF filters(LP,HP,BP,Notch filter)

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VII
DIGITAL INSTRUMENTATION

Course Code: EEC701

L	T	P	C
3	2	0	4

Objective: To study basic and advanced digital instruments e.g. digital multimeters, oscilloscopes etc.

Course Contents

Unit I **(Lectures 08)**

Theory of Measurement: Introduction, Performance Characteristics: static & dynamic standards, Error analysis: Sources, types and statistical analysis

Unit II **(Lectures 08)**

Transducers Passive Transducers: Resistive, Inductive and capacitive Active transducers: Thermoelectric, piezoelectric & photoelectric Bridges: Direct current and alternating current bridges, LCR bridges

Unit III **(Lectures 08)**

Analog Meters: AC analog meters: Average, Peak and RMS responding voltmeters, sampling voltmeters. Electronics Analog meters: Electronics analog DC and AC voltmeter and ammeters, Electronic analog ohmmeter and multimeter

Unit IV **(Lectures 08)**

Digital Meters: Analog to digital converter: Transfer characteristics, A/D Conversion techniques: Simple potentiometric & servo method, successive approximation, ramp type, Integrating & dual-slope intergrating method. D/A Converter: Transfer characteristics, D/A conversion techniques Digital mode of operation, performance characteristics of D/A converters. Display devices: Decimal, BCD and straight binary number, indicating system, numeric & alpha number display using LCD & LED, specification of digital meters: display digit & counts resolution, sensitivity, accuracy, speed & settling time etc.

Unit V **(Lectures 08)**

Oscilloscopes & RF Measurements: Types of oscilloscopes, controls, Measurements voltage, frequency time & Phase. High frequency measurements – RF impedancy.

Probes: Types of probes, probe loading & measurement effect, probe specifications

Text Books:

1. "*Electronic Instruments & Instrumentation Technology*" MMS Anand, PHI Pvt. Ltd., New Delhi 2005
2. "*Electronics Instrumentation*", H.S. Kalsi TMH Ed. 2004

Reference Books:

1. "*Electronics Instrumentation & Measurement Techniques*" by W.D. cooper & A.D. Helfrick, PHI
2. "*Electronic Measurement & Instrumentation*", Oliver & Cage Mc-

Semester VII
DIGITAL SIGNAL PROCESSING

Course Code: EEC702

L	T	P	C
3	2	0	4

Objective:

- To know about DFT, FIR filters and their designs.

Course Contents

Unit I **(Lectures 08)**

Discrete Fourier Transform: Frequency Domain Sampling: The Discrete Fourier Transform Frequency-Domain Sampling and Reconstruction of Discrete-Time Signals. TheDiscrete Fourier Transform (DFT). The DFT as a linear Transformation.Relationship of the DFT to Other Transforms. Properties of the DFT.Periodicity, Linearity, and Symmetry Properties. Multiplication of two DFTs and Circular Convolution. Additional DFT Properties. Frequency analysis of signals using the DFT.

Unit II **(Lectures 08)**

Efficient Computation of DFT Efficient Computation of the DFT: FFT Algorithms, Direct Computation of the DFT. Radix-2 FFT algorithms. Efficient computation of the DFT of tworeal sequences, computations, Efficient computation of the DFT of a 2NPoint real sequences, Gortezel Algorithm, Chirp Z-transform algorithm.

Unit III **(Lectures 08)**

Basic IIR Filter Structures: Direct forms (I & II), cascade and parallel realizations. Signal flow graph, Transposed structure, Basic FIR filter structures-. Direct form structure, frequency sampling structure, Lattice structure, Linear phase FIR structure. FIR structures.

Unit IV **(Lectures 08)**

Symmetric and Anti-symmetric FIR Filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the Frequency Sampling Method, Design of FIR, Equiripple filter design Differentiators. Design of Hilbert Transformers.

Unit V **(Lectures 08)**

Design of IIR Filters from Analog Filters: IIR Filter Design by Approximation of Derivatives, IIR Filter Design by Impulse Invariance. IIR Filter Design by the Bilinear Transformation. The Matched-z Transformation, Characteristics of Commonly Used Analog Filters. Application of above technique to the design of Butterworth & Chebyshev filters.

Text Books:

1. "*Digital Signal Processing: Principles Algorithms and Applications*", Proakis, J.G. & Manolakis, D.G., Prentice Hall (India).

Reference Books:

1. "*Digital Signal Processing",* Sanjit K. Mitra, TMH, 2005
2. "*Digital Signal Processing",* Oppenheim A.V. & Schafer, Ronald W., Pearson Education.
3. "*Theory and applications of DSP*", Rabiner, L.R. and Gold B., PHI.
4. "*Digital Signal Processing*", DeFatta, D.J., Lucas, J.G. & Hodgkiss, W.S., John Wiley & Sons

Semester VII

MOBILE AND CELLULAR COMMUNICATION

Course Code: EEC703

L	T	P	C
3	2	0	4

Objective: To study the principle of mobile communications and various schemes.

Course Contents

Unit I **(Lectures 08)**

Introduction: PCS Architecture, Cellular Telephony, Cordless Telephony and Low-tier PCS, Third Generation wireless system

Mobility Management: Handoff, Inter - BS handoff, Intersystem handoff, Roaming management, Roaming management under SS7 and Roaming management for CT2.

Handoff Management: Detection and Assignments, Handoff detection, Strategies for handoff detection, Mobile controlled handoff, Network controlled handoff, Mobile assisted handoff, Handoff failure, Channel assignment, Non- prioritized scheme and Reserved channel scheme, Queuing priority scheme, Sub rating scheme, Implementation issues, Hard handoff – MCHO link transfer, MAHO/NCHO link transfer, Sub rating MCHO link transfer, Soft handoff – adding new BS, dropping a BS.

Unit II **(Lectures 08)**

GSM Overview: GSM Architecture, location tracking and call setup, Security, Data Services – HSCSD, GPRS, Unstructured supplementary service data. GSM Network Signaling – GSM MAP service frame work, MAP protocol machine, MAP dialogue.GSM Mobility management – GSM location update, Mobility databases, Failure restoration, VLR Identification algorithm, VLR Overflow control.

Unit III **(Lectures 08)**

GSM Short Message Service: SMS architecture, SMS protocol hierarchy, Mobile originated messaging, Mobile terminated Messaging. International Roaming for GSM – International GSM call setup, Reducing the International call delivery cost GSM Operations, Administration, and Maintenance – Call recording functions, Performance Measurement and Management, Subscriber and Service data Management. Mobile number portability – Fixed network number portability, Number portability for Mobile networks, Mobile number portability mechanism.

