

Study & Evaluation Scheme

of

Bachelor of Technology (Electronics & Communication Engineering)

[Applicable w.e.f. Academic Session 2012-13 till revised]

[With changes in ECS303,EEE304,EEE353,ECS353,EEC552,EEC503,EEC504
wide approval of V.C dated 26-10-2013]



TEERTHANKER MAHAVEER UNIVERSITY

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TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Bagarpur, Moradabad (U.P)

Study & Evaluation Scheme 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	: <input type="text" value="194"/>
Minimum credit required for the degree	: <input type="text" value="190"/>

Assessment Theory	:	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			

Project Phase-1	:	Internal	External	Total
		100	-	100

Evaluation of Practical/ Industrial Training/ Project Phase-2	:	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 teacher's 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% 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

- 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).*
- Out of the remaining 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.*
- Usually each question in the examination should be designed to have a numerical component.*

Study & Evaluation Scheme
Programme: B. Tech (Electronics & Communication Engg.)
Semester I

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS 101	Engineering Mathematics-I	3	1	-	4	30	70	100
2	EAS 102/ EAS 202	Physics - I	3	-	-	3	30	70	100
	EAS 103/ EAS 203	Chemistry							
3	EME101/ EME 201	Engineering Mechanics	3	-	-	3	30	70	100
	EME102/ EME202	Manufacturing Science							
4	ECS 101/ ECS 201	Computer Basics & C Programming	3	-	-	3	30	70	100
	EAS 104/ EAS204	Environmental Science							
5	EEE 101/ EEE 201	Basic Electrical Engineering	3	-	-	3	30	70	100
	EEC 101/ EEC 201	Basic Electronics Engineering							
6	EHM 101	Foundation English-I	2	-	2	3	30	70	100
7	EAS 151/ EAS 251	Physics (Lab)	-	-	3	1.5	50	50	100
	EAS 152/ EAS 252	Chemistry (Lab)							
8	EME 151/ EME251	Engineering Mechanics(Lab)	-	-	3	1.5	50	50	100
	ECS 151/ ECS251	Computer Basics & C Programming (Lab)							
9	EME 152/ EME252	Engineering Drawing (Lab)	-	-	4	2	50	50	100
	EME 153/ EME253	Workshop Practice (Lab)							
10	EEE 151/ EEE251	Basic Electrical Engineering (Lab)	-	-	3	1.5	50	50	100
	EEC 151/ EEC251	Basic Electronics Engineering (Lab)							
		Total	17	1	15	25.5	380	620	1000

Semester II

S.No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS 201	Engineering Mathematics-II	3	1	-	4	30	70	100
2	EAS 202/ EAS102	Physics - I	3	-	-	3	30	70	100
	EAS 203/ EAS103	Chemistry							
3	EME 201/ EME 101	Engineering Mechanics	3	-	-	3	30	70	100
	EME 202/ EME102	Manufacturing Science							
4	ECS 201/ ECS101	Computer Basics & C Programming	3	-	-	3	30	70	100
	EAS 204/ EAS 104	Environmental Science							
5	EEE 201/ EEE 101	Basic Electrical Engineering	3	-	-	3	30	70	100
	EEC 201/ EEC 101	Basic Electronics Engineering							
6	EHM 201	Foundation English-II	2	-	2	3	30	70	100
7	EAS 251/ EAS 151	Physics (Lab)	-	-	3	1.5	50	50	100
	EAS 252/ EAS 152	Chemistry (Lab)							
8	EME 251/ EME 151	Engineering Mechanics (Lab)	-	-	3	1.5	50	50	100
	ECS 251/ ECS 151	Computer Basics & C Programming (Lab)							
9	EME 252/ EME 152	Engineering Drawing (Lab)	-	-	4	2	50	50	100
	EME 253/ EME 153	Workshop Practice (Lab)							
10	EEE 251/ EEE 151	Basic Electrical Engineering (Lab)	-	-	3	1.5	50	50	100
	EEC 251/ EEC 151	Basic Electronics Engineering (Lab)							
		Total	17	1	15	25.5	380	620	1000

Semester III

S.No.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS 301/ EAS 302	Mathematics-III/ Physics-II	3	1	0	4	30	70	100
2	EEC301	Digital Logic & Circuit	3	-	0	3	30	70	100
3	EEC 302	Semiconductor Materials & Devices	3	-	0	3	30	70	100
4	EEC 303	Engineering Electromagnetics	3	1	0	4	30	70	100
5	ECS 305	Data Structures using C	3	-	0	3	30	70	100
6	EEE 302	Instruments & Measurements	3	-	0	3	30	70	100
7	EEC 351	Digital Logic & Circuit (Lab)	0	-	3	1.5	50	50	100
8	EEE 352	Instruments & Measurements (Lab)	0	-	3	1.5	50	50	100
9	ECS 355	Data Structures using C (Lab)	0	-	3	1.5	50	50	100
		Total	18	2	9	24.5	330	570	900

Additional Courses for Lateral Entry Students with B.Sc background, to be taken in III and IV semester and all should pass with minimum of 40% marks: credits will not be added)

1	EME 152/ EME 252	Engineering Drawing Lab	-	-	3	0	50	50	100
2	EME 101/ EME201	Engineering Mechanics	3	-	-	0	30	70	100
	EME 102/ EME202	Manufacturing Science							
3	EME 153/ EME253	Workshop Practice (Lab)	-	-	3	0	50	50	100
	EME 151/ EME251	Engineering Mechanics (Lab)							

Semester IV

S.No.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS 401/ EAS 402	Mathematics-III/ Physics-II	3	1	0	4	30	70	100
2	EEC 401	Signal & Systems	3	1	0	4	30	70	100
3	EEE 403	Network Analysis & Synthesis	3	-	0	3	30	70	100
4	EEC 402	Principles of Communications	3	-	0	3	30	70	100
5	EEC 403	Electronic Devices & Circuits	3	-	0	3	30	70	100
6	ECS 405	Neural Networks	3	-	0	3	30	70	100
7	EEE 452	Network Analysis & Synthesis (Lab)	0	-	3	1.5	50	50	100
8	EEC 452	Electronic Devices & Circuits (Lab)	0	-	3	1.5	50	50	100
9	EEC 453	Communication Lab-I (Analog)	0	-	3	1.5	50	50	100
		Total	18	2	9	24.5	330	570	900

Semester V

S.No.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EEE 501	Control Systems	3	-	0	3	30	70	100
2	EEC 501	Microprocessor & Applications	3	-	0	3	30	70	100 3
	EEC 502	Microwave Techniques	3	-	0	3	30	70	100
4	EEC 504	Digital Communication Systems	3	-	0	3	30	70	100
5	EEC 506	Radar & Navigation	3	-	0	3	30	70	100
6	EEE 551	Control Systems (Lab)	0	-	3	1.5	50	50	100
7	EEC 553	Microprocessor & Applications (Lab)	0	-	3	1.5	50	50	100
8	EEC 552	Communication Lab-II (Digital)	0	-	3	1.5	50	50	100
9	EEC 554	Microwave Techniques (Lab)	0	-	3	1.5	50	50	100
10	EEC 591	Industrial Training & Presentation*	0	-	0	2	50	50	100
		Total	15	-	12	23	400	600	1000

* Industrial Training for four weeks

Semester VI

S.No.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EHM 602	Industrial Psychology	3	-	0	3	30	70	100
2	EEC 601	Antenna & Wave Propagation	3	1	0	4	30	70	100
3	EEC 602	Analog Integrated Electronics	3	-	0	3	30	70	100
4	EEC 603	Design of Electronic Systems	3	-	0	3	30	70	100
5	EEC 604	Telecommunication Switching Systems	3	-	0	3	30	70	100
6	EHM 601	Technical Writing	2	-	2	3	30	70	100
7	EEC 651	Analog Integrated Electronics (Lab)	0	-	3	1.5	50	50	100
8	EEC 652	Design of Electronic Systems (Lab)	0	-	3	1.5	50	50	100
9	EEC 653	Antenna & Wave Propagation (Lab)	0	-	3	1.5	50	50	100
		Total	17	1	11	23.5	330	570	900

Semester VII

S.No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EEC 701	Digital Instrumentation	3	-	-	3	30	70	100
2	EEC 702	Digital Signal Processing	3	1	-	4	30	70	100
3	EEC 703	Mobile & Cellular Communication	3	-	-	3	30	70	100
4		Elective I#	3	-	-	3	30	70	100
5	EEC 751	Digital Instrumentation(Lab)	0	-	3	1.5	50	50	100
6	EEC 752	Digital Signal Processing (Lab)	0	-	3	1.5	50	50	100
7	EEC 753	Electronic Workshop & PCB Lab	0	-	3	1.5	50	50	100
		Elective-I# –Choose any one course							
	EEC 704	Information Theory & Coding							
	EEE 705	Power Electronics & Application							
	EEC 706	Embedded Systems							
8	EEC 791	Industrial Training & Presentation*	0	-	-	3	50	50	100
9	EEC 799	Project Work Phase-1 (Synopsis, Literature Survey, and Presentation)	0	-	6	3	100		100
		Total	12	1	15	23.5	420	480	900

* Industrial Training for six weeks

Semester VIII

S.No	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EEC 801	VLSI Design & Technology	3	-	-	3	30	70	100
2	EEC 802	Optical Fiber Communication	3	-	-	3	30	70	100
3	EHM 801	Economics & Project Management	3	-	0	3	30	70	100
4		Elective II#	3	-	0	3	30	70	100
5	EEC 851	VLSI Design & Technology (Lab)	0	-	3	1.5	50	50	100
6	EEC 852	Optical Fiber Communication (Lab)	0	-	3	1.5	50	50	100
Elective II# -Choose any one course									
	EEC 803	Biomedical Instrumentation							
	EEC 804	Satellite Communication							
	EHM 804	Principles of Management							
7	EEC 899	Project Work Phase -II (Report, Analysis, Implementation/Simulation, and Presentation)	-	-	18	9	50	50	100
		Total	12	-	24	24	270	430	700

Abbreviations: (L T P C)

L – Lecture	T - Tutorial	P - Practical	C -Credits
1L = 1Hr	1T = 1 Hr	1P =1Hr	1C =1Hr of theory
Total Credit =194			1C = 2 Hr of Practical/tutorial

Semester I
ENGINEERING MATHEMATICS-I

Course Code: EAS 101

L	T	P	C
3	1	0	4

Objective:

- To familiarize the basics of matrices, differential calculus, multiple integrals and vector calculus.
- To solve all problems related to matrices, calculus and vectors.

Course Contents

UNIT I

(Lectures 08)

Matrices: Elementary row and column transformation; Rank of matrix; Linear dependence; Consistency of linear system of equations; Characteristic equation; Cayley-Hamilton Theorem; Eigen values and Eigen vectors; Diagonalization; Complex and unitary matrices.

UNIT II

(Lectures 08)

Differential Calculus-I: Successive differentiation; Leibnitz theorem; Partial differentiation; Euler's theorem; Curve tracing; Change of variables; Expansion of function of several variables

UNIT III

(Lectures 08)

Differential Calculus-II: Jacobian; Approximation of errors; Extrema of functions of several variables; Lagrange's method of multipliers (Simple applications).

UNIT IV

(Lectures 08)

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

UNIT V

(Lectures 08)

Vector Calculus: Point functions; Gradient, Divergence and Curl of a vector and their physical interpretations; Line, Surface and Volume integrals; Green's & Stokes' theorem; Gauss' divergence theorem.

Text Books

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

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.

Semester I/II PHYSICS-I

Course Code: EAS 102/EAS 202

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

Semiconductor Physics: Distinction among metal, insulator & semiconductor on the basis of band theory; Intrinsic and Extrinsic semiconductors; Basic concepts of Fermi level; Electron and hole mobilities; Electrical conductivity and Hall effect; Basics of p-n Junction.

UNIT II

(Lectures 08)

Interference: Basics of interference of light; coherent Sources, Conditions of Interference; Interference by division of wave front and amplitude (Fresnel's bi-prism, Newton's Rings).

Diffraction: Single and multiple slit Diffraction; Diffraction Grating; Rayleigh's criterion of resolution; Resolving Power of Telescope, Microscope and Grating.

UNIT III

(Lectures 08)

Polarization: Phenomenon of double refraction; Ordinary and extra-ordinary rays; Nicol Prism; Production and analysis of Plane, Circularly and Elliptically Polarized Light; Optical Activity; Specific Rotation, Polarimeter.

Laser: Principle of Laser action; Einstein's Coefficients; Construction and working of He-Ne and Ruby Laser.

UNIT IV

(Lectures 08)

Fiber Optics and Holography: Fundamentals of fiber optics; Types of fibers; Acceptance angle ; Numerical aperture; Attenuation, signal loss in optical fiber and dispersion; Propagation mechanism and communication in optical fiber.

Basic principle of holography; Construction of a hologram and wave reconstruction; Applications of holography.

UNIT V

(Lectures 08)

Electromagnetics: Ampère's law and displacement current; Maxwell's equations in Integral and Differential Forms; Equation of continuity; Electromagnetic Wave Propagation in Free Space and Conducting Media; Poynting Theorem.

Text Books

- Malik K. H., *Engineering Physics*, Tata McGraw Hill.
- Subramanyam N, *Optics*, Tata McGraw Hill.

Reference Book

- Yadav V. S., *Engineering Physics*, Tata McGraw Hill.
- Mehta Neeraj, *Engineering Physics Vol. I & II*, Prentice Hall of India Pvt. Ltd.

**Semester I/II
CHEMISTRY**

Course Code: EAS 103/EAS 203

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

Chemical bonding & Solid State Chemistry: Molecular theory of diatomic hetero-molecules; Band theory of bonding in metals; Hydrogen bonding; 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.

