Electrical & Electronics Engineering (EEE)
Semester III/ EEE/B.TECH

Sl No	Subject Code	Subject	Hours			Credit
			L	T	P	
Theory						
1	MA131301	Mathematics-III	3	2	0	4
2	EC131302	Network Analysis	3	2	0	4
3	CS131303	Object Oriented Programming in C++	3	1	0	3
4	EC131304	Semiconductor & Electronic Devices	3	2	0	4
5	EEE131305	Digital Circuits	3	2	0	4
6	HS131306	Sociology	2	0	0	2
Practical						
7	EC131312	Network Analysis Lab	0	0	2	1
8	CS131313	Object Oriented Programming in C++ Lab	0	0	2	1
9	EC131314	Semiconductor & Electronic Devices Lab	0	0	2	1
10	EEE131315	Digital Circuits Lab	0	0	2	1
TOTAL			17	9	8	25
TOTAL CONTACT HOURS PER WEEK						**34**
TOTAL CREDIT						**25**

SUBJECT:: **Mathematics III**
CODE **MA131301**
L-T-P-C: 3-2-0-4
CLASS HOUR: 4
TOTAL NO OF CLASSES: 48
EXPECTED NO OF WEEKS:12

Module	Topic	No of hours
1	**First order Partial differential equation:** Partial differential equation of first order, Linear partial differential equation, Non-linear partial differential equation, Homogenous and non-homogeneous partial differential equation with constant co- efficient, Cauchy type, Monge's method. **Second order Partial differential equation:** Second order partial differential equation The vibrating string, the wave equation and its solution, the heat equation and its solution, Two dimensional wave equation and its solution, Laplace equation in polar, cylindrical and spherical coordinates, potential.	15
2	**Complex Analysis:** Analytic function, Cauchy-Riemann equations, Laplace equation, Conformal mapping, Complex integration: Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions. **Mathematical Series**: Power Series, Taylor's series, Laurent's series, Singularities and zeros, Residue integration method.	15
3	**Probability and statistics:** (i)Definition of probability, Laws of probability, Bays theorem, random variables, probability distributions and characteristics, binomial distribution, poisson's distributions and Normal distribution. (ii) Elementary sampling theory, tests of hypothesis (statistical inference), Standard error, Fudicial (Confidence) limits, Tests of significance- Students' T-tests, Chi square tests and Z –tests.	10
4	**Laplace Transform** Definition of Laplace transform, Laplace transform of elementary functions, inverse of Laplace transforms. Properties of Laplace Transform- Linearity, multiplication by t^n and division by t. Laplace Transform of derivatives and integrals. Shifting theorems, Laplace transform of (i) periodic function (ii) unit step function, (iii) Dirac-delta function. Covolution theorem, Application of Laplace transforms to initial value problems.	8

Reference Books:

1. E. Kreyszig," Advanced Engineering Mathematics:, Eighth Edition, WileyIndia.
2. B.V. Ramana, "Higher Engineering Mathematics", McGraw Hil Education.
3. N.P.Bali and Manish Goel, " A text book of Engineering mathematics", Laxmi Publication.
4. B. S. Grewal , "Higher Engineering Mathematics", Khanna Publication, Delhi.
   Babu Ram, "Engineering Mathematics", Pearson

SUBJECT:: **NETWORK ANALYSIS**
CODE **EC131302**
L-T-P-C: 3-2-0-4
CLASS HOUR: 4
TOTAL NO OF CLASSES: 48
EXPECTED NO OF WEEKS:12