Unit IV **(Lectures 08)**

VoIP Service for mobile networks – GSM on the Net, iGSM wireless VoIP solution, iGSM procedures and Message flows.

General Packet Radio Services – Architecture, Network nodes, Interfaces, Procedures, Billing, Evolving from GSM to GPRS.

Unit V **(Lectures 08)**

Wireless Application Protocol – WAP Model, WAP Gateway, WAP Protocol – WDP, WTLS, WTP, WSP, WAE, Mobile station Application execution environment. Third Generation Mobile Services – Paradigm shifts in 3G Systems, W-CDMA, cdma 2000, Improvements on core network, Quality of service in 3G, Wireless Operating System for 3G Handset. Paging Systems – Paging Network Architecture, User Access Interface – Telocator Alphanumeric Input Protocol (TAP), Telocator Message Entry Protocol (TME), Intersystem Interface. Wireless Local Loop – WLL Architecture, WLL technologies.

Text Book

1. T.S. Rappaport, "*Wireless Communication-Principles and practice*", Pearson
2. Haykin S & Moher M., "*Modern wireless communication*", Pearson, 2005.

Reference Books:

1. Yi-Bing Lin and Imrich Chlamtac *"Wireless and Mobile Network Architecture"*, Wiley Publication.
2. Kasera Sumit, Narang Nishit, *"3G Networks: Architecture, Protocols and Procedures"*, TMH
3. Willium C. Y. Lee, *"Mobile communication Design and fundamentals"*

Semester-VII
Corporate Communication

Course code: EHM701
(Common with BPH707)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Corporate behavior, Corporate expectation, Office etiquettes, Telephonic conversation & etiquette. **(10 Hours)**

Unit II

Communication: Press communication, press-note, notification, e-mail, inviting tenders, writing advertisements, writing notices, Agenda for the meeting, writing minutes of the meeting. **(10 Hours)**

Unit III

Interview skills: Concept & Process, Preparing for the Interview, Dressing sense, Self-awareness – Meaning & scope, Self- image, self-concept, self confidence. **(10 Hours)**

Unit IV

Group Discussion (G.D), Tips and Style. **(10 Hours)**

Recommended Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Newstron John W., *Organizational Behaviour: Human Behaviour at work* – Tata McGraw Hill.
3. Luthans Fred, *Organizational Behaviour* – Tata McGraw Hill.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester VII
DIGITAL INSTRUMENTATION (LAB)

Course Code: EEC751

L	T	P	C
0	0	4	2

1. Identification, Study & Testing of various electronic components:
   (a) Resistances - Various types, Color coding
   (b) Capacitors-Various types, Coding
   (c) Inductors
   (d) Diodes
   (e) Transistors
   (f) SCRs
   (g) ICs
   (h) Photo diode
   (i) Photo transistor
   (j) LED
   (k) LDR
   (l) Potentiometers

2. Study of symbols for various Electrical & Electronic Components, Devices, Circuit functions etc.
3. To study and perform experiment on CRO demonstration kit.
4. Soldering & desoldering practice.
5. (a) To Design layout & fabricate PCB for a Regulated dc power supply;
   (b) Assemble the Regulated power supply using PCB and test it.

6. To study and plot the characteristics of following Opto-Electronic devices
   (a) LED
   (b) LDR
   (c) Photovoltatic cell
   (d) Opto-coupler
   (e) Photo diode
   (f) Photo transistor

7. To study the specifications and working of a Transistor radio kit and perform measurements on it.
8. To study the specifications and working of a VCD Player.
9. To study the specifications and working of color TV.
10. To study the specifications and working of a Tape Recorder kit.
11. To prepare design layout of PCBs using software tools.
12. To fabricate PCB and testing of electronics circuit on PCB.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VII

DIGITAL SIGNAL PROCESSING (LAB)

Course Code: EEC752

L	T	P	C
0	0	4	2

Experiments On

1. Sampling & Waveform Generation.
2. Quantization
3. PCM Encoding
4. Delta Modulation
5. Digital Modulation Schemes (ASK, PSK, FSK)
6. Error Correcting Codes
7. DFT Computation.
8. Fast Fourier Transform.
9. FIR Filter implementation.
10. IIR Filter implementation.
11. DSP Processor Implementation
12. Computational Experiments with Digital Filters

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VII
EMBEDDED SYSTEM

Course Code: EEC707

L	T	P	C
3	2	0	4

Objective:

- To study the Embedded system concepts, system Architecture, Real Time Operating System Concepts etc.

Course Contents

Unit I **(Lectures 08)**

Embedded system: Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

Unit II **(Lectures 08)**

System Architecture: Introduction to ARM core architecture, ARM extension family, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, study of on-chip peripherals like I/O ports, timers, counters, interrupts, on-chip ADC, DAC, RTC modules, WDT, PLL, PWM, USB etc.

Unit III **(Lectures 08)**

Interfacing and Programming: Basic embedded C programs for on-chip peripherals study; in system architecture. Need of interfacing, interfacing techniques, interfacing of different displays including Graphic LCD (320X240), interfacing of input devices including touch screen etc, interfacing of output devices like thermal printer etc., embedded communication using CAN and Ethernet, RF modules, GSM modem for AT command study etc.

Unit IV **(Lectures 08)**

Real Time Operating System Concept: Architecture of kernel, task scheduler, ISR, Semaphores, mailbox, message queues, pipes, events, timers, memory management, RTOS services in contrast with traditional OS. Introduction to Ucos II RTOS, study of kernel structure of Ucos II, synchronization in Ucos II, Inter-task communication in Ucos II, memory management in Ucos II, porting of RTOS.

Unit V **(Lectures 08)**

Embedded Linux: Introduction to the Linux kernel, Configuring and booting the kernel, the root file system, Root file directories, /bin, /lib etc., Linux file systems, Types of file system: Disk, RAM, Flash, Network. Some debug techniques- Syslog and strace, GDB, TCP/IP Networking- Network configuration, Device control from user space- Accessing hardware directly, Multi processing on Linux and Inter Process Communication- Linux process model and IPCs, Multithreading using p Threads - Threads verses Processes and pThreads, Linux and Real-Time Standard kernel problems and patches

Text Books:

1. H.Kopetz, "*Real-Time Systems*", Kluwer, 1997.
2. R.Gupta, "*Co-synthesis of Hardware and Software for Embedded Systems*", Kluwer 1995.

References Books:

1. Rajkamal - *Embedded Systems*, TMH.
2. David Simon - *Embedded systems software primer*, Pearson
3. Steve Furber - *ARM System-on-Chip Architecture*, Pearson
4. Jean J Labrose – *Micro C/OS-II*, Indian Low Price Edition
5. DR.K.V.K.K. Prasad - *Embedded/Real Time System*, Dreamtech

6. Iyer, Gupta - *Embedded Real Systems Programming*, TMH
7. Steve Heath - *Embedded System Design*, Neuwans

Semester VII
ARTIFICIAL INTELLIGENCE

Course Code: ECS709

L	T	P	C
3	2	0	4

Objective: To study artificial intelligence and various algorithms.