UNIT II

(Lectures 08)

Polymers , Reaction Kinetics, Phase rule & Electrochemistry: 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.

UNIT III

(Lectures 08)

Water Chemistry & Fuels: Hardness of water; water softening by Lime Soda Process, Calgon process, Zeolites and ion-exchange resins; Reverse osmosis; Classification of fuels, Coal, Biomass & Biogas; Determination of gross and net calorific values using Bomb Calorimeter.

UNIT IV

(Lectures 08)

Glass & Ceramics: Concept of glass & its constituents; Classification & uses of different glasses; Elementary idea of manufacturing process of glass; Introduction to Ceramics materials & its constituents, Industrial application of glass & ceramics.

UNIT V

(Lectures 08)

Lubricants: Introduction to lubricants; Mechanism of lubrication; Classification of lubricants; Flash and fire points, Selection of lubricants.

Text Books

1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
2. Morrison & Boyd, *Organic Chemistry*, Prentice Hall
3. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books

1. Barrow Gordon M., *Physical Chemistry*, Mcgraw-Hill.
2. Manahan Stanley E., *Environmental Chemistry*, CRC Press.

Semester I/II
ENGINEERING MECHANICS

Course Code: EME 101/EME 201

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

Force systems and analysis: Basic concept; Newton's laws of motion; Transfer of force to a parallel position; Determination of resultant of planer force system; Free body diagrams; Equilibrium of forces and its equations.

Friction: Introduction; Coulomb's law of friction; Equilibrium of bodies involving dry friction; Belt Friction.

UNIT II

(Lectures 08)

Structural 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.

UNIT III

(Lectures 08)

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

UNIT IV

(Lectures 08)

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.

UNIT V

(Lectures 08)

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.

Text Books

1. Bansal R. K., *Engineering Mechanics*, Laxmi Publications.
2. Kumar D. S., *Engineering Mechanic*, S. K. Kataria & Sons.
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. Ramamruthams, *Strength of materials*, Dhanpat Rai Publications.

Semester I/II
MANUFACTURING SCIENCE

Course Code: EME 102/EME 202

L	T	P	C
3	0	0	3

Objective: To expose the students about basics of manufacturing processes as applicable in Mechanical Engineering.

Course Contents

UNIT I

(Lectures 08)

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

UNIT II

(Lectures 10)

Metal Forming: Basic metal forming operations & uses of such as: Forging, Rolling, Wire drawing/making and Extrusion, and its products/application; Press-work; die & punch assembly, cutting and forming, its application; Hot-working versus cold-working; Introduction to Plastics: Types, Machines: Injection Moulding.

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.

UNIT III

(Lectures 10)

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 and principle; Electric-Arc welding; Resistance welding; Soldering, & Brazing and its uses.

UNIT IV

(Lectures 8)

Unconventional Manufacturing Process: Limitations of conventional manufacturing process; need of unconventional manufacturing processes; Basic Principles and working of unconventional manufacturing process and their applications; Electro-Discharge machining; Electro-chemical machining; Ultrasonic machining; Abrasive jet machining; Water jet machining; Laser cutting and Laser beam welding.

UNIT V

(Lectures 04)

Super Finishing Processes: Introduction; Lapping; Honing; Buffing; Burnishing; Powder coating; Polishing

Text Books

1. Hajra & Bose, *Workshop Technology, Vol 1 & 2*, Roy Media Promoters.
2. Pandey & Singh, *Production Engineering Science*, Standard Publishers.
3. R.K. Jain, *Production technology*, Khanna publishers.

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*, Pearson Education.

Semester I/II
COMPUTER BASICS & C PROGRAMMING

Course Code: ECS 101/ECS 201

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

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.

UNIT II

(Lectures 08)

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: Numeric and relation operators; logical operator; bit operator; operator precedence and associativity.

UNIT III

(Lectures 08)

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. Break and default with switch.

UNIT IV

(Lectures 08)

Concepts in Operating Systems: Elementary Concepts in Operating Systems; Textual Vs GUI Interface.

Arrays: Notation and representation; Manipulation of array elements; Multidimensional arrays.

UNIT V

(Lectures 08)

Functions & Strings: Definition; Declaration; Call by Value; Call by Reference; Returns values and their types; Function calls

Text Books

1. Sinha P. K., *Computer Fundamentals*, BPB Publications.
2. Yadav, DS, *Foundations of IT*, New Age.
3. Curtin, *Information Technology: Breaking News*, Tata McGraw Hill.
4. Rajaraman,R, *Introduction to Computers*, Prentice Hall of India.

Reference Books

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

Semester I/II
ENVIRONMENTAL SCIENCE

Course Code: EAS 104/EAS 204	L	T	P	C
	3	0	0	3

Objective:

- To create awareness among students about environment protection.

UNIT I **(Lectures 08)**

Introduction: Definition, Scope, Segments of Environment and its Multidisciplinary Nature; Some Major Environmental Problems; Definition and Scope of Ecology.

UNIT II **(Lectures 08)**

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.

UNIT III **(Lectures 08)**

Air & water pollution: Various segments of Atmosphere and their Significance; Sources and Effects of Air Pollution; Sources of Air Pollution: Photochemical Smog, Acid Rain, Global Warming, Ozone Layer - Its Depletion and Control Measures; Sources of Water Pollution; Treatment of Water Pollution; Eutrophication.

UNIT IV **(Lectures 08)**

Soil & Thermal pollution: Soil pollution: Sources and Consequences; Solid Wastes – Pollution; Treatment & Disposal.

Thermal - sources and consequences; Sustainable Development; Dams and Reservoirs- Their Benefits and Problems.

UNIT V **(Lectures 08)**

Biodiversity & its conservation

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; Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation; Biological Magnification.

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.

Semester I/II
BASIC ELECTRICAL ENGINEERING

Course Code: EEE 101/EEE 201

L	T	P	C
3	0	0	3

Objective

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

Course Contents

UNIT I

(Lectures 08)

D.C. Network Theory: Circuit theory concepts-Mesh and node analysis; Network Theorems-Superposition theorem, Thevenin's theorem, Norton's theorem and Maximum Power Transfer theorem; Star Delta transformation.

UNIT II

(Lectures 08)

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; Power factor; Series and parallel resonance; Band width and quality factor; magnetic circuit.

UNIT III

(Lectures 08)

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.

UNIT IV

(Lectures 08)

Transformer: Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and voltage regulation of single phase transformer; Open and short circuit 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; Motor applications.

UNIT V

(Lectures 08)

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,

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. Fitzgerald A.E & Higginbotham ., D.E., *Basic Electrical Engineering*, McGraw Hill.
3. A Gabel, *Basic Electrical Engineering*, McGraw Hill.
4. Cotton H., *Advanced Electrical Technology*, Wheeler Publishing.

Semester I/II
BASIC ELECTRONICS ENGINEERING

Course Code: EEC 101/EEC 201

L	T	P	C
3	0	0	3

Objective

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

Course Contents

UNIT I

(Lectures 08)

p-n 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.

UNIT II

(Lectures 08)

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 A_i , A_v , R_i & R_o of single transistor CE amplifier configuration.

UNIT III

(Lectures 08)

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.

UNIT IV

(Lectures 08)

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

UNIT V

(Lectures 08)

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

Text Books

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

Reference Books

1. Sedra and Smith, *Microelectronic Circuits*, Oxford University Press .
2. Gayakwad, R A, *Operational Amplifiers and Linear Integrated circuits*, Prentice Hall of India Pvt. Ltd.
3. Chattopadhyay D and P C Rakshit, *Electronics Fundamentals and Applications*, New Age International.

Semester-I
FOUNDATION ENGLISH - I

Course code: EHM 101

L	T	P	C
2	0	2	3

(Common with BPH105/BED105/BAL101/AR107/BHM101/BFS106/BCA106/BBA106/ BCH106/ BFA103)

Course Contents:

UNIT I

(Lectures 10)

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

UNIT II

(Lectures 10)

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

UNIT III

(Lectures 10)

Communication: Meaning & importance of communication, Barriers to effective communication, Channels of communication, Language as a tool of communication.

UNIT IV

(Lectures 10)

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

Text Books:

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

Reference Books:

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

**Semester I/II
PHYSICS (LAB)**

Course Code: EAS 151/EAS 251

L T P C
0 0 3 1.5

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:

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
CHEMISTRY (LAB)

Course Code: EAS 152/EAS 252

L	T	P	C
0	0	3	1.5

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
ENGINEERING MECHANICS (LAB)

Course Code: EME 151/EME 251

L	T	P	C
0	0	3	1.5

(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 conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To conduct the Impact test on Impact-testing machine to find the toughness by Charpy impact test.
4. To conduct the Impact-test on Impact-testing machine to find the toughness by Izod impact Test.
5. To determine the hardness of the given specimen using Rockwell hardness testing machine.
6. To determine the hardness of the given specimen using Brinell hardness testing machine.
7. To determine gear ratio of simple and compound gear train.
8. To determine the mechanical advantage of worm and worm wheel for load lifting.
9. To find the coefficient of friction on inclined plane.
10. To perform torsion test for rod on torsion testing machine.

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

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

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

Course Code: ECS 151/ 251

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

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

Evaluation of Practical Examination:

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
ENGINEERING DRAWING (LAB)

Course Code: EME 152/EME 252

L	T	P	C
0	0	4	2

1. To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.
2. To draw the types of lines and conventions of different materials.
3. To draw and study dimensioning and Tolerance.
4. To construction geometrical figures of Pentagon and Hexagon
5. To draw the projection of points and lines
6. To draw the Orthographic Projection of given object in First Angle
7. To draw the Orthographic Projection of given object in Third Angle
8. To draw the sectional view of a given object
9. To draw the development of the lateral surface of given object
10. To draw the isometric projection of the given orthographic projection.

Reference Books

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

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

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

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
WORKSHOP PRACTICE (LAB)

Course Code: EME 153/EME 253

L	T	P	C
0	0	4	2

List of Experiments

Perform any ten experiments selecting at least one from each shop.

Carpentry Shop:

1. To prepare half-lap corner joint.
2. To prepare mortise & tenon joint.
3. To prepare a cylindrical pattern on woodworking lathe.

Fitting Bench Working Shop:

1. To prepare a V-joint fitting
2. To prepare a U-joint fitting
3. To prepare a internal thread in a plate with the help of tapping process

Black Smithy Shop:

1. To prepare a square rod from given circular rod
2. To prepare a square U- shape from given circular rod

Welding Shop:

1. To prepare a butt and Lap welded joints using arc welding machine.
2. To prepare a Lap welded joint Gas welding equipment.
3. To prepare a Lap welded joint using spot welding machine.

Sheet-metal Shop:

1. To make round duct of GI sheet using 'soldering' process.
2. To prepare a tray of GI by fabrication

Machine Shop:

1. To prepare a bolt on the lathe machine as per given. diagram
2. To prepare a job on the lathe machine as per given diagram.

Foundry Shop:

1. To prepare core as per given size.
2. To prepare a mould for given 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
BASIC ELECTRICAL ENGINEERING (LAB)

Course Code: EEE 151/EEE 251

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

1. To verify the Kirchhoff's current and voltage laws.
2. To verify the Superposition theorem.
3. To verify the Thevenin's theorem.
4. To verify the Norton's theorem.
5. To verify the maximum power transfer theorem.
6. To determine the efficiency of single-phase transformer by load test.
7. To determine the external characteristics of DC Shunt generator.
8. To measure current and speed for speed control of D.C. Shunt Motor.
9. To measure the power in a 3-phase system by two-wattmeter method
10. To measure the power factor in an RLC by varying the capacitance.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
BASICS ELECTRONICS ENGINEERING (LAB)

Course Code: EEC 151/EEC 251

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

1. To study the V-I characteristics of p-n junction diode.
2. To study the diode as clipper and clamper.
3. To study the half-wave & full-wave rectifier using silicon diode.
4. To study transistor in Common Base configuration & plot its input/output characteristics.
5. To study transistor in Common Emitter configuration & plot its input/output characteristics. .
6. To study the operational amplifier in inverting & non inverting modes using IC 741.
7. To study the operational amplifier as differentiator & integrator.
8. To study the Zener diode as a shunt regulator.
9. To study various logic gates & verify their truth tables.
10. To study half adder/full adder & verify their truth tables.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
ENGINEERING MATHEMATICS- II

Course Code: EAS 201

L	T	P	C
3	1	0	4

Objective:

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

Course Contents

UNIT I

(Lectures 08)

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).

UNIT II

(Lectures 08)

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.

UNIT III

(Lectures 10)

Partial Differential Equations and applications: 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.

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.

UNIT IV

(Lectures 06)

Fourier Series: Periodic functions, Trigonometric series; Fourier series; Euler's formulae; Even and odd functions, Half range sine and cosine series.

UNIT V

(Lectures 08)

Laplace Transform: Laplace transform; Existence theorem; Laplace transform of derivatives and integrals; Inverse Laplace transform; Unit step function; Dirac delta function; Laplace transform of periodic functions; Convolution theorem; Application to solve simple linear and simultaneous differential equations.

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.

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 Mathematics-II*, Laxmi Publications.

Semester I/ Semester II
PHYSICS-I

Course Code: EAS 102/EAS 202

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

Semiconductor Physics: Distinction among metal, insulator & semiconductor on the basis of band theory; Intrinsic and Extrinsic semiconductors; Basic concepts of Fermi level; Electron and hole mobilities; Electrical conductivity and Hall effect; Basics of p-n Junction.

UNIT II

(Lectures 08)

Interference: Basics of interference of light; coherent Sources, Conditions of Interference; Interference by division of wave front and amplitude (Fresnel's bi-prism, Newton's Rings).