Module	Chapter	Content	Hours
1	**DC Circuit analysis**	Sources-Transformation, Star Delta Conversion, Mesh and Nodal Analysis, Network theorems – Superposition theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, Millman's theorem, Compensation theorem, Maximum power transfer theorem and Tellegen's theorem – Application to DC circuit analysis including circuits with dependent sources	8
2	**AC Circuit Analysis**	Phasor concept, Complex impedance, admittance and their phasor diagram. Series circuits -RC, RL and RLC circuits and parallel circuits – RLC circuits – sinusoidal steady state response – Mesh and Nodal analysis – analysis of circuits using Superposition, Thevenin's. Norton's and Maximum power transfer theorems. Resonance – Series resonance – Parallel resonance – Variation of impedance with frequency – Variation in current through and voltage across L and C with frequency – Bandwidth – Q factor – selectivity.	10
3	**Magnetically Coupled Circuits**	Self inductance – Mutual inductance – Dot rule – Co-efficient of coupling, series, Parallel connection of coupled inductors – single tuned coupled circuits..	5
4	**Transients**	Forcing Functions; Impulse, Step and Ramp Functions, Solution of simple circuits using Laplace transform.	5
5	**Network topology**	Network Terminology, Graph of a network, Incident matrix, Tie Set Matrix and Cut set Matrix, Formulation of Network Equilibrium equations.	6
6	**One port networks**	Foster and Cauer form of realization of one port network with two kinds of elements – LC, RC or RL.	6
7	**Two port networks**	General principle, Open circuit Impedance parameter (Z), Short Circuit Admittance parameter (Y), Hybrid parameter (h) and	8

		Transmission Parameter (ABCD), Inter-relationship between parameters, Interconnection of two port networks. Network functions for two port networks; Driving point and Transfer Function.	
		Total	48

Text Books / reference:

1. William H. Hayt, Jr. Jack E, Kemmerly and Steven M. Durbin, ‘’Engineering Circuits Analysis’’, MCGrwa Hill Science Engineering, seventh Edition, 2006.
2. M. E. Valkenburg, ‘’Network analysis’’, PHI.
3. A. sudhakar, Shymmohan Palli, ‘’Circuits and Network’’, 3rd edition, McGraw Hill.
4. Ravish R singh, ‘’Network Analysis and synthesis’’ McGraw Hill.
5. David a. Bell, ‘’Electronic Circuits’’, 7th edition Oxford University Press.

SUBJECT:: **OBJECT ORIENTED COMPUTER PROGRAMMING IN C++**
CODE **CS131303**
L-T-P-C: 3-1-0-3
CLASS HOUR: 3
TOTAL NO OF CLASSES: 36
EXPECTED NO OF WEEKS:12

Module	Chapter	Content	Hours
1	**INTRODUCTION**	**(a)** What is Object Oriented Programming? Why we need Object Oriented Programming? Programming characteristics of OOP. Difference between OOP and procedure oriented programming. **(b)** Basic Concepts of OOPs, feature of OOPs, Application of OOPs, and review of Data Types (user define and derived data types), Keywords, Tokens, Identifies, Constants, Reference variables, different Operators and Control statement.	6
2	**CLASSES AND OBJECTS**	**(a)** Introduction to Objects and classes, Difference between Class and Structure, Class definition and syntax, Defining member functions, Access control to other functions(Private, Public, Protected) **(b)** Objects-Dynamic Creation and initialization, Passing and Returning objects, Object assignment and array of objects,; **(c)** Constructors-Types, Destructors, Nesting member function, Private member function , Inline functions, **(d)** Static class members, Function prototyping, Call by reference, Return by reference, Default Argument, Friend functions, this pointer	8
3	**INHERITANCE**	**(a)** Types of Inheritance; Base and Derived classes – Syntax of derived classes, access to the base class; Types of Inheritance. **(b)** Multiple inheritances – Virtual Base classes. Constructors and Destructors in Inheritance. **(c)** Container classes, Abstract Classes.	5
4	**POLYMORPHISM**	**a)** Compile time (Early/Static binding)-Overloading functions and operators, Overloading new and delete operators. **b)** Run time polymorphism (Late/Dynamic Binding) – Virtual functions, Pure Virtual functions, Virtual Destructors. **c)** Review of Virtual base classes.	6

5	**TEMPLATES**	Templates – Uses, Generic classes, Class templates, Function templates, Advance templates. Examples.	3
6	**EXCEPTION HANDLING AND MANIPULATORS**	(a) Exception handling – Advantages, Try catch and throw clauses, Examples. (b) Manipulators, different examples of manipulators.	3
7	**POINTERS AND FILES**	a) Pointer types- uses; Dynamic memory allocation techniques - garbage collection, Linked list, generic pointers. b) Files: Open, Close, Read and Write; File attributes, File management.	5
		Total	36

TEXT/ REFERENCE BOOKS:

1. E. BALAGURUSWAMY**: OBJECT ORIENTED PROGRAMMING WITH C++,** Tata McGraw Hill.
2. HERBERT SCHILDT: "**C++, THE COMPLETE REFERENCE".**
3. BARKATAKI: "**OBJECT ORIENTED PROGRAMMING"**, PHI.