Course Contents

Unit 1 **(Lectures 08)**

Introduction to AI: Intelligent agents, Perception, Natural language processing, Problem, Solving agents, Searching for solutions: Uniformed search strategies, informed search strategies.

Unit 2 **(Lectures 08)**

Knowledge and reasoning: Adversarial search, Optimal and imperfect decisions, Alpha, Beta pruning.

Logical agents: Propositional logic, First order logic, Syntax and semantics, Using first order logic, Inference in first order logic.

Unit 3 **(Lectures 08)**

Uncertainty, Acting under uncertainty, Basic probability notation, Axioms of probability, Baye's rule, Probabilistic reasoning, and making simple decisions.

Unit 4 **(Lectures 08)**

Planning: Planning problem, Partial order planning, Planning and acting in nondeterministic domains.

Learning: Learning decision trees, Knowledge in learning, Neural networks, Reinforcement learning, Passive and active.

Unit 5 **(Lectures 08)**

Expert Systems: Definition, Features of an expert system, Organization, Characteristics, Prospector, Knowledge Representation in expert systems, Expert system tools, MYCIN, EMYCIN.

Text Books

1. *Artificial Intelligence*, "Elain Rich and Kevin Knight", Second Edition Tata McGraw Hill, 1995.
2. W. Patterson, *'Introduction to Artificial Intelligence and Expert Systems'*, Prentice Hall of India, 2003

References:

1. *Artificial Intelligence - A Modern Approach*, "Stuart Russel and Peter Norvig", Second Edition, Pearson Education, 2003 / PHI.
2. *A Guide to Expert Systems*, "Donald A.Waterman", Pearson Education
3. *Artificial Intelligence – Structures and Strategies for Complex Problem Solving*, "George F.Luger", Fourth Edition, Pearson Education, 2002.
4. *Foundations of Artificial Intelligence and Expert Systems*, "Janakiraman, K. Sarukesi", Macmillan Series in Computer Science

Semester VII
EMBEDDED SYSTEM (LAB)

Course Code: EEC753

L	T	P	C
0	0	4	2

LAB EXERCISE

- Integrated Development Environment Overview (Project creation, down load and debug)
- Study of JTAG Debugger/on-board debugger-emulator.
- ARM Instructions execution (Barrel Shifter, LDR / STR, SMT / LDM)

List of Practical:

GROUP - A

1) Writing basic C-programs for I/O operations
2) C-Program to explore timers/counter
3) C-programs for interrupts
4) Program to demonstrate UART operation

GROUP - B

5) Program to demonstrate I2C Protocol.
6) Program to demonstrate CAN Protocol.

GROUP - C

7) Program to interface LCD
8) Program to interface Keyboard and display key pressed on LCD
9) Program to interface stepper motor

GROUP - D

10) Program to demonstrate RF communication
11) Program to implement AT commands and interface of GSM modem
12) Implementation of USB protocol and transferring data to PC.
13) Implementation of algorithm /program for the microcontroller for low power modes.
14) COS II / Embedded Linux RTOS Examples

GROUP - E

15) Interfacing 4 x 4 matrix keyboards and 16 x 2 characters LCD displays to microcontroller / microprocessor and writing a program using RTOS for displaying a pressed key.
16) Writing a scheduler/working with using RTOS for 4 tasks with priority. The tasks may be keyboard, LCD, LED etc. and porting it on microcontroller/ microprocessor.

GROUP - F

17) Implement a semaphore for any given task switching using RTOS on microcontroller board.
18) Create two tasks, which will print some characters on the serial port, Start the scheduler and observe the behavior.

GROUP – G

19) RTOS based interrupt handling using Embedded Real Time Linux.
20) Program for exploration of (Process creation, Thread creation) using Embedded Real Time Linux.

GROUP – H

21) Program for exploring Message Queues using Embedded Real Time Linux.
22) Ethernet Based Socket Programming using Embedded Real Time Linux.

Note:

1) At least ONE practical should be performed from EACH GROUP.
2) Two practical should be performed using the JTAG debugger / on-board Debugger- emulator.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination

Semester VII
ARTIFICIAL INTELLIGENCE (LAB)

Course Code: ECS755

L	T	P	C
0	0	4	2

List of Experiments:

1. Write a LISP Program to solve the water-jug problem using heuristic function.
2. Create a compound object using Turbo Prolog.
3. Write a Prolog Program to show the advantage and disadvantage of green and red cuts.
4. Write a prolog program to use of BEST-FIRST SEARCH applied to the eight puzzle problem.
5. Implementation of the problem solving strategies: Forward Chaining, Backward Chaining, Problem Reduction.
6. Write a Lisp Program to implement the STEEPEST-ASCENT HILL CLIMBING.
7. Write a Prolog Program to implement COUNTE PROPAGATION NETWORK.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

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</table>

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VII
INFORMATION THEORY & CODING

Course Code: ECS714

L	T	P	C
3	2	0	4

Objective: To study the basic concept of information theory and different types of coding.

Course Contents

Unit I **(Lectures 08)**

Information theory - information and entropy - properties of entropy of a binary memory less source - extension of a binary memory less source - source coding theorem - Shannon fano coding - Huffman coding – Lempel-Ziv coding - binary symmetric channel – mutual information - properties - channel capacity - channel coding theorem

Unit II **(Lectures 08)**

Coding - linear block codes - generator matrices - parity check matrices - encoder syndrome and error correction - minimum distance - error correction and error detection capabilities - cyclic codes - coding and decoding

Unit III **(Lectures 08)**

Introduction to algebra - groups - fields - binary field arithmetic - construction of Galois field - basic properties - computations - vector spaces - matrices - BCH codes - description - decoding - Reed Solomon codes

Unit IV **(Lectures 08)**

Coding - Convolutional codes - encoder - generator matrix - state diagram – distance properties - maximum likelihood decoding - viterbi decoding - sequential decoding

Text books:

1. "*Information Theory*", Norman Abramson, John Wiley
2. "*Fundamentals and Applications*", Shu Lin, Costello D.J., Error Control Coding Prentice Hall Inc. Englewood Cliffs

Reference books:

1. "*Digital Communications*", Simon Haykin, John Wiley
2. "*Principles of Communication System*", Taub & Schilling, Tata McGraw Hill
3. "*Electronic Communication, Fundamentals Through Advanced*", Tomasi, Pearson education
4. "*Digital Communication*", Sklar, Pearson Education
5. "*Elements of Information Theory*", T. Cover and Thomas, John Wiley & Sons 1991.