Diffraction: Single and multiple slit Diffraction; Diffraction Grating; Rayleigh's criterion of resolution; Resolving Power of Telescope, Microscope and Grating.

UNIT III

(Lectures 08)

Polarization: Phenomenon of double refraction; Ordinary and extra-ordinary rays; Nicol Prism; Production and analysis of Plane, Circularly and Elliptically Polarized Light; Optical Activity; Specific Rotation, Polarimeter.

Laser: Principle of Laser action; Einstein's Coefficients; Construction and working of He-Ne and Ruby Laser.

UNIT IV

(Lectures 08)

Fiber Optics and Holography: Fundamentals of fiber optics; Types of fibers; Acceptance angle ; Numerical aperture; Attenuation, signal loss in optical fiber and dispersion; Propagation mechanism and communication in optical fiber.

Basic principle of holography; Construction of a hologram and wave reconstruction; Applications of holography.

UNIT V

(Lectures 08)

Electromagnetics: Ampère's law and displacement current; Maxwell's equations in Integral and Differential Forms; Equation of continuity; Electromagnetic Wave Propagation in Free Space and Conducting Media; Poynting Theorem.

Text Books

3. Malik K. H., *Engineering Physics*, Tata McGraw Hill.
4. Subramanyam N, *Optics*, Tata McGraw Hill.

Reference Book

3. Yadav V. S., *Engineering Physics*, Tata McGraw Hill.
4. Mehta Neeraj, *Engineering Physics Vol. I & II*, Prentice Hall of India Pvt. Ltd.

**Semester I/ Semester II
CHEMISTRY**

Course Code: EAS 103/EAS 203

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

Chemical bonding & Solid State Chemistry: Molecular theory of diatomic hetero-molecules; Band theory of bonding in metals; Hydrogen bonding; 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.

UNIT II

(Lectures 08)

Polymers , Reaction Kinetics, Phase rule & Electrochemistry: 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.

UNIT III

(Lectures 08)

Water Chemistry & Fuels: Hardness of water; water softening by Lime Soda Process, Calgon process, Zeolites and ion-exchange resins; Reverse osmosis; Classification of fuels, Coal, Biomass & Biogas; Determination of gross and net calorific values using Bomb Calorimeter.

UNIT IV

(Lectures 08)

Glass & Ceramics: Concept of glass & its constituents; Classification & uses of different glasses; Elementary idea of manufacturing process of glass; Introduction to Ceramics materials & its constituents, Industrial application of glass & ceramics.

UNIT V

(Lectures 08)

Lubricants: Introduction to lubricants; Mechanism of lubrication; Classification of lubricants; Flash and fire points, Selection of lubricants.

Text Books

4. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
5. Morrison & Boyd, *Organic Chemistry*, Prentice Hall
6. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books

3. Barrow Gordon M., *Physical Chemistry*, Mcgraw-Hill.
4. Manahan Stanley E., *Environmental Chemistry*, CRC Press.

Semester I/ Semester II ENGINEERING MECHANICS

Course Code: EME 101/EME 201

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

Force systems and analysis: Basic concept; Newton's laws of motion; Transfer of force to a parallel position; Determination of resultant of planer force system; Free body diagrams; Equilibrium of forces and its equations.

Friction: Introduction; Coulomb's law of friction; Equilibrium of bodies involving dry friction; Belt Friction.

UNIT II

(Lectures 08)

Structural 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.

UNIT III

(Lectures 08)

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

UNIT IV

(Lectures 08)

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.

UNIT V

(Lectures 08)

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.

Text Books

- Bansal R. K., *Engineering Mechanics*, Laxmi Publications.
- Kumar D. S., *Engineering Mechanic*, S. K. Kataria & Sons.
- Kumar K. L., Kumar V., *Engineering Mechanics*, Tata McGraw Hill Publication.
- Khurmi R. S., *Engineering Mechanics*, S. Chand Publications.

Reference Books

- Shames, *Engineering Mechanics*, Prentice Hall of India Pvt. Ltd.
- Ryder G. H., *Strength of Materials*, Macmillan Publishers India Ltd.
- Ramamruthams, *Strength of materials*, Dhanpat Rai Publications.

Semester I/ Semester II
MANUFACTURING SCIENCE

Course Code: EME 102/EME 202

L	T	P	C
3	0	0	3

Objective: To expose the students about basics of manufacturing processes as applicable in Mechanical Engineering.

Course Contents

UNIT I

(Lectures 08)

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

UNIT II

(Lectures 10)

Metal Forming: Basic metal forming operations & uses of such as: Forging, Rolling, Wire drawing/making and Extrusion, and its products/application; Press-work; die & punch assembly, cutting and forming, its application; Hot-working versus cold-working; Introduction to Plastics: Types, Machines: Injection Moulding.

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.

UNIT III

(Lectures 10)

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 and principle; Electric-Arc welding; Resistance welding; Soldering, & Brazing and its uses.

UNIT IV

(Lectures 8)

Unconventional Manufacturing Process: Limitations of conventional manufacturing process; need of unconventional manufacturing processes; Basic Principles and working of unconventional manufacturing process and their applications; Electro-Discharge machining; Electro-chemical machining; Ultrasonic machining; Abrasive jet machining; Water jet machining; Laser cutting and Laser beam welding.

UNIT V

(Lectures 04)

Super Finishing Processes: Introduction; Lapping; Honing; Buffing; Burnishing; Powder coating; Polishing

Text Books

1. Hajra & Bose, *Workshop Technology, Vol 1 & 2*, Roy Media Promoters.
2. Pandey & Singh, *Production Engineering Science*, Standard Publishers.
3. R.K. Jain, *Production technology*, Khanna publishers.

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*, Pearson Education.

Semester I/II
COMPUTER BASICS & C PROGRAMMING

Course Code: ECS 101/ECS 201

L	T	P	C
3	0	0	3

Objective:

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

Course Contents

UNIT I

(Lectures 08)

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.

UNIT II

(Lectures 08)

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: Numeric and relation operators; logical operator; bit operator; operator precedence and associativity.

UNIT III

(Lectures 08)

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. Break and default with switch.

UNIT IV

(Lectures 08)

Concepts in Operating Systems: Elementary Concepts in Operating Systems; Textual Vs GUI Interface.

Arrays: Notation and representation; Manipulation of array elements; Multidimensional arrays.

UNIT V

(Lectures 08)

Functions & Strings: Definition; Declaration; Call by Value; Call by Reference; Returns values and their types; Function calls

Text Books

5. Sinha P. K., *Computer Fundamentals*, BPB Publications.
6. Yadav, DS, *Foundations of IT*, New Age.
7. Curtin, *Information Technology: Breaking News*, Tata McGraw Hill.
8. Rajaraman, R, *Introduction to Computers*, Prentice Hall of India.

Reference Books

5. Peter Nortans, *Introduction to Computers*, Tata McGraw Hill.
6. Leon & Leon, *Fundamental of Information Technology*, Vikas Publishing.
7. Kanter, *Managing Information System*, Prentice-Hall.
8. CISTems, *Internet: An Introduction*, Tata McGraw Hill.

Semester I/II
ENVIRONMENTAL SCIENCE

Course Code: EAS 104/EAS 204

L	T	P	C
3	0	0	3

Objective:

- To create awareness among students about environment protection.

UNIT I

(Lectures 08)

Introduction: Definition, Scope, Segments of Environment and its Multidisciplinary Nature; Some Major Environmental Problems; Definition and Scope of Ecology.

UNIT II

(Lectures 08)

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.

UNIT III

(Lectures 08)

Air & water pollution: Various segments of Atmosphere and their Significance; Sources and Effects of Air Pollution; Sources of Air Pollution: Photochemical Smog, Acid Rain, Global Warming, Ozone Layer - Its Depletion and Control Measures; Sources of Water Pollution; Treatment of Water Pollution; Eutrophication.

UNIT IV

(Lectures 08)

Soil & Thermal pollution: Soil pollution: Sources and Consequences; Solid Wastes – Pollution; Treatment & Disposal.

Thermal - sources and consequences; Sustainable Development; Dams and Reservoirs- Their Benefits and Problems.

UNIT V

(Lectures 08)

Biodiversity & its conservation

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; Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation; Biological Magnification.

Text Books

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

Reference Books

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

Semester I/II
BASIC ELECTRICAL ENGINEERING

Course Code: EEE 101/EEE 201

L	T	P	C
3	0	0	3

Objective

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

Course Contents

UNIT I

(Lectures 08)

D.C. Network Theory: Circuit theory concepts-Mesh and node analysis; Network Theorems-Superposition theorem, Thevenin's theorem, Norton's theorem and Maximum Power Transfer theorem; Star Delta transformation.

UNIT II

(Lectures 08)

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; Power factor; Series and parallel resonance; Band width and quality factor; magnetic circuit.

UNIT III

(Lectures 08)

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.

UNIT IV

(Lectures 08)

Transformer: Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and voltage regulation of single phase transformer; Open and short circuit 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; Motor applications.

UNIT V

(Lectures 08)

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,

Text Books

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

Reference Books

5. Nagrath I.J., *Basic Electrical Engineering*, Tata McGraw Hill.
6. Fitzgerald A.E & Higginbotham ., D.E., *Basic Electrical Engineering*, McGraw Hill.
7. A Grabel, *Basic Electrical Engineering*, McGraw Hill.
8. Cotton H., *Advanced Electrical Technology*, Wheeler Publishing.

Semester I/II
BASIC ELECTRONICS ENGINEERING

Course Code: EEC 101/EEC 201

L	T	P	C
3	0	0	3

Objective

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

Course Contents

UNIT I

(Lectures 08)

p-n 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.

UNIT II

(Lectures 08)

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 A_i , A_v , R_i & R_o of single transistor CE amplifier configuration.

UNIT III

(Lectures 08)

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.

UNIT IV

(Lectures 08)

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

UNIT V

(Lectures 08)

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

Text Books

5. Robert Boylestad & Louis Nashelsky, *Electronic Circuit and Devices*, Pearson India.
6. Millman & Halkias, *Integrated Electronics*, McGraw Hill.
7. Millman & Halkias, *Electronics Devices and Circuits*, McGraw Hill.
8. Morris Mano M., *Digital Design*, Prentice Hall.

Reference Books

4. Sedra and Smith, *Microelectronic Circuits*, Oxford University Press .
5. Gayakwad, R A, *Operational Amplifiers and Linear Integrated circuits*, Prentice Hall of India Pvt. Ltd.
6. Chattopadhyay D and P C Rakshit, *Electronics Fundamentals and Applications*, New Age International.

Semester-II
FOUNDATION ENGLISH - II

Course code: EHM 201

L	T	P	C
2	0	2	3

(Common with BPH206/BBA206/BCA206/BHM201/AR207/BCH206/BFA203)

UNIT I

(Lectures 10)

Functional Grammar: Articles, Preposition, Tenses: Functions, Synthesis, Transformation, Spotting errors and correction of sentences.

UNIT II

(Lectures 10)

Pre- Requisites of Technical written Communication: One word substitution, Spelling rules, Words often confused & misused, Phrases.

UNIT III

(Lectures 10)

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.

UNIT IV

(Lectures 10)

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.

Text-Books:

1. Wren & Martin, *High School English Grammar & Composition* – S. Chand & Co.
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.
4. Better Your English- A Workbook for 1st year Students- Macmillan India.

Reference Books:

1. Horn A.S., *Guide to Patterns & Usage in English* – O.U.P.

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.

**Semester I/II
PHYSICS (LAB)**

Course Code: EAS 151/EAS 251

**L T P C
0 0 3 1.5**

LIST OF EXPERIMENTS

11. To determine the wavelength of Sodium light by Newton's rings.
12. To determine the wavelength of Sodium light by Fresnel's Biprism.
13. To determine the Specific Rotation of the Cane sugar solution with the help of Polari meter.
14. To determine the wavelength of the sodium light by Michelson's interferometer.
15. To study the PN junction characteristics.
16. To determine the high resistance by Leakage method.
17. To study the energy band gap by four probe method.
18. To study the variation of magnetic field using Stewart and Gee's apparatus.
19. To determine the frequency of A.C. mains by means of a Sonometer.
20. 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:

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
CHEMISTRY (LAB)

Course Code: EAS 152/EAS 252

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

16. To determine total alkalinity in the given water sample.
17. To determine the temporary and permanent hardness in water sample using EDTA as standard solution.
18. To determine the available chlorine in bleaching powder solution.
19. To determine the chloride content in the given water sample by Mohr's method.
20. To determine the pH of the given solution using pH meter and pH-metric titration.
21. To determine the Equivalent weight of Iron by the chemical displacement method.
22. To determine the Viscosity of an addition polymer like polyester by Viscometer.
23. To determine the dissolved oxygen present in a water sample.
24. To prepare the Bakelite resin polymer.
25. To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer.
26. To determine the carbon dioxide content in polluted water sample.
27. To find chemical oxygen demand of waste water sample by potassium dichromate.
28. To determine the total hardness in water sample using complexometric method.
29. To determine the iron content in the given sample using external indicator.
30. 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
ENGINEERING MECHANICS (LAB)

Course Code: EME 151/EME 251

L T P C
0 0 3 1.5

(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 conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To conduct the Impact test on Impact-testing machine to find the toughness by Charpy impact test.
4. To conduct the Impact-test on Impact-testing machine to find the toughness by Izod impact Test.
5. To determine the hardness of the given specimen using Rockwell hardness testing machine.
6. To determine the hardness of the given specimen using Brinell hardness testing machine.
7. To determine gear ratio of simple and compound gear train.
8. To determine the mechanical advantage of worm and worm wheel for load lifting.
9. To find the coefficient of friction on inclined plane.
10. To perform torsion test for rod on torsion testing machine.