REFERENCES:

1. DEITAL AND DEITAL: **"C++ HOW TO PROGRAM"**
2. O"REILY: **"Head First C#:"**
3. R. LAFORE: "**OBJECT ORIENTED PROGRAMMING IN TURBO C++",** GALGOTIA, NEW DELHI
4**.** P.B. MAHAPATRA: "**THINKING IN C- INCLUDING OBJECT ORIENTED PROGRAMMING WITH C++",** WHEELER PUBLISHING

SUBJECT:: **SEMICONDUCTOR & ELECTRONIC DEVICES**
CODE **EC131304**
L-T-P-C: 3-2-0-4
CLASS HOUR: 4
TOTAL NO OF CLASSES: 48
EXPECTED NO OF WEEKS:12

Module	Contents	Hours
1	**Energy Bands and Charge Carriers in Semiconductors:** Energy-band (E-k diagram) and the bond model, metal, insulator, semiconductor; Effective mass, Concept of hole, Direct & indirect band-gap semiconductors; Carrier distribution. **Semiconductor in equilibrium :** Charge carriers in semiconductor, equilibrium distribution of electrons and holes, effective density of states function, intrinsic carrier concentration, FD distribution function, intrinsic Fermi-level, Extrinsic semiconductors and energy levels, distribution, Mass action law, Degenerate and non degenerate semiconductor, mathematical derivation of position of Fermi Energy Level, Effect of temperature and doping on Fermi level. Carrier Transport phenomena: Carrier drift, mobility, phonon and impurity scattering, conductivity, carrier diffusion, Graded impurity distribution, Einstein Relation, Hall effect. **Semiconductor in non-equilibrium:** Carrier generation and recombination, excess carrier, Continuity equation, quasi-Fermi level, excess carrier life time, surface states.	13
2	**pn junction:** Concept of homo and hetero junctions, Basic structure of pn junction, unbiased and biased pn junction, built in potential, electric field, space charge width, junction capacitance, concept of one-sided junction, non-uniformly doped junction. **pn junction diode:** pn junction current under zero, forward and reverse biased conditions, characteristics, static and dynamic resistance, piecewise linear model, Diode switching, Breakdown mechanism, Zener diode, Varactor, Tunnel, Schottky, PIN, Optical devices and Solar cells.	13
3	**Bipolar Junction Transistors*:*** BJT as a current controlled device, Physical mechanism, current gain, minority current distribution; Punch-through and avalanche effect, amplification property of BJT, input & output characteristics for CB. CE & CC mode, transistor as a switch, Eber's Moll model, Charge controlled model, Basic idea about Photo-transistors & Power transistors, PNPN transistors - simple working principle, I-V	12

	characteristics, triggering, mention of Triacs, Diacs & Thyristors, UJT.	
4	**Field Effect Transistors :** Basic MOS capacitor, energy band diagram, flat band and threshold voltages, Basic structure, working, characteristics of JFET and MOSFET, CMOS.	10
	Total	48

Text Books:

Neamen- Semiconductor Physics and Devices TMH
Ben Streetman and Banerjee- Solid State Electronic Devices, Prentice Hall.
Bhattacharya & Sharma- Solid State Electronic Devices- Oxford
Maini & Agrawal- Electronics Devices and Circuits- Wiley
David A. Bell: Electronic Devices and Circuits- Oxford University Press.

Reference Books:

Milman, Halkias & Jit- Electronics Devices and Circuits- TMH
Bell-Electronics Devices and Circuits-Oxford
Bhattacharya & Sharma- Solid State Electronic Devices- Oxford
Singh & Singh- Electronics Devices and Integrated Circuits –PHI
Bogart, Bisley & Rice- Electronics Devices and Circuits- Pearson
Kasap-Principles of Electronic Materials and Devices- TMH
Boylestad & Nashelsky- Electronics Devices and Circuit Theory- Pearson
Salivahanan, Kumar & Vallavaraj- Electronics Devices and Circuits- TMH

SUBJECT:: **DIGITAL CIRCUITS**
CODE **EEE131305**
L-T-P-C: 3-2-0-4
CLASS HOUR: 4
TOTAL NO OF CLASSES: 48
EXPECTED NO OF WEEKS:12

