GONDWANA UNIVERSITY, GADCHIROLI

FACULTY OF SCIENCE & TECHNOLOGY

CONSOLIDATED STATEMENT OF VARIOUS PARAMETERS IN TEACHING & EXAMINATION SCHEME OF

B.E. (ELECTRONICS ENGINEERING)

SR. NO.	SEMESTER	NO. OF THEORY SUBJECTS	NO OF LABS/PRACT	TEACHING HOURS(TH) (L+T)	TEACHING HOURS (PRACT)	TOTAL CREDIT	MAX. THEORY MARKS	MAX.PRACT MARKS	MAX. MARKS TOTAL
1	I								
2	II								
3	III	5	3	21	9	24	500	150	650
4	IV	5	4	20	10	26	500	200	700
5	V	5	4	18	11	24	500	200	700
6	VI	5	3	20	9	25	500	150	650
7	VII	5	3	20	8	24	500	150	650
8	VIII	5	3	19	12	27	500	250	750
		30	**20**	**119**	**59**	**150**	**3000**	**1100**	**4100**

***Audit course. It is neither considered as passing head nor considered for earning some credit(s). However, this is mandatory to be taken up at the respective college level**

Subject wise Board of Studies Affiliation

Board of Studies	**Subject Codes**
APPLIED SCIENCES & HUMANITIES	EN 301,EN 401,EN 505
ELECTRICAL ENGINEERING	EN 303,EN 405,EN 503,EN 603
COMPUTER TECHNOLOGY/CSE	EN604
ELECTRONICS ENGINEERING	Rest all ,except above enlisted
EN/ETC/ECE COMMOMN	ET302/EN302, ET305/EN305,ET 403/EN403, ET405/EN404 ET501/EN501,ET502/EN502, ET601/EN601,ET602/EN602,ET701/ET701,ET801/EN801 **A**

Appendix A

Gondwana University, Gadchiroli

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Choice Based Credit System
Third Semester B.E. (Electronics Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours Per Week			Number of Credits	THEORY						PRACTICAL			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
								MSE	IE						
3BEEN01	Applied Mathematics-III	4	0	0	4	3	80	10	10	100	40	--	--	--	--
3BEEN02	Electronic Devices & Circuits	3	1	0	4	3	80	10	10	100	40	--	--	--	--
3BEEN03	Electronic Measurements & Instrumentation	3	1	0	4	3	80	10	10	100	40	--	--	--	--
3BEEN04	Network Theory	3	0	0	3	3	80	10	10	100	40	--	--	--	--
3BEEN05	Programming Language C ++	3	1	0	4	3	80	10	10	100	40	--	--	--	--
Laboratories															
3BEEN06	Electronic Devices & Circuits	0	0	2	1	--	--	--	--	--	--	25	25	50	25
3BEEN07	Electronic Measurements & Instrumentation	0	0	2	1	--	--	--	--	--	--	25	25	50	25
3BEEN08	Programming Language C ++	0	0	2	1	--	--	--	--	--	--	25	25	50	25
Total		**16**	**3**	**6**											
Semester Total		**25**			**22**					**500**				**150**	**650**

Appendix A

Gondwana University, Gadchiroli

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Choice Based Credit System
Fourth Semester B.E. (Electronics Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours Per Week			Number of Credits	THEORY						PRACTICAL			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
								MSE	IE						
4BEEN01	Applied Mathematics-IV	4	0	0	4	3	80	10	10	100	40	--	--	--	--
4BEEN02	Basic Electrical Machines	3	0	0	3	3	80	10	10	100	40	--	--	--	--
4BEEN03	Digital Circuits & Fundamentals of Microprocessors	3	1	0	4	3	80	10	10	100	40	--	--	--	--
4BEEN04	Electronic Engineering Materials & Components	4	0	0	4	3	80	10	10	100	40	--	--	--	--
4BEEN05	Electromagnetic Fields	3	1	0	4	3	80	10	10	100	40	--	--	--	--
Laboratories															
4BEEN06	Basic Electrical Machines	0	0	2	1	--	--	--	--	--	--	25	25	50	25
4BEEN07	Digital Circuits & Fundamentals of Microprocessors	0	0	2	1	--	--	--	--	--	--	25	25	50	25
4BEEN08	Programming Practice (MATLAB/SCILAB)	0	0	2	1	--	--	--	--	--	--	25	25	50	25
4BEEN09	Personal Proficiency-I	0	0	2	1	--	--	--	--	--	--	50	--	50	25
Total		**17**	**2**	**8**											
Semester Total		**27**			**23**					**500**				**200**	**700**