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

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

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

Course Code: ECS 151/ 251

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

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

Evaluation of Practical Examination:

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
ENGINEERING DRAWING (LAB)

Course Code: EME 152/EME 252

L	T	P	C
0	0	4	2

1. To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.
2. To draw the types of lines and conventions of different materials.
3. To draw and study dimensioning and Tolerance.
4. To construction geometrical figures of Pentagon and Hexagon
5. To draw the projection of points and lines
6. To draw the Orthographic Projection of given object in First Angle
7. To draw the Orthographic Projection of given object in Third Angle
8. To draw the sectional view of a given object
9. To draw the development of the lateral surface of given object
10. To draw the isometric projection of the given orthographic projection.

Reference Books

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

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

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

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
WORKSHOP PRACTICE (LAB)

Course Code: EME 153/EME 253

L	T	P	C
0	0	4	2

List of Experiments

Perform any ten experiments selecting at least one from each shop.

Carpentry Shop:

4. To prepare half-lap corner joint.
5. To prepare mortise & tenon joint.
6. To prepare a cylindrical pattern on woodworking lathe.

Fitting Bench Working Shop:

4. To prepare a V-joint fitting
5. To prepare a U-joint fitting
6. To prepare a internal thread in a plate with the help of tapping process

Black Smithy Shop:

1. To prepare a square rod from given circular rod
2. To prepare a square U- shape from given circular rod

Welding Shop:

4. To prepare a butt and Lap welded joints using arc welding machine.
5. To prepare a Lap welded joint Gas welding equipment.
6. To prepare a Lap welded joint using spot welding machine.

Sheet-metal Shop:

3. To make round duct of GI sheet using 'soldering' process.
4. To prepare a tray of GI by fabrication

Machine Shop:

3. To prepare a bolt on the lathe machine as per given. diagram
4. To prepare a job on the lathe machine as per given diagram.

Foundry Shop:

3. To prepare core as per given size.
4. To prepare a mould for given 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
BASIC ELECTRICAL ENGINEERING (LAB)

Course Code: EEE 151/EEE 251

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

11. To verify the Kirchhoff's current and voltage laws.
12. To verify the Superposition theorem.
13. To verify the Thevenin's theorem.
14. To verify the Norton's theorem.
15. To verify the maximum power transfer theorem.
16. To determine the efficiency of single-phase transformer by load test.
17. To determine the external characteristics of DC Shunt generator.
18. To measure current and speed for speed control of D.C. Shunt Motor.
19. To measure the power in a 3-phase system by two-wattmeter method
20. To measure the power factor in an RLC by varying the capacitance.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I/II
BASICS ELECTRONICS ENGINEERING (LAB)

Course Code: EEC 151/EEC 251

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

11. To study the V-I characteristics of p-n junction diode.
12. To study the diode as clipper and clamper.
13. To study the half-wave & full-wave rectifier using silicon diode.
14. To study transistor in Common Base configuration & plot its input/output characteristics.
15. To study transistor in Common Emitter configuration & plot its input/output characteristics. .
16. To study the operational amplifier in inverting & non inverting modes using IC 741.
17. To study the operational amplifier as differentiator & integrator.
18. To study the Zener diode as a shunt regulator.
19. To study various logic gates & verify their truth tables.
20. To study half adder/full adder & verify their truth tables.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

**Semester III /IV
MATHEMATICS-III**

Course Code: EAS301/EAS 401

L	T	P	C
3	1	0	4

Course Contents

UNIT I

(Lectures 08)

Integral Transforms: Fourier integral, Fourier complex transform, Fourier sine and cosine transforms and applications to simple heat transfer equations.

Z – Transform and its application to solve difference equations.

UNIT II

(Lectures 08)

Functions of a Complex Variable: Analytic functions; C-R equations and harmonic functions; Line integral in the complex plane; Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions; Liouville's theorem.

UNIT III

(Lectures 08)

Functions of a Complex Variable II: Representation of a function by power series; Taylor's and Laurent's series; Singularities, zeroes and poles; Residue theorem, evaluation of real integrals; conformal mapping and bilinear transformations.

UNIT IV

(Lectures 08)

Statistical Techniques: Moments, Moment generating functions, Skewness, Kurtosis, Curve Fitting and Solution of Equations: Method of least squares and curve fitting of straight line and parabola, Solution of cubic and bi-quadratic equations, Correlation and Regression, Binomial distribution, Poisson distribution, Normal distribution.

UNIT V

(Lectures 08)

Numerical Technique: Bisection method, Regula – Falsi method, Newton - Raphson method.

Interpolation: Finite difference, Newton's forward and backward interpolation, Lagrange's and Newton's divided difference formula for unequal intervals; Numerical Differentiation, Numerical Integration; Trapezoidal, Simpson's 1/3 and 3/8 rule.

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 Mathematics Vol-II*, S. Chand.

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-III*, Laxmi Publications.

Semester III/IV
PHYSICS II

Course Code: EAS 302/EAS 402

L	T	P	C
3	1	0	4

Objective:

- To understand modern physics like nanotechnology, cryogenics etc.

Course Contents

UNIT I

(Lectures 08)

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.

UNIT II

(Lectures 08)

Modern Physics: Bragg's Law; Compton Effect; Wave Particle Duality; De Broglie matter wave; Davisson and Germer's Experiment; Phase and Group velocities; Uncertainty Principle and application.

UNIT III

(Lectures 08)

Quantum Mechanics II : Physical Interpretation of Wave Function and its Normalization; Expectation Value; Schrodinger Equation in One Dimension; Solutions of Time-Independent Schrodinger Equation for Free Particle; Particle in an Infinite Square Well; Potential Barrier and Tunneling; Hydrogen atom (qualitative).

UNIT IV

(Lectures 08)

Superconductivity: Temperature dependence of resistivity; Meissner effect; Penetration depth; Type I and Type II superconductors; Temperature dependence of critical field; BCS theory of superconductors; applications of superconductors.

Introduction to Nanomaterials: Basic principles of nanoscience and technology; creation and use of buckyballs; properties and use of carbon nanotubes; applications of nanomaterials.

UNIT V

(Lectures 08)

Vacuum Physics: Mean free path; rotary and diffusion pumps; Pirani and Penning Gauges.

Nuclear Physics: Nuclear Forces; Binding Energy; Liquid Drop Model; Fission; Nuclear Reactors; Fusion and Energy Processes in Stars, Controlled Thermonuclear Reactions.

Text Books:

1. Robert Resnick, *Introduction to Special Theory of Relativity*, Wiley.
2. A. Beiser, *Perspectives of Modern Physics*, Mc.- Graw Hill.
3. R.Booker and E. Boysen, *Nanotechnology*, Wiley.
4. G. G. Haselden, *Cryogenic Fundamentals*, Academic Pre

Semester III
DIGITAL LOGIC & CIRCUITS

Course Code: EEC 301

L	T	P	C
3	0	0	3

Objective:

- To study the various aspects of switching theory & learn about logic family circuits ,flip flop, sequential circuits also study the memory details.

Course Contents

UNIT I

(Lectures 08)

Number Systems: Binary, Octal, Hexadecimal and their inter-conversion; Binary Arithmetic: Addition, Subtraction, Multiplication and Division; Diminished radix and radix compliments; Codes: BCD codes, 8421 code, Excess-3 code, Gray code, error detection and correction, Hamming code.

UNIT II

(Lectures 08)

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

UNIT III

(Lectures 08)

Logic Families: 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 IV

(Lectures 08)

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

UNIT V

(Lectures 08)

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.
2. M. Morris Mano, *Digital Design*, Prentice Hall of India.
3. Thomas Downs and Mark F Schulz, *Logic Design with Pascal*, Van Nostrand Reinhold.

Reference Books:

1. Malvino and Leach, *Digital principle and applications*, McGraw Hill
2. Cheung, *Modern digital systems design* (WPC)

Semester III
SEMICONDUCTOR DEVICES & MATERIAL

Course Code: EEC 302

L	T	P	C
3	0	0	3

Objective:

- To study the structure of semiconductors, junction properties, transistors & semiconductor devices in detail.

Course Contents

UNIT I

(Lectures 08)

Semiconductors: Crystal lattice structure, Bonding forces and energy bands in solids, Concept of Fermi level, Charge carriers in semiconductors, Carrier concentrations, Drift of carriers, Conductivity and mobility concept.

UNIT II

(Lectures 08)

Excess carriers in semiconductors: Optical absorption, Photoluminescence, Electroluminescence, Carrier lifetime and photoconductivity, Diffusion of carriers, Haynes-Shockley experiment.

UNIT III

(Lectures 08)

Junction properties: Equilibrium conditions, Biased junctions, Zener & avalanche breakdown, metal-semiconductors junction, Concept of hetero-junction.

UNIT IV

(Lectures 08)

Transistors: Fundamentals of BJT operation, Amplification with BJTs, Construction and operation of metal semiconductors field effect transistors (MESFET), High electron mobility transistors.

UNIT V

(Lectures 08)

Semiconductors Devices: Tunnel diode, Concept of step-graded junction, Varactor diode, Photo diode, LED, P-N-P-N diode, DIAC, TRIAC.

Text Book :

1. Beng streetman, *Solid state Electronics Devices*, PHI
2. Adel S. Sedra, Kenneth, C., Smith *Microelectronics Circuits* ,Oxford University Press 5e

Reference Book:

1. Jacob Millman, Christo S Halkias, Chetan D Parikh, *Integrated Electronics, Analog and Digital Circuits and systems*, McGraw-Hill, 2e
2. Albert Malvino, David J Bates, *Electronic Principles*, McGraw Hill.

Semester III
ENGINEERING ELECTROMAGNETICS

Course Code: EEC 303

L	T	P	C
3	1	0	4

Objective:

- To study the electromagnetic field theory comprising of electrostatics, electrodynamics, plane waves, waveguides, transmission line & cavity resonators.

Course Contents

UNIT I

(Lectures 08)

Coordinate systems and transformation: Cartesian coordinates, 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 Stokes' theorem; Laplacian of a scalar.

UNIT II

(Lectures 08)

Electrostatics: Electrostatic fields; Coulomb's law and field intensity; Electric field due to charge distribution; Electric flux density; Gauss' Law; 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 conditions.

Electrostatic boundary value problems: Poisson's and Laplace's equations; General procedures for solving Poisson's and Laplace's equations; Resistance and capacitance; Method of images.

UNIT III

(Lectures 08)

Plane Waves: Maxwell's equations; Wave equation in an isotropic homogeneous medium and its solution: Phasor notation, Polarization of waves, Reflection and refraction of plane waves at plane boundaries; Poynting vector.

Unit IV

(Lectures 08)

Waveguides: Electromagnetic fields: Parallel-plate, Rectangular and circular waveguides; TE and TM modes; Wave impedance; Wave velocities; Attenuation in waveguides.

Unit V

(Lectures 08)

Planar Transmission Line: Electromagnetic fields: Strip-lines, Micro-strip-lines, Co-planar waveguides; Transmission line parameters; Transmission line equations; Input impedance; Standing wave ratio and power; Smith chart; Some applications of transmission lines..

Cavity Resonators: Electromagnetic fields in rectangular and cylindrical resonators; Degeneracy of modes.

Text books:

1. E.C. Jordan, K.G. Balmain, *E. M. Waves & Radiating Systems*, Pearson Education, 2006
2. William H. Hayt, John A. Buck, *Engineering Electromagnetics*, McGraw-Hill Publishing Co.; 6th Edition (July 1, 2001)
3. Kraus, J.D. and Fleisch, D.A., *Electromagnetics with Applications*, McGraw Hill.1999
4. Matthew N.O.Sadiku, *Principles of Electromagnetics*, Oxford University Press, 4th edition

Reference Book:

1. Kaduskar, *Principles of Electromagnetics*, Wiley India
2. Ida, N., *Engineering Electromagnetics*, Springer
3. Kodali, *Engineering Electromagnetic Compatibility*, John Wiley & sons.

Semester III
DATA STRUCTURE USING 'C'

Course Code: ECS 305

L	T	P	C
3	0	0	3

Objective

- The objective of the paper is to give the practical knowledge and the concept of how the data is exactly stored in memory&perform different operations on them using concept of C programming.

Course Contents

UNIT I

(Lectures 08)

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.

UNIT II

(Lectures 08)

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.

UNIT III

(Lectures 08)

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.

UNIT IV

(Lectures 08)

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.

UNIT V

(Lectures 08)

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, BTree index Files, Indexing and Hashing Comparisons.

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

Semester III
INSTRUMENTS & MEASUREMENTS

Course Code: EEE 302

L	T	P	C
3	0	0	3

Objective:

- To study electrical instruments like ammeters, voltmeters, wattmeters, AC Potentiometer, CRO etc.

Course Contents

Unit I

(Lectures 08)

Philosophy of Measurement: Methods of Measurement, Measurement Systems; Classification of Instruments; Characteristic of Instruments & Measurement systems; Errors in Measurement & their Analysis.

Unit II

(Lectures 08)

Analog Measurement of Electrical Quantities: Electrodynamical type Ammeters & Voltmeters; Electrodynamical Wattmeter, Three Phase Wattmeter, Power in three Phase System, Errors & remedies in Wattmeter

Potential Transformer (PT) & Current Transformer (CT): Phase Angle and Ratio errors; Construction and design considerations; Applications.

Unit III

(Lectures 08)

Measurement of Resistance, Capacitance and Inductance: Different methods of measuring low, medium and high resistances; Measurement of Inductance & Capacitance with the help of AC Bridge; Q Factor Measurement.