Module	Chapter	Content	Hours
1	**NUMBER SYSTEMS & CODES**	Positional number systems - decimal, binary, octal and hexadecimal. Number base conversion. Representation of negative binary numbers. Codes - BCD, Gray, and ASCII extended BCD.	7
2	**BOOLEAN ALGEBRA & LOGIC CIRCUITS**	Axioms and basic theorems of Boolean algebra. Truth table, logic functions and their realization. Logic gates, standard representation (canonical forms) of logic functions - SOP and POS forms. Min terms and max terms.	8
3	**SIMPLIFICATION OF LOGIC FUNCTIONS**	Karnaugh map of 2, 3 and 4 variables. Simplification by algebra and by map method. Function simplification for don't care conditions, SOP, POS realization; conversion to NAND-NAND or NOR-NOR logic	9
4	**DIGITAL LOGIC FAMILIES**	TTL, MOS, ECL, Interfacing between logic families.	6
5	**COMBINATIONAL CIRCUITS**	Multiplexer/demultiplexer, encoder/ decoder, adder/ subtractor, comparator and parity generators; Design using multiplexers and decoders; Full Adder, Ripple carry adder.	8
6	**SEQUENTIAL CIRCUITS**	Latches and flip-flops (RS, JK, D, T, and Master Slave); Registers; Counters: ripple, ring, and shift register counters; Design and analysis of synchronous sequential finite state machine; Programmable logic devices.	10

		Total	48

Books:

1. **Modern Digital Electronics** – R.P.Jain (Tata McGraw Hill)
2. **Digital Design** – M.Morris Mano, Michael D.Ciletti

SUBJECT:: **SOCIOLOGY**
CODE **HS131306**
L-T-P-C: 2-0-0-2
CLASS HOUR: 2
TOTAL NO OF CLASSES: 24
EXPECTED NO OF WEEKS:12

Module	SOCIOLOGY	Hours
1	Sociology in the Industrial Perspective: Concept of sociology/ Sociology as a science?/ Sociology of work and industry/ Perspectives for sociological analysis of work/ Class conflict in industry/ Social impact of industrialization	8
2	Work and Social Change: Nature of modern societies/ Emergence of industrial capitalism/ Technology and social change/ The information society after the industrial society/ Postmodernity/ Globalization and convergence/ Significance of the service sector today/ Work restructuring and corporate management	8
3	Work Experiences in Industry: The concept of alienation/ Work satisfaction/ Technology and work experience/ Social background of workers/ Work orientations/ Stress and anxiety of the worker/ Work and leisure/ Unemployment/ Conflicts in the workplace	8
	Total	24

Reference Books:

1. Miller and Form, Industrial Sociology (London: Harper & Row, 1968)
2. N. R. Sheth, Social Framework of Indian Factory (Bombay: Oxford University Press, 1968)
3. Gisbert, Fundamentals of Industrial Sociology (New Delhi: Oxford University Press, 1971)
4. P. Gisbert, Fundamentals of Industrial Sociology (New Delhi: Oxford University Press, 1971)
5. Tony J. Watson, Sociology, Work and Industry (New York: Routledge, 2004 reprint)

SUBJECT:: **Network Analysis Laboratory**
CODE **EC 131312**
L-T-P-C: 0-0-2-1
EXPECTED NO OF WEEKS:12

Sl No	Aim of the Experiment	Hours
1	Verification of Superposition Theorem. Measure the branch currents and verify with theoretically calculated values	3
2	Verification of Thevenin"s Theorem for a simple DC Circuit. To measure the value of Vth and Rth and compare with theoretically calculated values.	3
3	Verification of Maximum Power Transfer Theorem for a simple dc circuit. Draw the Power Vs load resistance curve and hence find the resistance corresponding to maximum power from the curve.	3
4	To construct a RC low pass filter and observe output for a sinusoidal input over a range of frequencies. To measure the amplitude and phase shift at various frequencies and plot Bode plot and hence find the 3dB bandwidth	3
5	To construct a RC high pass filter and observe output for a sinusoidal input over a range of frequencies. To measure the amplitude and phase shift at various frequencies and plot Bode plot and hence find the 3dB bandwidth	3
6	To plot the frequency response of series RLC circuit and find the resonant frequency and 3dB points on the graph and hence calculate the bandwidth and Q factor.	3
7	To plot the frequency response of parallel RLC circuit and find the resonant frequency and 3dB points on the graph and hence calculate the bandwidth and Q factor	3