Semester VII
POWER ELECTRONICS AND APPLICATIONS
Course Code: EEE 703

L	T	P	C
3	2	0	4

Objective:

- To create an awareness of the general Nature of Power Electronic Equipments.
- To study the principles of Operation of Power Electronic Devices.
- To understand the applications of Power Electronic Devices as Converters, Inverters etc.

Course Contents

Unit I

Power semiconductor Devices: Power semiconductor devices their symbols and static characteristics. Characteristics and specifications of switches, types of power electronic Circuits BJTO operation steady state and switch characteristics, switching limits Operation and steady state characteristics of MOSFET and IGBT Thyristor – Operation V- I characteristics, two transistor model, methods of turn-on Operation of GTO, MCT and TRIAC. **(Lectures 08)**

Unit II

Power Semiconductor Devices (Contd), Protection of devices. Series and parallel operation of thyristors Commutation techniques of thyristor DC-DC Converters: Principles of step-down chopper, step dow chopper with R-L load Principle of step-up chopper, and operation with RL load, classification of choppers. **(Lectures 08)**

Unit III

Phase Controlled Converters Single phase half wave controlled rectifier with resistive and inductive loads, effect of freewheeling diode. Single phase fully controlled and half controlled bridge converters. **(Lectures 08)**

Unit IV

AC Voltage Controllers: Principle of On-Off and phase controls Single phase ac voltage controller with resistive and inductive loads Three phase ac voltage controllers (various configurations and comparison) Single phase transformer tap changer. Cyclo Converters Basic principle of operation, single phase to single phase, three phase to single phase and three phase to three phase cyclo converters, output voltage equation. **(Lectures 08)**

Unit V

Inverters: Single phase series resonant inverter Single phase bridge inverters Three phase bridge inverters. Voltage control of inverters Harmonics reduction techniques Single phase and three phase current source inverters. **(Lectures 08)**

Text Books

1. Rashid M.H., *Power Electronics: Circuits, Devices & Applications*, Prentice Hall of India Ltd., 2004.

2. Singh M.D. & Khanchandani K.B., *Power Electronics*, Tata MC Graw Hill, 2005

Reference Books

1. Jamil M.S Asghar, *Power Electronics*, Prentice Hall of India Ltd., 2004

2. Chakrabarti A.rai & Co., *Fundamentals of Power Electronics & Drives*, Chanpat Rai & Co.

3. Babu K.Hari, *Power Electronics*, Switch Publications.

Semester VII
DATABASE MANAGEMENT SYSTEM

Course Code: ECS706

L	T	P	C
3	2	0	4

Objective: To study basic concepts of DBMS and its implementation.

Course Contents

Unit I **(Lectures 08)**

Introduction to DBMS: Basic concepts, advantages of a DBMS over file processing system, Data abstraction, Data models and data independence, components of a DBMS and overall structure. Database terminology

Database Administration issues: DBA role, indexes. Data dictionary, security, backups, Replication, SQL support for DBA, commercial RDBMS selection

Data Modeling: Basic concepts, types of data models, E-R data model and Object oriented data model, relational, network and hierarchical data models and their comparison, E-R and ERR diagramming.

Unit II **(Lectures 08)**

Relational Model: Basic concepts, attributes and domains, interaction and extensions of a relation, concept of integrity and referential constraints. Relational query languages (relational algebra, relational calculus), concepts of view and trigger

Unit III **(Lectures 08)**

SQL: Structure of a SQL query, DDL and DML, SQL queries, set operations. Predicates and join membership, tuple variables, set comparison, ordering of tuples, aggregate functions, nested query. Database modification using SQL, Dynamic and embedded SQL and concepts of stored procedure, Query optimization

Unit IV **(Lectures 08)**

Relational Database Design: Need of normalization, Notation of a normalized relation, Normalization using functional dependency, Multi-valued dependencies and join dependency, 1NF, 2NF, 3NF, BCNF, 4NF.

Transaction Management: Basic concepts of transaction, components of transaction management (concurrency control, Recovery system), Different concurrency control protocols such as Time stamps and locking, different crash recovery such as log based recovery and shadow paging, concepts of cascaded abort, Multi-version concurrency control methods.

Unit V **(Lectures 08)**

Object oriented DBMS: Review of object oriented concepts: Objects, Classes, attributes, Messages, Inheritance, and Polymorphism etc. Object schemas, Class subclass relationships, inter-object relationships, features of object oriented DBMS and ORDBMS, concepts of OID, persistence of objects in OODBMS, Physical organization, object-oriented queries, schemas modifications, Temporal databases, Active databases.

Text Books

1. Henry F. Korth, Abraham silberschatz, *"Database system concepts"*, 5th Ed.Mc Graw Hill Inc
2. Date, *"Introduction to Database Management Systems"*, 8/e Pearson LPE.

Reference Books:

1. Singh, *"Database Systems: Concepts,Design & Apllication"*- Pearson LPE
2. Kahate, *"Introduction to Database Management Systems"*- Pearson LPE.
3. Rajesh Narang, *"Database Management System"*, PHI
4. Elmasri, Navathe, Somayajulu, Gupta, *"Fundamantals of Database Systems"*, Pearson
5. ISRD, *"Introduction to Database Management System"*, Tata McGraw Hill
6. Connolly, *"Database Systems"* – Pearson LPE.
7. Bipin Desai, *"Introduction to database management systems"*, Galgotia.
8. Renu Vig, *"Fundamentals of database management systems"*, ISTE learning materials centre
9. Phillip Pratt, *"Concepts of DBMS"*, Thomson Learning, 3rd Ed.
10. Phillip Pratt, *"A Guide to SQL"*, Thomson Learning, 5th Ed.
11. V.K.Jain, *"Database Management System"*, Dreamtech Press (Wiley India)
12. *Oracle Sql,Pl/Sql for 9i and 10g*, Dreamtech Press(Wiley India)

Semester VII
INFORMATION THEORY & CODING (LAB)

Course Code: ECS757

L	T	P	C
0	0	4	2

Implement the following Practical using C/C++:

1. Implement Shanon Fano coding.
2. Implement Huffman coding.
3. Implement Lempbel Zib coding.
4. Implement cyclic redundancy cods.
5. Implement BCH Codes.
6. Implement Solomon codes.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practicals conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

<table>
<tr><td colspan="3">PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)</td><td rowspan="2">ATTENDANCE (5 MARKS)</td><td rowspan="2">QUIZ (5 MARKS)</td><td rowspan="2">VIVA (10 MARKS)</td><td rowspan="2">TOTAL INTERNAL (50 MARKS)</td></tr>
<tr><td>EXPERIMENT (10 MARKS)</td><td>FILE WORK (10 MARKS)</td><td>VIVA (10 MARKS)</td></tr>
</table>

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VII

POWER ELECTRONICS AND APPLICATIONS (LAB)

Course Code: EEE 753

L	T	P	C
0	0	4	2

List of Experiments

Note: A minimum of 10 experiments has to be performed out of which at least three should be from software based experiments.