THIRD SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : **EN 301**

Title of the Course : **APPLIED MATHEMATICS III**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
4	**0**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**Laplace Transform**	
	Definition, Properties (statements only). Periodic functions and unit step function, Inverse Laplace transform by partial fractions and convolution theorem. Solution of ordinary linear differential equations with constant coefficients by Laplace transform	11
II	**Matrices**	
	Inverse of matrix by adjoint and partitioning method, Rank of a matrix and consistency of system of linear simultaneous equations , Linear dependence ,Linear and orthogonal transformation , Eigen values and eigen vectors, Reduction to diagonal form	08
III	**Matrices**	
	Cayley-Hamilton Theorem, Sylvester's Theorem (statements only) Solution of second order linear differential equation with constant coefficient by matrix method. Largest eign value and corresponding eign vector by iteration	08
IV	**Partial Differential Equations**	
	Linear Partial Differential Equations -first order and first degree i.e. Lagrange's form, Linear homogeneous equations of higher order with constant coefficients, Method of separation of variables.	08
V	**Fourier series and Fourier Transforms**	
	Periodic functions and their Fourier series expansion, Fourier Series for even and odd functions, Change of interval, Half range expansions, Fourier integrals and Fourier Transforms.	10

Text Books:

1. Higher Engineering Mathematics -B.S.Grewal,Khanna Publications
2. Probability and Statistics by Murray R Spiegel 3/e Schaum's Outline Series
3. Higher Engineering Mathematics By H.K.Dass S.Chand

Reference Book:

A Text Book of Engineering Mathematics by N.P. Bali and Manish Goyal Laxmi Publications

THIRD SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING/ ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code : **3BEET03**

Title of the Course : **ELECTRONIC DEVICES AND CIRCUITS**

Course Outcomes:

1. To understand the physical construction, working and operational characteristics of Semiconductor devices.
2. To understand the working of transistors, its various configuration and their applications.
3. Able to design simple circuits containing non-linear elements such as transistors using the concepts of load lines and operating points.
4. To analyze the basic principle, operation and applications of JFET and MOSFET
5. To analyze various parameters of power amplifier.

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**1**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**P-N Junction Diode and its applications**	
	Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-ampere Characteristics, Temperature dependence of diode VI characteristic, Ideal versus Practical ,static and dynamic resistance of a diode, Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes. Principle of Operation and Characteristics of Zener Diode and Voltage Regulation using Zener Diode. The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier. Filters: filters: capacitive filter, inductive filter, L-C & C-L-C Filters .	10
II	**Bipolar Junction Transistor**	
	Transistor Construction, BJT Operation, Transistor Current Components Transistor as switch, Common Base, Common Emitter and Common Collector Configurations and its input, output characteristics. BJT Specifications, Transistor as an Amplifier, analytical expression (Ebers-moll model) for transistor characteristics **The Transistor at Low Frequencies:** Two-port Devices and the Hybrid model, Transistor Hybrid model, Analysis of a transistor amplifier circuit using h parameters, Millers Theorem and its dual, cascading transistor amplifiers	14
III	**Transistor Biasing and Stabilization**	

	Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in VBE and β, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability **The Transistor at High Frequencies:** The hybrid-pi (π) Common Emitter transistor Model, hybrid-π Conductances and Capacitances.	12
IV	**Field Effect Transistor**	
	Junction Field Effect Transistor Construction and principle of operation, JFET characteristics, JFET Small Signal Model, MOSFET Construction and principle of operation, MOSFET Characteristics in Enhancement and Depletion modes.FET Biasing , FET Amplifiers: FET Common Source Amplifier, Common Drain Amplifier,FET as Voltage Variable Resistor.	12
V	**Power Amplifiers**	
	Introduction, difference between voltage amplifier and power amplifier, classification of power amplifiers, overall and collector efficiency of power amplifiers, Transformer coupled class A amplifier, Push pull class B amplifier, complementary symmetry class B amplifier, cross over distortion.	12