Unit IV

(Lectures 08)

AC Potentiometer: Polar type & Co-ordinate type AC potentiometers; Applications of AC Potentiometers in Electrical Measurement.

Magnetic Measurement: Ballistic Galvanometer; Flux meter; Determination of Hysteresis loop; Measurement of iron losses.

Unit V

(Lectures 08)

Digital Measurements of Electrical Quantities: Concept of Digital Measurement, Block Diagram: Digital Voltmeter, Frequency meter, Power analyzer and harmonics analyzer, Electronic Multi-meter.

Cathode Ray Oscilloscope: Basic CRO circuit (Block Diagram), Cathode ray tube (CRT) & its component, Application of CRO in measurement, Lissajous Patterns, Dual trace & Dual beam Oscilloscopes.

Text Books:

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

Reference Books:

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

B. Tech (EC) - Revised Syllabus Applicable w.e.f. Academic Session 2012-13 [01112012]

Semester III
DIGITAL LOGIC & CIRCUITS LAB

Course Code: EEC 351

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

- 1) To study combinational circuits: Multiplexer, Demultiplexer and Encoder and to verify truth tables of various logic functions.
- 2) To study the 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 study & 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) To study the experimental of characteristics of CMOS integrated circuits.
- 9) To study & Interface the CMOS to TTL and TTL to CMOS.
- 10) To study BCD codes & convert it to binary on digital IC trainer.
- 11) To study & test the digital IC by automatic digital IC trainer.
- 12) To study operational amplifier 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 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester III
INSTRUMENTS & MEASUREMENTS (LAB)

Course Code: EEE 352

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

Note: Minimum ten experiments should be performed from the following:

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-Sauty's Bridge.
8. To measure the low resistance by Kelvin's Double Bridge.
9. To trace out the transient response of RLC series circuits using storage type CRO.
10. To trace out the transient response of RLC parallel circuits using storage type CRO
11. To Measure the frequency of sine, triangular, square wave signal generated by a function generator and verify its frequency at 100 Hz tap point using "labview" software.
12. To Measure the voltage and current level of the signal generated by 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 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)
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Semester III
Data Structure using 'C' Lab.

Course Code: ECS 355

L T P C
0 0 3 1.5

Write programs in C/C++ for

1. Write a program to illustrate the overloading of various operators.
2. Write a program to illustrate the use of Friend, Inline, Static Member functions, default arguments.
3. Write a program to illustrate the use of destructor and various types of constructor.
4. Write a program to illustrate various forms of Inheritance.
5. Write a program to illustrate use of virtual functions, virtual Base Class.
6. Write a program to illustrating how exception handling is done.
7. Write a program to implement various kinds of sorting algorithms, Search algorithms & Graph algorithms.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

**Semester III /IV
MATHEMATICS-III**

Course Code: EAS301/EAS 401

L	T	P	C
3	1	0	4

Course Contents

UNIT I

(Lectures 08)

Integral Transforms: Fourier integral, Fourier complex transform, Fourier sine and cosine transforms and applications to simple heat transfer equations.

Z – Transform and its application to solve difference equations.

UNIT II

(Lectures 08)

Functions of a Complex Variable: Analytic functions; C-R equations and harmonic functions; Line integral in the complex plane; Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions; Liouville's theorem.

UNIT III

(Lectures 08)

Functions of a Complex Variable II: Representation of a function by power series; Taylor's and Laurent's series; Singularities, zeroes and poles; Residue theorem, evaluation of real integrals; conformal mapping and bilinear transformations.

UNIT IV

(Lectures 08)

Statistical Techniques: Moments, Moment generating functions, Skewness, Kurtosis, Curve Fitting and Solution of Equations: Method of least squares and curve fitting of straight line and parabola, Solution of cubic and bi-quadratic equations, Correlation and Regression, Binomial distribution, Poisson distribution, Normal distribution.

UNIT V

(Lectures 08)

Numerical Technique: Bisection method, Regula – Falsi method, Newton - Raphson method.

Interpolation: Finite difference, Newton's forward and backward interpolation, Lagrange's and Newton's divided difference formula for unequal intervals; Numerical Differentiation, Numerical Integration; Trapezoidal, Simpson's 1/3 and 3/8 rule.

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 Mathematics Vol-II*, S. Chand.

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-III*, Laxmi Publications.

**Semester III/IV
PHYSICS II**

Course Code: EAS 302/EAS 402

L	T	P	C
3	1	0	4

Objective:

- To understand modern physics like nanotechnology, cryogenics etc.

Course Contents

UNIT I

(Lectures 08)

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.

UNIT II

(Lectures 08)

Modern Physics: Bragg's Law; Compton Effect; Wave Particle Duality; De Broglie matter wave; Davisson and Germer's Experiment; Phase and Group velocities; Uncertainty Principle and application.

UNIT III

(Lectures 08)

Quantum Mechanics II : Physical Interpretation of Wave Function and its Normalization; Expectation Value; Schrodinger Equation in One Dimension; Solutions of Time-Independent Schrodinger Equation for Free Particle; Particle in an Infinite Square Well; Potential Barrier and Tunneling; Hydrogen atom (qualitative).

UNIT IV

(Lectures 08)

Superconductivity: Temperature dependence of resistivity; Meissner effect; Penetration depth; Type I and Type II superconductors; Temperature dependence of critical field; BCS theory of superconductors; applications of superconductors.

Introduction to Nanomaterials: Basic principles of nanoscience and technology; creation and use of buckyballs; properties and use of carbon nanotubes; applications of nanomaterials.

UNIT V

(Lectures 08)

Vacuum Physics: Mean free path; rotary and diffusion pumps; Pirani and Penning Gauges.

Nuclear Physics: Nuclear Forces; Binding Energy; Liquid Drop Model; Fission; Nuclear Reactors; Fusion and Energy Processes in Stars, Controlled Thermonuclear Reactions.

Text Books:

1. Robert Resnick, *Introduction to Special Theory of Relativity*, Wiley.
2. A. Beiser, *Perspectives of Modern Physics*, Mc.- Graw Hill.
3. R.Booker and E. Boysen, *Nanotechnology*, Wiley.
4. G. G. Haselden, *Cryogenic Fundamentals*, Academic Press

Semester IV
SIGNALS & SYSTEMS

Course Code: EEC 401

L	T	P	C
3	1	0	4

Objective:

- To learn the main techniques of signal analysis using Laplace Transform & Z-Transform and the analysis of systems in time & frequency domain.

Course contents

UNIT I

(Lectures 08)

Signals: Definition, Types of signals and their representations: Continuous and discrete, Periodic and non-periodic, Even and odd, Energy and power, Deterministic and random, one-dimensional and multi-dimensional; Commonly used signals (continuous and discrete): Unit impulse, Unit step, Unit ramp, Rectangular, Exponential, Sinusoidal; Operations on continuous and 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.

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 function algebra and block diagram representation; System bandwidth and rise time through the analysis of a first order CT low pass filter.

Text Book:

P. Ramakrishna Rao, "Signal and Systems", 2008 Tata McGraw Hill, 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 & Systems", Pearson Education, Second Edition, 2003.

Semester IV
NETWORK ANALYSIS AND SYNTHESIS

Course Code: EEE 403

L	T	P	C
3	0	0	3

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 loops and basic cut sets, 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): Superposition 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 Z, Y, ABCD and h parameters; Reciprocity and Symmetry; Inter-relationships between the parameters; Inter-connections of two-port networks; Image parameters and characteristic impedance; 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: Fundamentals of Passive and active filters; Low pass, High pass, Band pass, and Band elimination filters.

Text Books:

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

Reference Books:

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

Semester IV
PRINCIPLES OF COMMUNICATIONS

Course Code: EEC 402

L	T	P	C
3	0	0	3

Objective:

- To study the concepts of analog & digital communication.

Course Contents

UNIT I

(Lectures 06)

Introduction: Overview of Communication system, Communication channels. Need for modulation, Baseband and Pass band signals.

UNIT II

(Lectures 08)

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), Quadrature Amplitude Modulator, Radio Transmitter and Receiver. Approximately Compatible SSB systems

UNIT III

(Lectures 06)

Angle Modulation: Tone Modulated FM Signal, Arbitrary Modulated FM Signal, FM Modulators and Demodulators, Stereophonic FM Broadcasting, Phase Modulation, relations with FM. Examples Based on MATLAB.

UNIT IV

(Lectures 10)

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, introduction to Pulse Code Modulation (PCM) , Issues in digital transmission: Frequency Division Multiplexing, Time Division Multiplexing , T1 Digital System, TDM Hierarchy.

UNIT V

(Lectures 10)

Noise: Sources of Noise, Frequency domain representation of Noise, Superposition of Noise, Linear filtering of Noise, Mathematical Representation of Noise. Analysis, Signal to Noise Ratio, Figure of Merit, Noise in Amplitude Modulation and Frequency Modulation: Pre Emphasis, De Emphasis and SNR Improvement, threshold effect , Phase Locked Loops Analog and Digital.

Text Book:

1. H. Taube, D L Schilling, Goutam Saha, "Principles of Communication", 3rd Edition, Tata McGraw-Hill Publishing Company Ltd.

Reference Books:

1. B.P. Lathi, "Modern Digital and Analog communication Systems", 3rd Edition, Oxford University Press, 2009.

1. Simon Haykin, "Communication Systems", 4th Edition, Wiley India.

2. H. P. HSU & D. Mitra , "Analog and Digital Communications", 2nd Edition, Tata McGraw-Hill Publishing Company Ltd.

Semester IV
ELECTRONIC DEVICES AND CIRCUITS

Course Code: EEC 403

L	T	P	C
3	0	0	3

Objective:

- To study & do the analysis about electronic devices like diodes, LED, JFET, MOSFET, Amplifiers & Oscillators.

Course Contents

UNIT-I

(Lectures 08)

Special Diodes :LED; Varactor; Photodiode; Schotkey barrier; Tunnel diodes and their constructions and characteristics; Bipolar Junction Transistors: Transistor as an amplifier, Small signal equivalent circuits (Hybrid-pi, Ebers moll), Graphical analysis, biasing the BJT for discrete-circuit design.

UNIT-II

(Lectures 08)

BJT & MOSFET: Basic Single Stage BJT amplifier configurations transistor as a switch-cut off saturation, complete static characteristics, Internal capacitances and second order effects Field Effect transistor-Structure and physical operation of Enhancement and depletion types MOSFET, I/V characteristics, MOSFET circuits at DC, MOSFET as an amplifier, biasing in MOS amplifier circuits, Basic configurations of single stage MOS amplifier, Internal capacitances of MOSFETS.

UNIT-III

(Lectures 08)

Rectifier filter and regulators: Half wave rectifier, ripple factor, full wave rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, Pi-section filter, Multiple L-section and Multiple Pi-section filter, simple circuit of a regulator using Zener diode; Series and Shunt voltage regulators.

UNIT-IV

(Lectures 08)

Amplifiers: Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, 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 A_i , R_i , A_v , R_o , FEEDBACK AMPLIFIERS: Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers,

UNIT-V

(Lectures 08)

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

Reference Books:

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

Semester IV
NEURAL NETWORKS

Course Code: ECS 405

L T P C
3 0 0 3

Objective:

- The object behind this subject is to know about Networking system, control information & algorithms.

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

Reference Books:

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

Semester IV
NETWORK ANALYSIS & SYNTHESIS (LAB)

Course Code: EEE 452

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

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

1. To verify the superposition theorem with DC and AC sources.
2. To verify the Thevenin's theorem with DC and AC sources.
3. To verify the Norton's theorem with DC and AC sources.
4. To verify the Maximum power transfer theorem with DC & AC sources.
5. To verify the Tellegen's theorem for two networks of the same topology.
6. To verify the reciprocity theorem in a given network.
7. To plot the pole-zero diagram of the given network.
8. To determine the transient response for RL and RC circuits with step voltage input, under critically damped and over damped cases.
9. To determine the frequency response for RLC (series & parallel) circuits with sinusoidal AC input Signal.
10. To Study loading effect in the cascade connected Networks.
11. To determine the frequency response of a Twin – T notch filter.
12. 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester IV
ELECTRONIC DEVICES & CIRCUITS (LAB)

Course Code: EEC 452

L T P C
0 0 3 1.5

Note: Select any 10 out of the following list of experiments.

LIST OF EXPERIMENTS

1. To Study the lab equipments and components: CRO, Multimeter, Function Generator, Power supply- Active, Passive Components & Bread Board.
2. To study the characteristics of Zener diode.
3. To study the characteristic of BJT.
4. To study the characteristic of FET.
5. To study the applications of Op-amp.
6. To study & plot the gain in dB Vs frequency of FET.
7. To study the design of single RC coupled amplifier.
8. To study & plot the gain Vs frequency of two stage amplifier.
9. To study the common collector configuration-emitter follower using Darlington pair.
10. To study the power amplifier and its gain characteristics.
11. To study & implement the transistor differential amplifier and plot its non ideal characteristics.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester IV
COMMUNICATION LAB-I
(ANALOG)

Course Code: EEC453

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

1. To study and construct a detector circuit for demodulation of AM signal and observe the diagonal peak clipping effect.
2. To study amplitude demodulation by linear diode detector
3. To study Frequency modulation using voltage controlled oscillator.
4. To study the generation of DSB- SC signal using balanced modulator.
5. To study generation of side band signal.
6. To study and detect the FM signal using PLL.
7. To study and measure the noise figure using a noise generator.
8. To study the super heterodyne AM receiver and measure the sensitivity, selectivity and fidelity.
9. To study Pulse Width Modulation and Pulse Position Modulation.
10. To study sampling and reconstruction of Pulse Amplitude modulation system.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
CONTROL SYSTEMS

Course Code: EEE 501

L	T	P	C
3	0	0	3

Objective:

- To learn about the open and closed loop control systems.
- To understand the time response analysis, frequency response analysis and study control system component etc.