1. To study V-I characteristics of SCR and measure latching and holding currents.

2. To study UJT trigger circuit for half wave and full wave control.

3. To study single-phase half wave controlled rectified with (i) resistive load (ii) inductive load with and without freewheeling diode.

4. To study single phase (i) fully controlled (ii) half controlled bridge rectifiers with resistive and inductive loads.

5. To study three-phase fully/half controlled bridge rectifier with resistive and inductive loads.

6. To study single-phase AC voltage regulator with resistive and inductive loads.

7. To study single phase cyclo-converter

8. To study triggering of (i) IGBT (ii) MOSFET (iii) power transistor

9. To study operation of IGBT/MOSFET chopper circuit

10. To study MOSFET/IGBT based single-phase series-resonant inverter.

11. To study MOSFET/IGBT based single-phase bridge inverter.

SOFTWARE BASED EXPERIMENTS (PSPICE/MATLAB)

1. To obtain simulation of SCR and GTO thyristor.

2. To obtain simulation of Power Transistor and IGBT.To obtain simulation of single phase fully controlled bridge rectifier and draw load voltage and load current waveform for inductive load.

3. To obtain simulation of single phase full wave ac voltage controller and draw load voltage and load current waveforms for inductive load.

4. To obtain simulation of step down dc chopper with L-C output filter for inductive load and determine steady-state values of output voltage ripples in out put voltage and load current.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practicals conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VII
DATA BASE MANAGEMENT SYSTEM (LAB)

Course Code: ECS756

L	T	P	C
0	0	4	2

List of experiments using SQL:

1. Create Table, SQL for Insertion, Deletion, Update and Retrival using aggregating functions.
2. Write Programs in PL/SQL, Understanding the concept of Cursors.
3. Write Program for Join, Union & intersection etc.
4. Creating Views, Writing Assertions, Triggers.
5. Creating Forms, Reports etc.
6. Writing codes for generating read and update operator in a transaction using different situations.
7. Implement of 2PL concerning central algorithm.
8. Developing code for understanding of distributed transaction processing.
   Students are advised to use Developer 2000 Oracle 8+ version for above experiments.
   However, depending on the availability of Software's students may use power builder/SQL Server/DB2. for implementation.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VII
INDUSTRIAL TRAINING PRESENTATION

Course Code: EEC791

L	T	P	C
0	0	0	4

Students will go for Industrial training of six weeks in any industry or reputed organization after the VI semester examination in summer. The evaluation of this training shall be included in the VII semester evaluation.

The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the VI semester and shall be coordinator of the training.

Students will also be required to prepare an exhaustive technical report of the training during the VII semester which will be duly signed by the officer under whom training was taken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Director of the college.

The student at the end of the VII semester will present his report about the training before a committee constituted by the Director of the College which would be comprised of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately to the Director in a sealed envelope.

The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.

Not more than three students would form a group for such industrial training/ project submission.

The marking shall be as follows.

Internal: 50 marks
By the Faculty Guide – 25 marks
By Committee appointed by the Director – 25 marks

External: 50 marks
By Officer-in-charge trainee in industry – 25 marks
By External examiner appointed by the University – 25 marks

Semester VIII
VLSI DESIGN & TECHNOLOGY

Course Code: EEC801

L	T	P	C
3	2	0	4

Objective: To learn about transistors and its working. To investigate principles of operation of VLSI devices e.g. MOSFET, FET etc.

Course Contents

Unit I **(Lectures 08)**

Carrier concentration, Fermi level Drift of carrier in electrical and magnetic fields. Carrier life time diffusion of carrier.

Unit II **(Lectures 08)**

PN Junctions: Equilibrium condition, forward and reverse bias junction, reverse bias breakdown, Metal semiconductor junction.

Unit III **(Lectures 08)**

Field Effect Transistor: Junctions FET, Metal semiconductor FET and MOS FET Transistor.

Unit IV **(Lectures 08)**

Fundamental of BJT operation minority carrier distribution and terminal currents, Secondary effects in transistor, Kirk effect.

Unit V **(Lectures 08)**

Introduction to monolithic integrated circuit, Diffusion, Long implantation, Epitaxy, Oxidation, Photolithography and etching, Metallization, Future tends in VLSI.

Text Books:

1. S.M. Sze (Ed.) / *VLSI Technology* / M Hill. 1988.
2. *Basic VLSI Design* by D.A. Pucknell & Eshraghian (PHI)
3. *Modern VLSI Design Systems* on Silicon by Wayne Wolf (Pearson Pub.)

Reference Books

1. S. Gandhi / *VLSI Fabrication Principles* / 2nd ED. John Willey 1994.
2. *Modern VLSI Design Systems on Silicon* by Wayne Wolf (Pearson Pub.)
3. S.A. Campbell / *The Science and Engineering of Microelectronic Fabrication* / Oxford Univ. Press 1996
4. *Introduction to Digital Microelectronics* Circuits by K. Gopalan (TMH)
5. *Microelectronic Circuits International Student Edition* by Sedra / Smith (Oxford)
6. *Microelectronics* by Milman & Grabel (Mc Graw-Hill)

Semester VIII
SATELLITE COMMUNICATIONS

Course Code: EEC802

L	T	P	C
3	2	0	4

Objectives: To study basic components of satellite communications and various kinds of access techniques.

Course Contents

Unit I **(Lectures 08)**

Introduction: General background, frequency allocations for satellite services, basic satellite system, system design considerations, applications. Satellite Orbits: Introduction, laws governing satellite motion, orbital parameters, orbital perturbations, Doppler effects, geostationary orbit, antenna look angles, antenna mount, limits of visibility, Earth eclipse of satellite, sun transit outage, inclined orbits, sun-synchronous orbit, launching of geostationary satellites.

Unit II **(Lectures 08)**

Wave Propagation and Polarization: Introduction, atmospheric losses, ionospheric effects, rain attenuation, other impairments, antenna polarization, polarization of satellite signals, cross polarization discrimination, ionospheric depolarization, rain depolarization, ice depolarization. Satellite Antenna: Antenna basics, aperture antennas, parabolic reflectors, offset feed, double reflector antenna shaped reflector systems.

Unit III **(Lectures 08)**

Link Design: Introduction, transmission losses, link power budget equation, system noise, carrier to noise ratio for uplink and downlink, combined uplink and downlink carrier to noise ratio, inter modulation noise.