Text Books:

1. Integrated Electronics – Millman & Halkias, Tata McGraw Hill Company.
2. Electronic Devices and Circuits by Millman Halkias (2 nd edition, McGraw Hill Publications)
3. Electronic Devices and Circuit Theory by Robert L. Boylestad (PHI Publications)

Reference Books:

1. Electronic Devices and Circuit by Allen Motorshed Eastern Economy Edition
2. Electronic Devices and Circuits by David A. Bell (PHI Publications)

THIRD SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : **EN 303**

Title of the Course : **Network Theory**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**0**	**0**	**3**	**3**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**INTRODUCTION**	
	Nodal and Mesh analysis of networks, source transformation, mutual inductances in mesh and nodal analysis, Duality.	9
II	**NETWORK THEOREMS**	
	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.	9
III	**FOURIER SERIES AND GRAPH THEORY**	
	Fourier series, Evaluation of Fourier coefficients, waveform symmetries as related to Fourier coefficients, Exponential form of Fourier series, steady state response to periodic signals, Fourier integral and transform. Graph theory: Graph of a network, tree, co-tree, basic loop and basic cut set, incidence matrix, cut set matrix, Tie-set matrix.	9
IV	**LAPLACE TRANSFORMS & TRANSIENT RESPONSE OF NETWORKS**	
	Definition of Laplace transform, properties of Laplace transforms, Laplace transform theorems, inverse Laplace transform, Laplace transform of periodic functions, Convolution integral, Partial fractions, applications of Laplace transforms. Transient behaviour, initial conditions, concept of complex frequency, driving points and transfer functions, Poles and zeros of network functions, restrictions on Pole and Zero locations for driving point functions, restrictions on Pole and Zero locations for transfer functions, time domain behaviour from the Pole and Zero plot.	9
V	**TWO PORT NETWOKS**	
	Relationship of two-port variables, short circuit admittance parameters, open circuit impedance parameters, transmission parameters, hybrid parameters, relationships between parameter sets, parallel connection of two port networks. Three phase unbalanced circuits and power calculations.	9

Text Books :

1.Network analysis by M.E. Van Valkenburg, Prentice Hall of India Pvt.Ltd.
2.Linear network theory by Kelkar and Pandit, Pratibha publication, Nagpur.

Reference books :

1.Engineering Network analysis and filter design by Gopal Bhise, Prem Chaddha, D. Kulshreshtha, Umesh publication, Delhi.
2.Circuit theory by a. Chakrabarti, Dhanpat Rai and co.
3.Circuit and Networks by A. Sudhakar, Shyammohan, Tata McGraw Hill.

THIRD SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : **EN 304**

Title of the Course : **PROGRAMMING LANGUAGE C++**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**1**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**INTRODUCTION**	
	Concept of Object Oriented Programming (OOP): Procedure Oriented Programming, OOP, Basic Concept of OOP, Benefits of OOP, Data Types : Basic Data Types, User Defined Data Types, Derived data types, Variables: Declaration of Variables, Dynamic Initialization of Variables, Reference Variables, Introduction to C++: Parts of C++ program, cout and cin objects, #include Directive, Variables and Constants, Comments, Operators: Arithmetic, Relational & Logical Operators, Type cast Operator, Scope resolution operator	7
II	**CONTROL STATEMENTS & ARRAYS**	
	Control Structures: for, do…while, while, if…else, switch, Arrays and strings : Operations on arrays : searching(linear and binary),sorting(bubble sort, insertion sort, selection sort)multidimensional array, strings ,strings manipulation , arrays of strings	9
III	**FUNCTIONS**	
	Function: Function Prototyping, Call by reference, Return by reference, Inline functions, Default arguments, const arguments, Function overloading, Recursion Classes & Objects : Defining a class, Defining member Functions, making an Outside function Inline, Nesting of Member Functions, Access Specifiers, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Friend functions	11
IV	**CONSTRUCTORS & OPERATOR OVERLOADING**	
	Constructors and Destructors : Constructors, Parameterized constructors, Constructors with default arguments, Dynamic initialization of Objects, Copy constructor, Dynamic Constructors, Constructors for Two-dimensional Arrays, constant Objects and constructor , Destructors. singly linked list (creation, insertion, deletion, updation) Operator Overloading : Introduction, Defining Operator Overloading, Overloading Unary and Binary Operators ,Overloading Unary and Binary Operators using Friend functions, Rules for Overloading Operators	9
V	**INHERITANCE, POLYMORPHISM & FILE PROCESSING**	
	Inheritance : Introduction, Defining Derived classes, Single, Multilevel, Multiple, Hybrid Inheritance, Multipath inheritance and Virtual Base classes, Abstract class, Polymorphism: Introduction, Pointer to Objects, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions, File handling : Introduction, Classes for File Stream Operations, Opening and closing a File, Detecting End of File, More about Open(), File pointers and their Manipulations, Updating a file	9