Course Contents

Unit I

(Lectures 08)

Control Systems: Open loop & closed control; Servomechanism; Physical examples; Transfer functions: Block diagram algebra, and 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 errors, Derivative output, Integral error and PID compensation; Design specifications 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 and Algebraic Criteria, Concept of stability and necessary conditions; Routh-Hurwitz criteria and limitations; Root Locus technique: 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 problems and preliminary considerations of lead, Lag and Lead-lag networks; Design of closed loop systems using compensation techniques in time and frequency domains.

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 Books:

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

Reference Books:

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

Semester V MICROPROCESSORS & APPLICATIONS

Course Code: EEC 501

L	T	P	C
3	0	0	3

Objective:

- To study the evolution of microprocessors & how to do assembly language programming with the help of 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 Operations.

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

Reference Books:

1. Liu and Gibson G.A., *Microcomputer Systems: The 8086/8088 Family*, Prentice Hall (India).
2. Brey, Barry B., *INTEL microprocessors*, Prentice Hall (India).
3. Ram B., *Advanced Microprocessor & Interfacing*, Tata McGraw Hill.

Semester V MICROWAVE TECHNIQUES

Course Code: EEC 502

L	T	P	C
3	0	0	3

Objective:

- To study microwave tubes such as reflex klystron, perform the analysis of microwave networks & also study in detail the microwave semiconductor devices.

Course Contents

UNIT I

(Lectures 08)

Microwave Tubes: Design considerations for microwave tubes, current status of microwave tubes, principle of operation of multicavity and reflex klystron, magnetron and traveling wave tube.

UNIT II

(Lectures 08)

Microwave Network Analysis: Equivalent voltages and currents, concept of impedance, impedance and admittance matrices of microwave junctions, scattering matrix representation of microwave networks, ABCD parameters, excitation techniques for waveguides.

UNIT III

(Lectures 08)

Power Dividers and Couplers: Scattering matrix of 3- and 4-port junctions, T-junction power divider, Wilkinson power divider, and qualitative description of two-hole and multi-hole waveguide couplers, hybrid junctions.

UNIT IV

(Lectures 06)

Ferrimagnetic Components: Permeability tensor of ferrites, plane wave propagation in ferrites, Faraday rotation, ferrite circulators, isolators and phase shifters.

UNIT V

(Lectures 10)

Microwave Semiconductor Devices: Operation and circuit applications of Gunn diode, IMPATT diode, PIN Diode, and Schottky barrier diode; Microwave BJT, MESFET, HEMT and their applications.

Text Books:

1. Pozar, D.M., “*Microwave Engineering*”, 3rd Ed., John Wiley & Sons
2. Liao, S.Y., “*Microwave Devices and Circuits*”, Prentice-Hall of India
3. Collin, R.E., Collin, R.E., “*Foundations for Microwave Engineering*”, 2nd Ed., John Wiley & Sons.

References Books:

1. Streetman, B.G. and Banerjee, S.K., “*Solid-state Electronic Devices*”, 6th Ed., Prentice-Hall of India
2. Sze, S.M. and Ng, K.K., “*Physics of Semiconductor Devices*”, 3rd Ed., John Wiley & Sons
3. Bahl, I. and Bhartia, P., “*Microwave Solid State Circuit Design*”, 2nd Ed., John Wiley & Sons

Semester V
DIGITAL COMMUNICATION SYSTEMS

Course Code: EEC 504

L T P C
3 0 0 3

Objective:

- To study the digital communication, information theory, coding techniques & digital modulation multiplexing.

Course Contents

UNIT I

(Lectures 08)

Elements of Digital Communication and Information Theory: Model of a Digital Communication System; Logarithmic Measure of Information; Entropy and Information Rate; Conditional Entropy and Redundancy; Source Coding; Fixed and Variable Length Code Words; Source Coding Theorem; Kraft Inequality.

UNIT II

(Lectures 08)

Coding Techniques: PCM, DM, DPCM, ADPCM; Line Coding and its properties, NRZ & RZ Types; Signaling Format for Unipolar, Polar, Bipolar (AMI) & Manchester Coding; Shannon-Fano and Huffman Coding; Optimum Filter; Matched Filter Receiver.

UNIT III

(Lectures 08)

Digital Modulation Techniques: Types of Digital Modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying; Method of Generation and Detection of Coherent & Non-Coherent Sources. Shift keying techniques: ASK, FSK, PSK, Differential PSK & Quadrature Modulation Technique (QPSK); Probability of Error and Comparison of Various Digital Modulation Techniques.

UNIT IV

(Lectures 08)

Digital Multiplexing: Fundamentals of Time Division Multiplexing (TDM), Frequency Division Multiplexing (FDM), Comparison & Bit-Byte Interleaving between TDM & FDM, T1 Carrier System, Synchronization, Signaling & Hierarchy of T1, TDM & PCM.

UNIT V

(Lectures 08)

Error Control Coding: Error Free Communication over a Noise Channel; Hamming code; Relation Between Minimum Distance and Minimum Distance Error Correcting Capability; Linear Block Codes; Encoding and Syndrome Decoding; Cyclic Codes; Encoder and Decoder for Cyclic Codes; Convolution Codes; Tree diagram, state diagram and Trellis diagram; Viterbi and Sequential Decoding .

Text Book:

1. Haykin, Simon ,*Communication Systems* , John Wiley , 4th Ed.

References Books:

1. Singh, R.P. & Sapre, S.D. ,*Communication Systems: Analog & Digital* ,Tata McGraw-Hill.
2. Lathi, B.P, *Modern Digital & Analog Communication Systems*, Oxford University Press
3. Simon Haykin , *Digital Communication*, John Wiley.

Semester V
RADAR & NAVIGATION

Course Code: EEC 506

L T P C
3 0 0 3

Objective:

- This course is introduced so that the students get an overview of radar transmitters & receivers and also study the navigation tools with the help of guidance principles.

Course Contents

UNIT I

Introduction: Block diagram; Range equation; Pulse and CW Radars; Pulse Doppler radar; Tracking and scanning radar, Delay line cancellers in radars.

UNIT II

Radar transmitters & Receiver: Different types of Radar Modulator Receivers block diagram & operations, Low noise front Ends, Receiver protector, Radar displays .A-Scope & PPI, Ends, Mixer, Duplexer.

UNIT III & IV

Navigation Aids : Radio direction finding Loop Antenna, Adcock, Errors in direction finders, Radar Beacons, VHF & UHF Radio range, VOR, DME, Hyperbolic navigation systems, Loran –Decca – Tacna landing system, GCAs, ILS, MLS, Global Positioning systems.

UNIT V

Guidance: Basic guidance, Block diagram, inertial, guidance, Gyroscopes, Servo Accelerators, Basic Application of Servo system components.

Text Books:

- 1 . N. S. Nagraja, *Elements of Electronics Navigation*, TMH.
2. K.K.Sharma, *Radar, Sonar & Navigation Engineering (With Guidance)*, S.K.Kataria & Sons.

Reference books:

1. Mark A Richards, *Fundamentals of radar signal processing*, TMH.
2. Peebles Jr. P. Z, *Radar principles*, Wiley, NY

Semester V
CONTROL SYSTEMS (LAB)

Course Code: EEE 551

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

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

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 and compare their performance.
3. To study and calibrate temperature using resistance temperature detector (RTD).
4. To design Lag compensator using Bode plot.
5. To design Lead compensator using Bode plot.
6. To design Lag, Lead and Lag-Lead compensators using Bode plot.
7. To study DC position control system.
8. To study synchro-transmitter and receiver and obtain output vs. input characteristics.
9. To determine speed-torque characteristics of an ac servomotor.
10. To study performance of a servo voltage stabilizer at various loads using load bank.
11. To study the behavior of separately excited dc motor in open loop and closed loop conditions at various loads.
12. To simulate second order system using PID controller and explore 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 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
MICROPROCESSOR & APPLICATIONS LAB

Course Code: EEC 553

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

1. To study the 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. To study the 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 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
COMMUNICATION LAB-II
(DIGITAL)

Course Code: EEC 552

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

- 1) To Study the sampling and reconstruction techniques.
- 2) To Study the Pulse code modulation and demodulation.
- 3) To Study the delta modulation and demodulation and observe effect of slope overload DCL-07
- 4) To Study the Adaptive Delta modulation and demodulation
- 5) To Study the data coding techniques.
- 6) To Study the amplitude shift keying modulator and demodulator.
- 7) To Study the frequency shift keying modulator and demodulator.
- 8) To Study the phase shift keying modulator and demodulator.
- 9) To Study the 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 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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
MICROWAVE TECHNIQUES LAB

Course Code: EEC 554

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

- 1) To study & measure the guide wavelength and frequency of the signal in a rectangular waveguide.
- 2) To study & measure the VSWR using slotted line.
- 3) To study the mode characteristics of reflex Klystron and determine the mode number, transit time & electronic tuning sensitivity.
- 4) To study the characteristics of Gunn oscillator.
- 5) To study the Gunn diode as modulated source (PIN modulation) and determine the modulation depth.
- 6) To study & measure the coupling coefficient and directivity of a directional coupler.
- 7) To study the insulation & coupling coefficient of a magic T.
- 8) To study & measure the attenuation using substitution method and plot of attenuation versus frequency characteristics.
- 9) To study the waveguide horn and its radiation pattern and determination of the beam width.
- 10) To study the ferrite circulator and measure the isolation, insertion loss, cross coupling and input VSWR.
- 11) To study & measure the 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 also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
INDUSTRIAL TRAINING & PRESENTATION

Course Code: EEC 591

L	T	P	C
0	0	0	2

Students will attend Industrial training of four weeks in any industry or reputed organization after the IV semester examination in summer vacation. 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 the nodal officer for coordination of the training.

Students will also be required to prepare an exhaustive technical report of the training undertaken 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 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 in a sealed envelope to the Director.

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 Industrial Psychology

Course code: EHM 602

L	T	P	C
3	0	0	3

Objective: To study the industrial perspective, corporate skills & teach the students about human values to give the exposure about professional ethics.

Course Contents

UNIT I

(Lectures 08)

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.

UNIT II

(Lectures 08)

Work and Social change: Nature of modern societies, emergence of industrial capitalism, Technology & Social change, the information society after the industrial society, post-modernity, globalization & Convergence, Significance of the service sector today, work restructuring and corporate management.

UNIT III

(Lectures 08)

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.

UNIT IV

(Lectures 08)

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.

UNIT V

(Lectures 08)

Ethical Leadership: Decision making, corporate culture and reputation management, corporate social responsibility and social reporting.

Text Books:

1. Sheth N.R., *Social Frame Work of Indian Factory*, O.U.P. Bombay.
2. Gisbert P., *Fundamentals of Industrial Sociology*, O.U.P. New Delhi.
3. Watson Tony J., *Sociology: Work & Industry*, New York. Routledge.
4. Schinzinger, Roland & Mike W. Martin, *Introduction to Engineering Ethics-* Boston, McGraw Hill.

Reference Books:

1. Fleddermann Charles, *Engineering Ethics*, Upper Saddle River- N.J. Prentice Hall.
2. Miller & Form, *Industrial Sociology*, London Harper & Row.
3. Parsons Richard D., *The Ethics of Professional Practice-* Allyn & Bacon, London.
4. Govindarajan - *Engineering Ethics-* Prentice Hall (India) New Delhi.
5. Bhatia S.K. - *Business Ethics & Management Values-* Deep & Deep Publication. N. Delhi

Semester VI
ANTENNA & WAVE PROPAGATION

Course Code: EEC 601

L	T	P	C
3	1	0	4

Objective: To develop design aspects and analysis, study of components used in antenna system, & develop a frame work for designing wave, antenna used in various systems.

Course Contents

UNIT I

(Lectures 08)

Antennas Basics: Introduction, Basic Antenna Parameters, Patterns, Beam Area (or Beam Solid Angle) Ω_A , Radiation Intensity, Beam Efficiency, Directivity D and Gain G, Directivity and Resolution, Antenna Apertures, Effective Height, The radio Communication link, Fields from Oscillating Dipole, Single-to-Noise Ratio (SNR), Antenna Temperature, Antenna Impedance, Retarded Potential, Far Field due to an alternating current element, Power radiated by a current element, Field variation due to sinusoidal current distribution.

UNIT II

(Lectures 08)

Point Sources and Their Arrays: Introduction, Point Source, Power Theorem and its Application to an Isotropic Source, Radiation Intensity, Arrays of Two Isotropic Point Sources, Non isotropic but Similar Point Sources and the Principle of Pattern Multiplication, Pattern Synthesis by Pattern Multiplication, Linear Arrays of n Isotropic Point Sources of Equal Amplitude and Spacing, Linear Broadside Arrays with Non uniform Amplitude Distributions.

UNIT III

(Lectures 08)

Electric Dipoles, Thin Linear Antennas and Arrays of Dipoles and Apertures: The Short Electric Dipole, The Fields of a Short Dipole, Radiation Resistance of Short Electric Dipole, Thin Linear Antenna, Radiation Resistance of $\lambda/2$ Antenna, Array of Two Driven $\lambda/2$ Elements: Broadside Case and End-Fire Case, Horizontal Antennas Above a Plane Ground, Vertical Antennas Above a Plane Ground, Yagi-Uda Antenna Design, Long-Wire Antennas, folded Dipole Antennas.