Multiple Access Techniques: Introduction, FDMA, TDMA, FDMA / DMA, operation in a multiple beam environment, CDMA, multiple access examples.

Unit IV **(Lectures 08)**

Satellite Transponder: Transponder Model, Satellite front end, RF filtering of digital carrier, Satellite signal processing Transponder limiting. Communication Satellites: Introduction, design considerations, lifetime and reliability, spacecraft sub systems, spacecraft mass and power estimations, space segment cost estimates. Earth Stations: Introduction, design considerations, general configuration and characteristics.

Unit V **(Lectures 08)**

Non Geostationary Orbit Satellite Systems: Introduction, reasons, design considerations, case study, example of systems.

Satellite Applications: INTELSAT Series, INSAT, VSAT, DBS Television and Radio, Remote sensing, Mobile satellite services: GSM and GPS, Satellite navigation system, DTH, Internet Connectivity, Video Conferencing.

Text book:

1. Timothy Pratt, Charles Bostian, Jeremy Allnut - *Satellite Communications*, John Wiley & Sons, 2nd Ed.
2. J. Martin - *Communication Satellite Systems*, PHI Publication.

Reference Books:

1. M. Richharia - *Satellite Communications Systems*, Mc Millan Publication, 2nd Ed.
2. Dennis Roddy - *Satellite Communications*, Mc-Graw Hill publication, 3rd Ed.
3. Robert M. Gagliardi - *Satellite Communication*, CBS Publishers and Distributors, 2nd Ed.

Semester-VIII
Industrial Sociology & Professional Ethics

Course code: EHM 801	L	T	P	C
	2	2	0	3

(INDUSTRIAL SOCIOLOGY)

Course Contents:

Unit I

Sociology in the industrial Perspective: Concept of Sociology, Sociology as a Science, Sociology of work & industry, Perspectives for sociological analysis of work, Class- Conflict in Industry, Social impact of industrialization, Corporate skills in the fast growing multinational set up. **(10 Hours)**

Unit II

Work experience in Industry: The concept of alienation, Work satisfaction, Technology & work experience, Social background of workers, Work orientations, Stress & anxiety of the worker, Work & Leisure, Unemployment, Conflicts in the work place. **(10 Hours)**

Reference Books:

1. Miller & Form, *Industrial Sociology*, London Harper & Row.
2. Sheth N.R., *Social Frame Work of Indian Factory,* O.U.P. Bombay.
3. Gisbert P., *Fundamentals of Industrial Sociology,* O.U.P. New Delhi.
4. Watson Tony J., *Sociology: Work & Industry*, New York. Routledge.

(PROFESSIONAL ETHICS)

Course Contents:

Unit III

General and Applied Ethics- Ethics and the professions – Standard of right and wrong, problems of Ethical Certainty, Significance of professional Ethics for Engineers, New Technology and Ethics, Applied Ethics - Cases in professional Engineering Practice, Principles of business ethics, Individual in the organization. **(10 Hours)**

Unit IV

Ethical Leadership: Decision making, corporate culture and reputation management, corporate social responsibility and social reporting. **(10 Hours)**

Reference Books:

1. Fleddermann Charles, *Engineering Ethics*, Upper Saddle River- N.J. Prentice Hall.
2. Parsons Richard D., *The Ethics of Professional Practice*- Allyn & Bacon, London.
3. Schinzinger, Roland & Mike W. Martin, *Introduction to Engineering Ethics*- Boston, McGraw Hill.
4. Govindarajan - *Engineering Ethics*- Prentice Hall (India) New Delhi.
5. Bhatia S.K. - *Business Ethics & Management Values*- Deep & Deep Publication. N.Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester VIII
PRINCIPLES OF MANAGEMENT

Course Code: EHM804

L	T	P	C
3	2	0	4

Objective: To impart knowledge about management policies, planning, implementation & how to grow an organization.

Course Contents

Unit I **(Lectures 08)**

Planning: Planning, types of plans, major steps in managerial planning, Organizing, nature an purpose, process of organization, basic departmentation. Coordination, nature purpose and process of coordination. Supervision, Leadership: purpose, functions, types.

Unit II **(Lectures 08)**

Communication, process of communication, effective communication, barriers to communication.
Motivation: What is motivation, factors involved, theories, motives in organization.

Unit III **(Lectures 08)**

Controlling-Nature and purpose: Management of change: forces of change, strategies of change, resistance to change.

Unit IV **(Lectures 08)**

Human elements in management: Factors in individual behaviour, Perception, Learning, Personality development, Interpersonal relationship & group behaviour, Conflict management Stress management, sources of stress, consequences, strategies of stress management.

Text Books

1. *"Principles and practices of management* ", CB Gupta ,
2. "*M. Principles of management*", Prasad, L,

Reference Books:

1. "*H. Management: A Global Perspective*", Koontz, H & Weihrich.
2. "*Organizational Behaviour*", Robbins, S. P.

Semester VIII
VLSI DESIGN & TECHNOLOGY LAB

Course Code: EEC851

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

PART-I

Schematic design and make Device Level Layout of following circuits.
1) BJT/FET Amplifier in various configuration.
2) Counters, Shift Registers & Sequence Decoders.
3) Various circuits with Op-Amp.

PART-II

Design of following ckt using appropriate software like VHDL/ FPGA.
1) 3-input NAND gate.
2) Half adder
3) D-Latch
4) Serial in-serial out shift register.

PART-III

To perform following experiments based on Fiber Optic Trainer.

1) To set up Fiber Optic Analog link.
2) To set up fiber Optic Digital link.
3) Measurement of Propagation loss and numerical aperture.
4) Characterization of laser diode and light emitting diode.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VIII
OPTICAL FIBRE COMMUNICATION

Course Code: EEC803

L	T	P	C
3	2	0	4

Objective: To study the basic principle of optical fibre communication and various optical devices.

Course Contents

Unit I **(Lectures 08)**

Introduction to Optical Fiber Communication System: Block diagram of OFCS, Advantage and Disadvantage of OFCS over other communication systems. Ray theory of transmission and concept of acceptance angle and Numerical Aperture (Numericals based on this), Meridonial and skew propagate wave theory of optical propagation: cut – off wavelength. Group velocity and Group delay, Types of fibers (According to materials, Refractive index profile, Mode of propagation) Fiber Optic Splices, connectors, couplers, Directional Coupler.