Text Books: 1.Mastering c++ by Venugopal, Rajkumar , Ravi Shankar
2.Object oriented programming with c++ fifth edition by Balagurusamy

Reference books : 1) Object oriented programming in C++ by Robert Lafore
2) Thinking in C++ by Sunil Pandey
3) Let us C++, Yashawant P Kanetkar

THIRD SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : **EN 305**

Title of the Course : **ELECTRONICS MEASUREMENTS AND INSTRUMENTATION**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**1**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**INTRODUCTION**	
	Statistical analysis of measurement of errors, accuracy, precision types of errors, Digital voltmeter: Characteristic features, advantages and applications, Digital LCR meter, Digital Multimeter	9
II	**BRIDGES & THEIR APPLICATIONS**	
	Bridges: Wheat stone, Kelvin, Max-well, Ray, Schering, Wienbridge Potentiometer, Measurement of Inductance, Capacitance using AC bridges, measurement of frequency	9
III	**SENSORS & TRANSDUCERS I**	
	Generalized instrumentation systems, active & passive transducers, primary and secondary transducers, digital & analog transducers, static & dynamic characteristic, Variable inductance transducers, Self generating & passive type, LVDT, Piezoelectric transducers, Proximity sensors: Eddy current, Capacitive and Inductive type	9
IV	**SENSORS & TRANSDUCERS II**	
	Laws of thermoelectric circuits, thermocouples, cold junction compensation, thermistors, Resistance temperature detector, radiation pyrometer, optical pyrometer, temperature measurement of flowing liquids, Strain Gauges: Wire wound, foil, semiconductor & capacitor types, Strain gauge circuits: Ballast, Wheatstone Bridge, Temperature compensation, Calibration of Strain gauge, Light sensors: Photodiodes, phototransistors, photoresistors	9
V	**SIGNAL CONDITIONING AND BUS STANDARDS**	
	Signal conditioning techniques: linearization, gain clipping, filtering, differential amplification, shielding techniques, data acquisition systems, IEEE 4888 bus & I2C bus: principle of operation, protocols	9

Text Books :

1. A Course in Electrical /Electronic Measurement and Instrumentation –A.K.Sawhney Dhanpat Rai & Sons Delhi
2. Instrumentation Devices & Systems-Ranjan C.S.,Sharma G.R. and Mani V.S.V.,Tata McGraw Hill Publications

Reference Books :

1.Sensors and Transducers –Patranbis D ,A H Wheeler and Company
2.Measurement System application and Design-E O Doebelin Tata Mc Graw Hill
3.Instrumentation , Measurement and Analysis-B.C.Nakra ,K A Chaudhary Tata Mc Graw Hill

THIRD SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : **EN 306**

Title of the Course : **ELECTRONICS DEVICES AND CIRCUITS**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**2**	**2**	**1**	**25**	**25**	**50**

It includes at least 7-8 experiments based on the theory syllabus of Electronics devices and circuits.

(At least two experiments should be conducted using simulator like Pspice)

List of suggested experiments
1. Analyzing V-I characteristics of p-n junction diode 2. Design of half wave rectifier 3. Design of full wave rectifier 4. Design of Bridge rectifier 5. Analyzing V-I characteristics of Zener diode 6. Design of voltage regulator using zener diode. 7. To obtain input and output characteristics of CE configuration BJT. 8. To obtain input and output characteristics of CB configuration BJT. 9. To obtain input and output characteristics of CC configuration BJT. 10. To obtain Drain and Transfer characteristics of FET 11. Analyzing the frequency response of single stage CE amplifier. 12. Analyzing the performance of push-pull amplifier.