UNIT IV

(Lectures 08)

Reflector Antennas: Flat Sheet Reflectors, Corner Reflectors, The Parabola-General Properties, A comparison Between Parabolic and Corner Reflectors, The Paraboloidal Reflector, Patterns of Large Circular Apertures with Uniform Illumination, Reflector Types (summarized), Feed Methods for Parabolic Reflectors, Antenna Measurements: Introduction, Antenna Measurement ranges, Radiation pattern Measurements, Gain and Directivity Measurements, Spectrum Analyzer.

UNIT V

(Lectures 08)

Wave Propagation: Ground Wave Propagation: Plane Earth Reflection, Space Wave and Surface Wave, Space Wave Propagation: Introduction, Field Strength Relation, Effects of Imperfect Earth, Effects of Curvature of Earth, Sky wave Propagation: Introduction structural Details of the ionosphere, Wave Propagation Mechanism, Refraction and Reflection of Sky Waves by ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance.

Text Books:

1. Jordan Edwards C & Balmain Keith G, *Electromagnetic Waves and Radiating Systems*, PHI
2. John D Krauss, Ronald J Marhefka and Ahmad S. Khan, "Antennas and Wave Propagation", Tata McGraw Hill, 2010 Special Indian Edition.

Reference Books:

1. Kraus, John D. & Mashefka, Ronald J, *Antennas: For All Applications*, Tata McGraw Hill,
2. Prasad, K.D *Antennas and Wave Propagation*, Khanna Publications
3. Collin, R, *Antennas and Radio wave Propagation*, Tata McGraw-Hill
4. A.R. Harish, M. Sachidananda, *Antennas and Wave Propagation*, Oxford University Press, 2009.
5. Jordan Edwards C. and Balmain, Keith G., *Electromagnetic Waves and Radiating Systems*, PHI.

Semester VI
ANALOG INTEGRATED ELECTRONICS

Course Code: EEC 602

L	T	P	C
3	0	0	3

OBJECTIVE:

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

Course Contents

UNIT I

(Lectures 08)

Frequency response of op-amp & multivibrators: Frequency response, compensating Networks, Frequency response of internally compensated and uncompensated Op-Amps, equivalent circuit, Astable, Monostable, Bistable multivibrator, Instrumentation Amplifier.

UNIT II

(Lectures 08)

Non linear circuits & regulators: Voltage Comparators, Schmitt Triggers, Precision Rectifiers-half wave, full wave, Analog Switches Peak detectors, sample and hold circuit, Linear Regulators, Switching Regulators, 723-general purpose regulator.

UNIT III

(Lectures 08)

Active filters & converters: First and second order filters-low pass, High pass, Band Pass, band Reject, All Pass filter-I convertors, I-V convertors, Analog to Digital and Digital to Analog Convertors.

UNIT IV

(Lectures 08)

Non linear amplifiers & phase locked loops: Log/Antilog Amplifiers, Analog multipliers, operational Transconductance Amplifiers(OTA), Phase Locked Loops, Monolithic PLLs, Noise in integrated Circuits.

UNIT V

(Lectures 08)

555 Timer & wave generator: 555 Timer-Functional block diagram, Implementing a Monostable Multivibrator using the 555 IC, Astable Multivibrator using the 555 IC, Schmitt trigger using the 555 IC, Voltage controlled oscillator, Square & Triangular wave generator.

Text Books:

1. Franco Sergio, *Design with operational Amplifiers and integrated Circuits*, Tata McGraw Hill.
2. Ramakant A. Gayakwad, *Op-Amp and Linear Integrated Circuits*, Prentice Hall of India.

Reference Books:

- 1 Millman J. & Halkias, *Integrated Electronics Analog and Digital Circuits & Systems*, Tata McGraw, Hill.
2. Soclof. S. *Application of Analog Integrated Circuits*, Prentice Hall of India.
- 3 Bell, David .A , *Operational Amplifiers Linear ICS*, Prentice Hall of India

Semester VI
DESIGN OF ELECTRONIC SYSTEMS

Course Code: EEC 603

L	T	P	C
3	0	0	3

Objective: To develop design aspects and analysis, study of components used in electronics system design & develop a frame work for designing analog/digital electronic systems.

Course Contents

UNIT I

(Lectures 08)

Design, Modeling&Analysis: Design mythologies, design principles, design layout of electronic system, basics of system, system analysis, system integration, system management, introduction to electronics systems-analog & digital. Design parameters of any electronic system, Modeling, simulation, design optimization techniques, PSO, ESL design.

UNIT II & III

(Lectures 16)

Components of Electronics system design I (Amplifiers&Regulators): Design of Amplifiers, Class - A, class - B, Class - AB , Push-pull amplifier, complementary symmetry amplifiers, Design power Amplifiers, : Design of Tuned amplifier BJT/FET single tuned, double tuned Feedback amplifier design. Designing of negative feedback amplifiers: voltage series, voltage shunt, current series, current shunt, 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.

UNIT IV

(Lectures 08)

Components of Electronics system design II (Transformers&oscillators): Transformers used in simple PCB circuits: step up/down selection of transformer to design any circuit/power supply, autotransformer, Use of auto transformer (Tapped - inductor). Design of Oscillator Circuits: Clapp, Colpitt, Hartley oscillator, crystal oscillator, phase shift oscillator.

UNIT V

(Lectures 08)

Design of small scale Electronic systems (Analog/Digital):power supplies,SMPS,analog filters,IC LM-379,voltage comparator, analog circuit design,process,key principles, concepts &techniques for analog IC design, , V - I converter, I - V converter, V - F converters, True RMS converter, digital electronic systems, digital filters:IIR & FIR.

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.
- 3.Robert Boylestad & Louis Nashelsky, *Electronic Circuit and Devices*, Pearson India.
- 4.Gayakwad, R A, *Operational Amplifiers and Linear Integrated circuits*, Prentice Hall of
- 5.Millman & Halkias, *Integrated Electronics*, McGraw Hill.

Reference Books:

1. Michael Jacob,*Application and Design with Analog Integrated Circuits*, PHI
2. Sergio Franco ,*Design with OP-AMP and Analog Integrated Circuits*, Tata McGraw Hill..
3. Bell ,*Electronics Devices and Circuits*, PHI
4. Bell ,*Solid State Pulse Circuits*, PHI
5. K.V.Ramanan ,*Functional Electronics*, Tata McGraw Hill.
6. Millman & Halkias, *Electronics Devices and Circuits*, McGraw Hill India Pvt. Ltd.

Semester VI
TELECOMMUNICATION SWITCHING SYSTEMS

Course Code: EEC 604

L	T	P	C
3	0	0	3

Objective: The objective behind this subject is to know about telecommunication network which is helpful in telecommunication system.

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.

UNIT III

(Lectures 08)

Traffic Engineering: Network traffic load and parameters, grade of service and blocking probability, Incoming Traffic and Service Time Characterization: Birth-death process, pure birth process, pure death process.

UNIT IV

Blocking models and loss estimates: Introduction to LCC, LCR, LCH models. Delay systems: Introduction to LCD. Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching concepts, OSI reference model, Repeaters, Bridges, Routers and gate ways.

UNIT V

(Lectures 08)

Integrated Services Digital Network (ISDN): Introduction, ISDN architecture. DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, CM & CMTS and DOCSIS. Protocols: TCP/IP & IPV4.

Text Books:

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

Reference Books:

1. J. Bellamy, *Digital telephony*, John Wiley.
2. Achyut. S. Godbole, *Data Communications & Networks*, Tata McGraw Hill.
3. H. Taub & D. Schilling, *Principles of Communication Systems*, Tata McGraw Hill.
4. B.A. Forouzan, *Data Communication & Networking*, Tata McGraw Hill.
5. J E Flood, *Telecommunication switching, Traffic and Networks*, Pearson Education

Semester VI Technical Writing

Course code: EHM 601

L	T	P	C
2	0	2	3

Objective:

- To study the forms of technical communication, also study to write a technical paper, proposal & learn the writing skills.

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, and importance of Report writing.

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, elements/steps in writing Technical paper & Scientific Article, Methods of writing technical paper & Scientific article.

UNIT III

Technical Proposal: Definition and meaning of Technical Proposal, Significance of Proposal, Kinds, Types of proposal, Characteristics of a good Proposal, Structure, Parts, Format of Proposal, Supplementary parts, Uses of Proposals.

UNIT IV

Writing Skills: Reporting events, Writing News paper, 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.

UNIT V

Value-based Text Reading: R.K. Narayan- A Bookish Topic.

1. Francis Bacon- of studies.
2. CEM Joad – The Civilization of Today.

(Note: The two periods per week may be utilized in Language Lab covering the above syllabus.)

Text Books:

1. Singh R.P., *An Anthology of English Easy* O.U.P. New Delhi.
2. 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.

Semester VI
ANALOG INTEGRATED ELECTRONICS (LAB)

Course Code: EEC 651

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

1. To study & plot V-I characteristics of junction diode and Zener diode.
2. To study & plot wave shape of the electrical signal at input and output points of the half wave, full wave and bridge rectifiers.
3. To study & plot input/output characteristics for common base transistor.
4. To study & plot input/output characteristics of FET and determine FET parameters at a given operating point.
5. To study & determine voltage gain, current gain, input impedance and output impedance of common emitter amplifier.
6. To study & determine voltage gain, current gain, input impedance and output impedance and frequency response of R-C coupled common emitter amplifier.
7. To study& 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 in ON state.
9. To study the design of triangular wave generator using IC-555.
10. To study & design Low pass &High pass 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 also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VI
DESIGN OF ELECTRONIC SYSTEMS (LAB)

Course Code: EEC 652

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

1. To study the characteristics of operational amplifier to get data for input bias current, measure the output- voltage and reduce it to zero and calculate slew rate.
2. To study the operational amplifier in inverting and non-inverting modes.
3. To study operational amplifier as scalar, summer and voltage follower.
4. To study operational amplifier as differentiator and integrator.
5. To study & design LPF and HPF using Op-Amp 741
6. To study & design band pass and band reject active filters using operational amplifier IC 741.
7. To study the design of oscillators: RC phase shift ,Hartley & Colpitts using operational amplifier.
8. To study & design astable & monostable multivibrators using IC-555 timer
9. To study the design of triangular & square wave generator using 555 timer.
10. To study the design of 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 also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VI ANTENNA AND WAVE PROPAGATION (LAB)

Course Code: EEC 653

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

PART-I

- To study ,analyze & plot the radiation pattern of following antennas:

- Dipole
- Half wave Dipole
- Yagi Antenna
- Log Antenna
- Crossed Dipole
- Log Periodic Antenna
- Slot Antenna
- Helix Antenna
- Microstrip Antenna

PART-II

- To study the experiments on coaxial line section:
 - a) To study & measure the VSWR.
 - b) To calculate & measure the unknown impedance of coaxial line section.
 - c) To study the technique of stub matching in coaxial line section.

PART-III

- To study the design & test the RF circuits
 - RF Tuned Amplifier IF Amplifier
 - RF Oscillator
 - RF Crystal Oscillator
 - RF mixer
 - 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 also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)
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Semester VII
DIGITAL INSTRUMENTATION

Course Code: EEC 701

L	T	P	C
3	0	0	3

Objective:

- To study the basic concepts of instrumentation, analog, digital meters, Oscilloscopes & RF measurement.

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 10)

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 06)

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. MMS Anand, *Electronic Instruments & Instrumentation Technology*, PHI
2. H.S. Kalsi, *Electronics Instrumentation*,TMH

Reference Books:

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

Semester VII
DIGITAL SIGNAL PROCESSING

Course Code: EEC 702

L T P C
3 1 0 4

Objective:

- The objective behind this subject is to know about DFT, FIR filters their design.

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. The Discrete 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 two real sequences, computations, efficient computation of the DFT of 2NPoint real sequences, Gortzel 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)

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

Reference Books:

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

Semester VII
MOBILE AND CELLULAR COMMUNICATION

Course Code: EEC 703

L T P C
3 0 0 3

Objective:

- To study the cellular system, Spread spectrum multiple access techniques, mobile network layer & the overview of the emerging technologies.

Course Contents

UNIT I

(Lectures 08)

The Cellular Concept: System design fundamentals, frequency reuse, channel planning for wireless systems, security, spread spectrum multiple access: FDMA, TDMA, CDMA, SDMA. A simplified reference model for mobile communications.

UNIT II

(Lectures 08)

GSM Overview: GSM system for mobile: Services and features, System Architecture, Radio Sub system Channel types, Frame Structure..GPRS:, Introduction,Architecture&Protocol stack,SMS Architecture .Mobile number portability.

UNIT III

(Lectures 08)

Introduction to Mobile communication: Evolution of Mobile Communication, Mobile and Wireless devices. A simplified reference model for mobile communications. Propagation models (Two-Ray, Knife-edge), Evolving from GSM to GPRS, Quality of service in 3G.

UNIT IV

(Lectures 08)

Mobile Network Layer: Mobile IP, Mobile adhoc Networks, Mobile transport layer: Traditional TCP, wireless network, physical layer & MAC layer, Medium Access Control: Introduction to MAC layer.

Unit V

(Lectures 08)

Emerging Technologies: Bluetooth protocol, stack.Introduction to wireless networks: 2G, 3G&4G Wireless Standards. Intelligent network, IEEE 802.11standard protocols, HiperLAN, TETRA Introduction to WSN.

Text Book

1. T.S. Rappaport, *Wireless Communication-Principles and practice*, Pearson
2. Haykin S & Moher M., *Modern wireless communication*, Pearson
3. Schiller, J. ,*Mobile Communication*,Pearson Education

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. William C. Y. Lee, *Mobile&Cellular Telecommunications(Analog&Digital)*,Mc GrawHill International Editions.