Unit II **(Lectures 08)**

Light Sources and Detectors Sources: Factors or Characteristics for their selection in OFCS.
Types: Light Emitting diodes, Laser diodes, Surface emitter LEDS, Edge emitter LEDS, Super luminescent LEDS, LED operating Characteristics, Modulation Bandwidth: 3-dB electrical bandwidth, 3-dB optical Bandwidth, Radiation patterns of surface and Edge emitters.
Laser Diode: Laser principles, semiconductor laser diode, Hetero junction Laser, strip- gromentry lasers, Distributed feedback lasers, laser diode operating Characteristics, Radiation patterns.
Detectors: Characteristics or factors for their Selection, P-N photo diode, P-I-N Photo diode, Avalanche photodiode, detector parameters: Quantum efficiency, Responsivity, speed of Response (Numericals based on this).

Unit III **(Lectures 08)**

Modulation: Non coherent/Coherent
Intensity Modulation: LED Modulation and Circuits (Analog and digital) Analog modulation formats; AM/IM Sub carrier Modulation, FM/IM Sub carrier Modulation. Digital Modulation formats; PCM: RZ, NEZ, Manchester, Bipolar codes, Other digital formats: PPM, PDM, OOK, FSK and PSK.
Detection: (Coherent detection/Heterodyne/Homodyne detection): Optical heterodyne receivers, Optic Frequency Division Multiplexing.

Unit IV **(Lectures 08)**

Losses in Fibers: Absorption, scattering and bending losses. Signal distortion in optical fiber: Material dispersion, waveguide dispersion, intermodal dispersion. Noise in optical fiber: Thermal Noise, shot noise, S/N Ratio, Noise equivalent power (Numerical based on this)
Fiber Optics System Design: Optical power budgeting, Rise-time budget.
Optical Fiber Measurements: Measurement of Attenuation, dispersion, refractive index.
Field Measurements: Optical time domain reflectometry (OTDR)

Unit V **(Lectures 08)**

Advanced Systems and Techniques: Wavelength Division Multiplexing, DWDM, optical amplifiers, Optical filters, Integrated optics, Optical Networks: SONET/SDH, Photonic switching, Local Area Networks, Optical Sensors.

Text books

1. Jonn M. Senior - *Optical fiber communication* (Principles and Practice), Pearson
2. B.P.Pal - *Optical Fiber Systems and Sensors*
3. Govind P. Agrawal - *Fiber Optic Communications Systems*, wiley 3rd Ed.

References Books:

1. G. Keiser - *Optical Fiber Communication*, MH
2. Joseph Palais - *Fiber Optic Communications*, Pearson
3. Wilson Hawkes - *Opto Electronics*, PHI
4. Selvrajan, Srinivas - *Optical Fiber Communication*, TMH

Semester VIII
BIOMEDICAL INSTRUMENTATION

Course Code: EEC804

L	T	P	C
3	2	0	4

Objective:

- To study the Electrodes and Transducers, Cardiovascular.
- To understand the Respiratory System Measurement, Ophthalmology Instruments etc.

Course Contents

Unit I: Introduction: (8 Lectures)

Specifications of bio-medical instrumentation system, Man- Instrumentation system Components, Problems encountered in measuring a living system. Basics of Anatomy and Physiology of the body.

Bioelectric potentials: Resting and action potentials, propagation of action potential, The Physiological potentials – ECG, EEG, EMG, ERG, EOG and Evoked responses.

Electrodes and Transducers: Electrode theory, Biopotential Electrodes – Surface electrodes, Needle electrodes, Microelectrodes. Biomedical Transducers.

Unit II: Cardiovascular Measurements: (8 Lectures)

Electrocardiography –ECG amplifiers, Electrodes and Leads, ECG recorders –Single channel, Three channel, Vector Cardiographs, ECG System for Stresses testing, Holter recording, Blood pressure measurement, Heart sound measurement. Pacemakers and Defibrillators. Patient Care & Monitoring: Elements of intensive care monitoring, displays, diagnosis, Calibration & Reparability of patient monitoring equipment.

Unit III: Respiratory system Measurements: (8 Lectures)

Physiology of Respiratory system .Measurement of breathing mechanism – Spirometer. Respiratory Therapy equipments: Inhalators, Ventilators &Respirators, Humidifiers, and Nebulizers & Aspirators. Nervous System Measurements: Physiology of nervous system, Neuronal communication, Neuronal firing measurements.

Unit IV: Ophthalmology Instruments: (8 Lectures)

Electroretinogram, Electro-oculogram, Ophthalmoscope, Tonometer for eye pressure measurement. Diagnostic techniques: Ultrasonic diagnosis, Eco-cardiography, Ecoencephalography, , X-ray &Radio-isotope diagnosis and therapy, CAT-Scan, Emission computerized tomography, MRI.

Unit V: Bio-telemetry: (8 Lectures)

The components of a Bio-telemetry system, Implantable units, Telemetry for ECG measurements during exercise, for Emergency patient monitoring.

Prosthetic Devices and Therapies: Hearing Aids, Myoelectric Arm, Dia-thermy, Laser applications in medicine.

Text Books:

1. Khandpur R.S.- Biomedical Instrumentation- TMH
2. Venkata Ram,S.K.-Bio-Medical Electronics & Instrumentation (Revised)- Galgotia.

Reference Books:

3. Cromwell- Biomedical Instrumentation and Measurements- PHI
4. Webster, J.G. –Bio- Instrumentation ,Wiley (2004)
5. Ananthi, S. –A Text Book of Medical Instruments-2005-New Age International
6. Carr &Brown –Introduction to Biomedical Equipment Technology – Pearson
7. Pandey & Kumar-Biomedical Electronics and Instrumentation. – Kataria

Semester VIII
OPTICAL FIBRE COMMUNICATION (LAB)

Course Code: EEC853

L	T	P	C
0	0	4	2

List of Practical:

1. Electrical characteristics of LEDs.
2. Photometric characteristics of LED / LD (Polar Plot, Intensity Measurement)
3. NA Measurement for Single / Multi de, Gi / S1, fiber
4. Attenuation Measurement of optical fiber
5. Spectral characteristics of LED / LD
6. Fiber optic Analog/Digital transmitter/receiver parameter measurement
7. Study of fiber optical connectors
8. Spectral response of optical fiber
9. Parameter measurement of opto isolator
10. Study of OTDR.