THIRD SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : **EN 307**

Title of the Course : **PROGRAMMING LANGUAGE C++**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**2**	**2**	**1**	**25**	**25**	**50**

It includes at least 7-8 programs based on the theory syllabus of Programming Language C++.

List of suggested programs
1) Program to print the sum of series $1 + \frac{x}{1!} + \frac{x^2}{2!} + \cdots$
2) i. Program to sort the array using bubble sort
ii. Program to sort the array using selection sort
iii. Program to sort the array using insertion sort
3) i. Program to search an element in the array using linear search
ii.Program to search an element in the array using binary search
4) Print number of vowels , characters in a string
5) Program to find area of triangle using function overloading
6) Program based on multiple inheritance
7) Program to convert decimal to binary and binary to decimal
8) Program based on classes and objects
9) Program to concatenate two strings
10) Program on file handling
11) Program to print transpose of matrix
12) Program to find addition of two matrices
13) Program to find multiplication of two matrices
14) Program to create singly linked list
15) Program to insert an element in singly linked list

THIRD SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : **EN 308**

Title of the Course : **ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**2**	**2**	**1**	**25**	**25**	**50**

It includes at least 7-8 experiments based on the theory syllabus electronics Measurements and Instrumentation.

List of suggested experiments
1. Study of AC Bridges 2. Study of DC Bridges 3. To study characteristics and performance of different types of temperature transducers 4. Study of LVDT 5. Study of strain gauges 6. Study of light sensors 7. Study of thermocouples 8. Study of thermistor 9. Study of LCR meter

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 401**

Title of the Course : **APPLIED MATHEMATICS IV**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
4	**0**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**Z- Transform**	
	Definition and propertie , Inverse Z-transform by partial fractions and convolution theorem. Application to solve difference equation with constant coefficients.	07
II	**Complex Variables**	
	Analytic functions Cauchy Riemann conditions, Conjugate functions, Singularities, Cauchy's Integral theorem and Cauchy's Integral Formula (statements only) Laurent's Theorem (statement only) Residue Theorem and application of residuals to evaluate Real integral of the form $\int_0^{2\pi} f(sin\theta, cos\theta)d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)}dx$ where F(x) has no zeros on real axis.	11
III	**Numerical Methods**	
	Solution of algebraic and transcendental equations by False position method, Newton-Raphson method. Non linear simultaneous equations by Newton-Raphson Method. Solution of system of simultaneous linear equations by Gauss Jordan method, Gauss Seidel method, Crouts method	08
IV	**Numerical Methods**	
	Solution of ordinary first order first degree differential equation by Taylor's series method, Runge-Kutta 4th order method, Euler's modified method, Milne's Predictor Corrector method. Largest eigen values and corresponding eigen vector by iteration method.	08
V	**Random Variables, and Probability Distribution**	
	Random variables Distribution functions of discrete and continuous random variables, Joint distributions, Mathematical Expectations, Moments, Moments generating function and Characteristic function. Coefficient of skewness and Kurtosis	11

Text Books :

1. Higher Engineering Mathematics By B.S.Grewal Khanna Publications
2. Probability and Statistics by Murray R Spiegel Schaums outline Series
3. Higher Engineering Mathematics By H.K.Dass S Chand Publications

Reference Book :

A Text Book of Engineering Mathematics by N.P. Bali and Manish Goyal Laxmi Publications

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 402**

Title of the Course : **DIGITAL CIRCUITS AND FUNDAMENTALS OF MICROPPROCESSOR**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**1**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**COMBINATIONAL CIRCUITS I**	
	Introduction to POS & SOP forms, Karnaugh Map (Up to 5 variables), Combinational circuits: Full Adder, Half adder, Binary Adder, BCD Adder, Carry Look Ahead Adder ,Parallel Adder, Half Subtractor, Full subtractor, Code converter	12
II	**COMBINATIONAL CIRCUITS II**	
	Magnitude Comparator, Parity Generator, Parity Checker, Multiplexer, De-Multiplexers, Decoder, Encoder, Priority Encoder	10
III	**SEQUENTIAL CIRCUITS**	
	Single cell memory element, Registers: SISO, SIPO, PISO, PIPO, Latch, Flipflops: SR,D,T, JK, Master Slave JK Flip Flop, Race around condition, Conversion of one Flip Flop to Another, Synchronous Counters: Binary Counter, Binary UP/DOWN counter, BCD counter, Asynchronous Counters: Binary Ripple Counter, BCD ripple Counter	14
IV	**INTRODUCTION TO µP 8085**	
	Architecture, Pin Diagram, Addressing Modes, Types of Instructions, Flags, Instruction Set, Timing Diagram	14
V	**INTRODUCTION TO INTERRUPTS & 8255 PPI**	
	Subroutine Delay, Interrupts: Schematic Block Diagram, Types of Interrupts, SIM & RIM, Interfacing with 8255 (Programmable Peripheral Interface)	10