Semester VII
DIGITAL INSTRUMENTATION (LAB)

Course Code: EEC 751

L T P C
0 0 3 1.5

LIST OF EXPERIMENT

1. To study, identify & test the various electronic components:
 - Resistances - Various types, Color coding
 - Capacitors-Variou types, Coding
 - Inductors
 - Diodes & Photo diode
 - Transistors& Photo transistor
 - SCRs
 - ICs
 - LED&LDR
 - Potentiometers
- 2.To Study the symbols for various electrical & electronic components, devices, circuit functions etc.
- 3.To study & perform experiment on CRO demonstration kit.
- 4.To study Soldering & desoldering in practical form:
 - To design&fabricate PCB for a regulated dc power supply;
 - To assemble the regulated power supply using PCB and test it.
- 5.To study and plot the characteristics of following Opto-Electronic devices:
 - LED &LDR
 - Photovoltaic cell
 - Opto-coupler
 - Photo diode
 - Photo transistor
- 6.To study the specifications ,working of a transistor radio kit & perform measurements on it.
- 7.To study the working & specifications and of a VCD Player.
- 8.To study the working & specifications of color TV.
- 9.To study the working & specifications of a Tape Recorder kit.
- 10.To study & prepare the design layout of PCBs using software tools.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VII
DIGITAL SIGNAL PROCESSING (LAB)

Course Code: EEC 752

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

1. To study the sampling & waveform generation.
2. To study the technique of Quantization.
3. To study the PCM Encoding.
4. To study the Delta Modulation.
5. To study the digital modulation schemes (ASK, PSK&FSK).
6. To study the error correcting codes
7. To study & compute DFT.
8. To study & analyze fast Fourier transform (FFT).
9. To study & implement FIR Filter.
10. To study & implement IIR Filter.
11. To study & implement DSP processor.
12. To study & perform computational experiments with digital filters

Note: The entire practical's to be performed on MATLAB DSP tool kit.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VII
ELECTRONIC WORKSHOP & PCB LAB.

Course Code: EEC 753

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

1. To study winding shop & design a Step down transformer winding of less than 5VA .
2. To study the PCB design & layout using software's (P-SPICE&SPRINT)
3. To study soldering shop& learn fabrication of DC regulated power supply
4. To study PCB layout of circuits using printing technology.
5. To study artwork, printing of a simple PCB & perform these operations on PCB.
6. To study etching, drilling of PCB& perform these operations on PCB.
7. To study wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
8. To study the testing techniques of regulated power supply fabricated & test the PCB.
9. To study audio amplifier & fabricate/ test the audio amplifier circuit by using above power supply PCB.
10. To study & design a electronic circuit using available software's & perform fabrication using all techniques of electronics workshop & PCB design.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VII
INFORMATION THEORY & CODING

Course Code: EEC 704

L	T	P	C
3	0	0	3

Objective: To teach the students about the information theory and coding techniques

Course Contents

UNIT I

(Lectures 08)

Introduction to 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 Techniques: 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)

Convolutional codes :Encoder, generator matrix, state diagram, distance properties, maximum likelihood decoding, viterbi decoding, sequential decoding

Text books:

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

Reference books:

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

Semester VII
POWER ELECTRONICS & APPLICATIONS

Course Code: EEE 705

L	T	P	C
3	0	0	3

Objective:

- 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

(Lectures 08)

Power Semiconductor Devices: Types of power semiconductor devices, their symbols and static characteristics; Characteristics and specifications of switches; Types of power electronic Circuits; BJT 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.

Unit II

(Lectures 08)

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 down chopper with R-L load, Principle of step-up chopper, Operation with RL load, classification of choppers.

Unit III

(Lectures 08)

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.

Unit IV

(Lectures 08)

AC Voltage Controllers: Principle of on-off and phase control 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.

Unit V

(Lectures 08)

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.

Text Books

1. M.H.Rashid, “*Power Electronics: Circuits, Devices & Applications*”, Prentice Hall of India, Ltd., 2004.
2. M.D. Singh & K.B. Khanchandani, “*Power Electronics*”, Tata McGraw Hill, 2005

Reference Books

1. M.S Jamil Asghar, “*Power Electronics*”, Prentice Hall of India Ltd., 2004
2. A Chakrabarti, “*Fundamentals of Power Electronics & Drives*”, Chanpat Rai & Co.
3. Babu K.Hari, “*Power Electronics*”, Switch Publications.

Semester VII
EMBEDDED SYSTEM

Course Code: EEC 706

L T P C
3 0 0 3

Objective:

- To develop aspect of embedded system, architecture, interfacing & programming concepts.

Course Contents

UNIT I

(Lectures 08)

Embedded system Introduction: 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 studied 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 pThreads - 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

Semester VII
INDUSTRIAL TRAINING AND PRESENTATION

Course Code: EEC 791

L	T	P	C
0	0	0	3

Students will have to undergo 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 the nodal officer for coordination of the training.

Students will prepare an exhaustive technical report of the training during the VII semester which will be duly signed by the officer under whom training was undertaken 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 comprise 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 in a sealed envelope to the Director.

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 VII
PROJECT WORK PHASE – I (Synopsis, literature survey & presentation)

Course Code: EEC 799

L	T	P	C
0	0	6	3

A group of students, not more than three, will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified in the starting of the VII semester.

The group will carry out the literature search and collect required material for carrying out the project.

The group will prepare a report not exceeding 15 pages at the end of semester.

The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester the student shall present the progress of project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner.

The evaluation committee shall consist of faculty members constituted by the college which would comprise 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 in a sealed envelope to the Director.

The marking shall be as follows.

Internal: 100 marks

By the Faculty Guide - 50 marks

By Committee appointed by the Director – 50 marks

Semester VIII
VLSI DESIGN & TECHNOLOGY

Course Code: EEC 801

L	T	P	C
3	0	0	3

Objective:

- The objective behind this subject is to know about VLSI design principles, the circuit designing using monolithic process

Course Contents.

UNIT-I

(Lectures 08)

Era of Integrated Circuit: Introduction to Monolithic Integrated Circuit Technology, Bipolar & MOS IC, Film IC Crystal Growth: Silicon wafer Preparation & characterization, Oxidation: Thermal oxidation, Oxide thickness measurement, Oxidation system.

UNIT-II

(Lectures 08)

Diffusion, Ion Implantation, Epitaxy, Etching & Film Deposition of dopants: Diffusion Eqns. Dopant profiles, sheet resistance, diffusion furnace, liquid and gaseous dopants, Ion implantation techniques, dopant profiles, apparatus used, Epitaxial growth of Si, apparatus for epitaxy, Photolithography techniques for pattern transfer, Mask making, photo resist & techniques. Vacuum deposition & Sputtering apparatus, CVD Processes and its applications in IC Lab,

UNIT-III

(Lectures 10)

MOS & CMOS Transistor: MOS Structure, MOS/IGFET Devices, MOS System under external bias, Structure & operation of MOSFET, Enhancement mode & Depletion mode devices, I-V Characteristics, MOSFET Scaling & Small-Geometry Effects. CMOS Basic Circuits: MOS Inverters, static & dynamic characteristics, NAND, NOR, AOI Circuits, Design Considerations, Layout Design, Micron & Submicron technologies, parasitic effects, Physical limitations, Concepts of SPICE for Circuit simulation.

UNIT-IV

(Lectures 08)

Standard Digital ICs: Combinational and Sequential MOS Logic Circuits, Design of standard Cells for LSI, VLSI Circuits, Computer-Aided Design Technology, Semiconductor Memories: DRAM, SRAM, Flash memory.

UNIT-V

(Lectures 06)

Programmable Logic Devices: PLA, PAL, PLD/CPLD, PGA/FPGA, ASIC, VLSI Testing.

Text Books:

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

References Books:

1. S. Gandhi, *VLSI Fabrication Principles* ED. John Willey 1994.
2. S.A. Campbell, *The Science and Engineering of Microelectronic Fabrication*, Oxford Univ. Press 1996
3. K. Gopalan , *Introduction to Digital Microelectronics Circuits* ,Mc GrawHill.
4. Sedra , Smith (International Student Edition), *Microelectronic Circuits* ,Oxford Univ. Press
- 5 Milman & Grabel , *Microelectronics* Mc Graw-Hill

Semester VIII
OPTICAL FIBRE COMMUNICATION

Course Code: EEC 802

L	T	P	C
3	0	0	3

Objective:

- To study the optical fiber communication system in detail & also get an overview of light sources, detectors sources.

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), Meridional 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 10)

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- geometry lasers, Distributed feedback lasers, laser diode operating Characteristics, Radiation patterns. Detectors: P-N photo diode, P-I-N Photo diode, Responsively, speed of Response (Numericals based on this).

Unit III

(Lectures 08)

Intensity Modulation: Non coherent/Coherent, 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. 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 06)

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. Govind P. Agrawal - *Fiber Optic Communications Systems*, Wiley

References Books:

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

Semester VII
ECONOMICS & PROJECT MANAGEMENT

Course code: EHM 801

L	T	P	C
3	0	0	3

Objective:

- To study the basic principles of economics & project management

Course Contents

Unit – I

(Lecture 08)

Nature and scope of Managerial Economics: Definition, nature and scope of Managerial Economics - Managerial Economics and Micro-economics - Managerial Economics and Macroeconomic - Applications of Economics in Managerial decisions making

Unit – II

(Lecture 10)

Demand: Demand Analysis - Determinants of Market Demand - Law of Demand - Elasticity of Demand - Measurement and its use - Demand Forecasting - Techniques of Demand Forecasting. Production and Costs: Meaning of Production Function - Law of variable proportions - Law of Supply and Elasticity of Supply - Costs and Cost Functions - Short Terms Costs and their use in decision making - Determinants of costs - Break Even Analysis - Cost Forecasting

Unit – III

(Lecture 10)

Theory of Consumer Behavior: Cardinal Utility Theory (assumptions, law of diminishing marginal utility, law of equimarginal utility, consumer's equilibrium, derivation of demand curve), Ordinal Utility Theory (assumptions, meaning and properties of indifference curve, marginal rate of substitution, consumer's equilibrium, income consumption curve, price consumption curve, income & substitution effects of normal goods under Hicksian approach, derivation of demand curve)

Unit – IV

(Lecture 08)

Market Structure: Perfect Competition (features of pure and perfect competition, determination of price, short and long run equilibrium of a firm, shut down point and its significance), Monopoly (features, causes, short run equilibrium of a firm, concept & conditions of Price Discrimination, Third degree price discrimination), Monopolistic Competition (features, short and long run equilibrium of a firm)

Unit –V

(Lecture 08)

National Income; Concepts and various methods of its measurement, Inflation, types and causes, Business Cycle, Profit concept and major theories of profits; Dynamic Surplus theory, Risk & Uncertainty bearing theory and Innovation theory.

Text Books:

1. Dwivedi, D. N, *Managerial Economics* (Vikas Publishing House: New Delhi)
2. Varshney & Maheshwari, *Managerial Economics* (Sultan Chand & Sons: New Delhi)
3. Dholakia & Oza, *Microeconomics for Management Students* (Oxford University Press: New Delhi)

Reference Books:

Samuelson, N., *Economics* (Tata-McGraw Hill: New Delhi)

Semester VIII
VLSI DESIGN & TECHNOLOGY (LAB)

Course Code: EEC 851

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

PART-I

- To study the schematic design & 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

- To study & design of following circuits 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 study Fiber Optic Trainer & perform following experiments:
- 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 also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VIII
OPTICAL FIBRE COMMUNICATION (LAB)

Course Code: EEC 852

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

Note: Minimum eight practical's to be performed.

1. To study the electrical characteristics of different types of LED.
2. To study & draw the polar plot of the photometric characteristics of LED / LD .
3. To study the numerical aperture & measure it for Single / Multi Gi / S1, fiber.
4. To study & measure attenuation of optical fiber
5. To study & measure spectral characteristics of LED / LD.
6. To study & measure Fiber optic Analog/Digital ,transmitter/receiver parameters.
7. To study the fiber optical connectors.
8. To study & plot spectral response of optical fiber.
9. To study & measure parameter of opto isolator.
10. To study the OTDR in detail.

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.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VIII
BIOMEDICAL INSTRUMENTATION

Course Code: EEC 803

L	T	P	C
3	0	0	3

Objective:

- To study the bio-medical instrumentation, cardiovascular measurement, respiratory system measurement, ophthalmology instruments & bio-telemetry.

Course Contents

Unit I

(Lectures 08)

Introduction of bio-medical instrumentation: 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

(Lectures 08)

Cardiovascular Measurements: 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

(Lectures 08)

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

Unit IV

(Lectures 08)

Ophthalmology Instruments: 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

(Lectures 08)

Bio-telemetry: 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

Semester VIII
SATELLITE COMMUNICATIONS

Course Code: EEC 804

L	T	P	C
3	0	0	3

Objective:

- To study the basic concepts of satellite communication, wave propagation, polarization, link design, satellite transponder & get an overview of the non geostationary orbit satellite systems.

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:

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

Semester VIII
PRINCIPLES OF MANAGEMENT

Course Code: EHM 804

L	T	P	C
3	0	0	3

Objective: The objective is 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 and 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

PROJECT WORK PHASE-II (Report, Analysis, Implementation/Simulation & Presentation)

Course Code: EEC 899

L	T	P	C
0	0	18	9

Students should devote themselves to prepare something tangible, which could be a working model of their thoughts based on their subject of choice.

The project shall be finalized by the students based on the VII semester project work report 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. In this semester student shall present the final project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner.

The evaluation committee shall consist of faculty members constituted by the college which would comprise 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 in a sealed envelope to the Director.

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.