SUBJECT:: **Object Oriented Computer Programming in C++ Lab**
CODE **CS131313**
L-T-P-C: 0-0-2-1
EXPECTED NO OF WEEKS:12

MODULE II: CLASSES AND OBJECTS	
1. Write a C++ program to implement the concept of static data member in class. 2. Write a C++ program to implement the concept of static function in class. 3. Write a C++ program using function with default argument. 4. Write a C++ program to illustrate the use of objects as function arguments (which performs the addition of time in the hour and minutes format) 5. Write a C++ program to illustrate the use of friend function. 6. Write a C++ program to illustrate how an object can be created (within a function) and returned to another function 7. Write a C++ program to illustrate the use of constructors and destructors. 8. Write a C++ program to illustrate the use of copy constructor.	**[8 programs from this module]**

MODULE III : INHERITANCE	
1. Write a C++ program to implement single inheritance (private/public). 2. Write a C++ program to implement multilevel inheritance. 3. Write a C++ program to implement multiple inheritances. 4. Write a C++ program to illustrate the use of virtual base class.	**[4 programs from this module]**

MODULE IV : POLYMORPHISM	
1. Write a C++ program to overload unary '-' (minus) operator. 2. Write a C++ program to overload unary '+' (plus) operator. 3. Write a C++ program to illustrate how an operator can be overloaded using friend function. 4. Write a C++ program to illustrate the use of run time polymorphism.	**[4 programs from this module]**
MODULE V : TEMPLATES	
1. Write a C++ program to swap two variable using *function templates.*	**[1 program from this module]**

MODULE VI :EXCEPTION HANDLING AND MANIPULATORS	
1. Write a C++ program to implement *try (), catch (), throw ()* function.	**[1 program from this module]**

MODULE VII :POINTERS AND FILES	
1. Write a C++ program to implement this pointer. 2. Write a C++ program to illustrate the use of pointers to derived objects. 3. Write a C++ program to illustrate the use of virtual function 4. Write a C++ program to open and close a file using *open(), close()* function 5. Write a C++ program to illustrate the use of *read(), write()* function	**[5 programs from this module]**

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3. P.B. MAHAPATRA : "**THINKING IN C- INCLUDING OBJECT ORIENTED PROGRAMMING WITH C++"** , WHEELER PUBLISHING

SUBJECT:: **SEMICONDUCTOR AND ELECTRONIC DEVICES LAB**
CODE **EC131314**
L-T-P-C: 0-0-2-1
EXPECTED NO OF WEEKS:12

SI No	Aim of the Experiment	Hours
1	To study the Forward characteristic of the p-n junction diodes.	3
2	To study the Forward characteristic of the Zener Diodes.	3
3	To plot the static collector characteristics of a BJT in the common emitter configuration.	3
4	To plot the static collector characteristics of a BJT in the common base configuration.	3
5	To plot the static collector characteristics of a BJT in the common collector configuration.	3
6	i) To plot the static drain characteristics of an n-channel Junction Field Effect Transistor in the common source configuration. ii) To plot the transfer Characteristic of the given JFET.	3

SUBJECT:: **Digital Circuits Lab**
CODE **EEE131315**
L-T-P-C: 0-0-2-1
EXPECTED NO OF WEEKS:12

Sl No	Aim of the Experiment	Hours
1	Introduction to digital logic circuits and implementation of elementary digital operations using transistors	3
2	To implement a simple Boolean expressions on TTL/CMOS Small Scale Integrated Circuit (SSI) Devices.	3
3	To implement Half Adder & Full Adder.	3
4	To study Parallel Binary adder.	3
5	To study a BCD to 7 Segment LED display decoder as an example of a multiple input and multiple output combinational digital circuit.	3
6	To study the J-K, D and T flip flops.	3
7	To study a simple two-bit ripple counter.	3
8	Introduction to Hardware Description Language (Verilog) (a) Logic Gates (b) Simple Combinational Circuits using gate level modeling.	3

Books:

1. Modern Digital Electronics – R.P.Jain (Tata McGraw Hill)
2. Verilog HDL: A Guide to Digital Design & Synthesis – Samir Palnitkar (Pearson)