Note: Minimum **EIGHT** practicals are to be performed

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)
The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VIII
BIOMEDICAL INSTRUMENTATION LAB

Course Code: EEC854

L	T	P	C
0	0	4	2

Biomedical Instrumentation Lab

1. Pulse measurement
2. Heartbeat measurement
3. Automatic BP measurement
4. Heart sound study using electronics stethoscope
5. ECG measurement

Following experiments to be done on the breadboard

6. Design of low noise and low frequency amplifier for biomedical application
7. Design of Instrumentation amplifier
8. Construction of chopper amplifier

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

<table>
<tr><td colspan="3">PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)</td><td rowspan="2">ATTENDANCE (5 MARKS)</td><td rowspan="2">QUIZ (5 MARKS)</td><td rowspan="2">VIVA (10 MARKS)</td><td rowspan="2">TOTAL INTERNAL (50 MARKS)</td></tr>
<tr><td>EXPERIMENT (10 MARKS)</td><td>FILE WORK (10 MARKS)</td><td>VIVA (10 MARKS)</td></tr>
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External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VIII
TELEVISION AND CONSUMER ELECTRONICS

Course Code: EEC805

L	T	P	C
3	2	0	4

Objective: To study operation of TV systems including both black& white and colour.

Course Contents

Unit – I **(Lectures 08)**

Basic concept of Television: TV broadcasting, Scanning methods, Synchronization, Aspect ratio, Kell factor, Horizontal and Vertical resolution, video bandwidth, positive and negative modulation. Composite video signal.

Camera Tubes: Image Orthicon, Vidicon, Plumbicon, Saticon, Silicon diode array, Television transmission: VSB transmission, TV channels, TV standards, TV Channels bands, block diagram of monochrome TV receiver.

Unit – II **(Lectures 08)**

Colour Television Receivers: Colour fundamentals, compatibility, frequency interleaving, colour mixing. Colour camera tube, picture tubes – static and dynamic convergence, colour purity. PAL, SECAM, NTSC system concept, encoder and decoder and their comparison. Colour TV transmitter and receiver block diagram.

Unit – III **(Lectures 08)**

Advanced TV System and Techniques: Introduction to digital compression technique: GPEG, MPEG.

Block diagram of digital TV: transmitter and receiver, HDTV- transmitter and receiver, DTH system, Video on demand. Introduction of Plasma and LCD TV. Cable TV. Introduction of 3D DTV system. CCTV, digital terrestrial TV (DTT).

Unit – IV **(Lectures 08)**

Methods of sound, video recording and reproduction: Disc recording, magnetic recording, optical recording- CD and DVD.

Monophony, stereophony, Hi-Fi system. PA system: Block diagram, requirement, characteristics, its planning for various uses. Introduction to satellite radio reception (word space)

Unit – V **(Lectures 08)**

Modern Home Appliances: Block Diagram and working of FAX Machine, Washing Machine, Microwave Oven, Video Games, CD and DVD players, Digital diary. Internet Applications: E-mail, FTP, WWW. Solar Cells and Panels. Introduction to Palm Top, Pen Drive.

Text Books

1. A. M. Dhake - *TV and Video Engineering*, TMH
2. R. G. Gupta - *TV Engineering and Video system*, TMH

Reference Books:

1. Kelth Jack - *Video Demisified*, Penram International
2. S. P. Bali - *Colour TV Theory and Practice*, TMH
3. Bernard Grobb, Charles E - *Basic TV and Video system*, TMH (6Th Ed.)
4. R. R. Gulati - *Monochrome and colour TV*, New Age
5. Philips Handbooks on *Audio, Video and Consumer Electronics application notes*
6. Olson - *High Quality Sound recording and reproduction*

Semester VIII
ADVANCED MICROPROCESSORS AND MICROCONTROLLERS

Course Code: EEC806

L	T	P	C
3	2	0	4

Objective:

- To understand the advanced Microprocessor and Micro controllers and their application in different fields.

Course Contents

Unit I **(Lectures 08)**

Mode of Operation of Higher Order Processors: Real mode and protected mode Real mode and protected mode memory addressing, access right byte, Memory paging, System descriptors, Multi Tasking & TSS.

Unit II **(Lectures 08)**

Instruction Set of higher order processors (8086 to Pentium): Comparison with 8086 in real mode: Generalized instruction set format Addressing Mode: DRAM & BRAM Categorization of instruction set of INTEL processors.

Integer instructions: Data transfer instructions, arithmetic and logical operations, string instructions, branch control instructions, procedure call instruction and return instruction.

Unit III **(Lectures 08)**

Processing of CALLS, INTERRUPTS & EXCEPTIONS: Privilege levels; ENTER and LEAVE Instructions, INTN, IRET. Interrupt processing sequence, Protected mode interrupts.

Unit IV **(Lectures 08)**

Assembly Level Programming: ROM BIOS Routines, MS DOS BIOS Routines, Assembling a progam using Assembler, exe and. com programs. Mixed Language Programming: using Assembly with C/C ++.

Unit V **(Lectures 08)**

Microcontrollers: Introduction, basic functions, applications of 8-bit and 16-bit microcontrollers.

8-bit microcontrollers INTEL 8051: Internal Architecture, signals, memory organization and interfacing, Timing and control, port operations, interrupts and I/O addressing. Instruction Set and programming.

16-bit microcontrollers INTEL 8096: Architectural description, memory Organization and interfacing, I/O addressing, Interrupts, instruction set and programming.

Text Books:

1. Ray, A.K. & Burchandi, K.m., "*Advanced Microprocessors and Peripherals: Architeacture, Programming and Interfacing"* Tata Mc.Graw Hill.
2. Renu Sing & B.P.Singh, "*Advanced Microprocessors and Microcontrollers"* New Age International.
3. Krishna Kant,"*Microprocessors and Microcontrollers*" PHI Learning.
4. Brey, Barry B. "*The INTEL Microprocessors*" Pearson Education.

Reference Books:

1. Ayala, "*The 8051 Micro Controller*", Centage Learning.
2. Mazidi M.A., Maizidi J.G. Mckinlay R.D., "*The 8051 Microcontroller and Embedded Systems*", Pearson Education.
3. Rajkamal, "*The concept and feature of microcontrollers 68HC11, 8051 and 8096",* S.Chand Publisher, New Delhi
4. Peatman John, "*Design with microcontroller*", Mc.-Graw Hill Publishing.

Semester VIII
PROJECT

Course Code: EEC899

L	T	P	C
0	0	6	6

Students should devote themselves to make a project which preferably should be a working model of their thoughts based on their subject of choice.

The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the VI semester.

The project shall be finalized by the students before the commencement of the VII semester and shall be completed and submitted at least one month before the last teaching day of the VIII semester, date of which shall be notified in the academic calendar.

The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII and each internal assessment shall be for 50 marks. The student shall present the final project live using overhead projector, power point presentation on LCD to the internal committee and also the external examiner.

The evaluation committee shall consist of faculty members constituted by the college which would be comprised of at least three members- Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately to the Director in a sealed envelope.

Not more than three students would form a group for such industrial training/ project submission.

The marking shall be as follows.

Internal: 50 marks
By the Faculty Guide - 25 marks
By Committee appointed by the Director – 25 marks

External: 50 marks
By External examiner appointed by the University – 50 marks