Text Book :

1) “Fundamental of Digital Electronics”:,A.Anand Kumar,Prentice Hall India,
1) “Modern Digital Electronics ”R. P. Jain, Tata McGraw Hill,4th Edition
2) **“**Microprocessor Architecture, Programming, and Applications with the 8085”,
Ramesh S. Gaonkar, Prentice Hall

Reference Books :

1) “Modern Digital Electronics ”R. P. Jain, Tata McGraw Hill,4th Edition,
2)“8 Bit Microprocessor”, V.J.Vibhute, P.B.Borole, Technova Educational Publication,
3) “Fundamental of Digital Circuits”:,R.K.Krishna,Rajni Publications

FOURTH SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING/ ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code : **4BEET04**

Title of the Course : **ELECTROMAGNETIC FIELDS**

COURSE OBJECTIVES:

1. To acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission, propagation and reception of electromagnetic wave system.
2. To identify, formulate and solve fields and electromagnetic waves propagation problems in a multidisciplinary frame.
3. To provide the students with a solid foundation in Electromagnetic fundamentals required to solve problems and also to pursue higher studies.

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**1**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**VECTOR ANALYSIS**	
	Scalars and Vectors, Vector algebra, Coordinate systems (Cartesian, Cylindrical, Spherical),Differential Length, Differential Area and Differential Volume, Line Integral, Surface Integral and Volume Integral, Del operator, Gradient, Divergence, Curl	7
II	**ELECTROSTATICS**	
	Coulomb's law, Electric field intensity, Electric Field due to point charge, line charge and sheet of charge, Electric flux density, Gauss's law and its applications, Divergence theorem, Electric potential, Potential Gradient, Conservative Property, Current Density, Continuity of Current, Method of Images, Electric Boundary conditions, Poisson's and Laplace's equations, Capacitance, Energy Density	11
III	**MAGNETOSTATICS**	
	Biot-Savart's law, Ampere's law and its applications, Stoke's theorem, Magnetic field due to straight infinite conductor, circular loop, infinite sheet of current, infinitely long coaxial transmission line, ideal Solenoid, ideal Toroid, magnetic flux and magnetic flux density, Scalar and Vector Magnetic Potential, Force on a differential current element, Force between differential current elements, magnetic materials, Magnetization and Permeability, Magnetic Boundary conditions, Inductance	11
IV	**TIME VARYING FIELDS & MAXWELL'S EQUATIONS**	
	Faradays law, Transformer and Motional emf, Displacement Current, Time Varying Maxwell's equations(differential & integral forms), Retarded Potential	4

V	**ELECTROMAGNETIC WAVE PROPAGATION**	
	Electromagnetic wave equations, Uniform Plane Waves, Wave propagation in free Space, Wave Propagation in Material Media(Conductors and Dielectrics), Wave Polarization, Poynting Vector and The Flow of Power, Reflection of Plane Wave at Normal Incidence, Reflection of Plane Wave at Oblique Incidence (Parallel and Perpendicular Polarization)	12

Text Books :

1. William H. Hayt, 'Engineering Electromagnetic' Tata Mcgraw Hill, Edition2001
2. John D. Kraus, 'Electromagnetic' Tata Mcgraw Hill, Book Co. New York 4th Edition

Reference Books :

1. Matthew N. O. Sadiku 'Element of Electromagnetic' Second Edition, oxford university press 1995.
2. Edward C. Jordan, Keith G. Balmin, 'Electromagnetic Waves and Radiating Systems', Second Edition, Prentice Hall of India Private Limited

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 404**

Title of the Course : **ELECTRONIC ENGINEERING MATERIALS AND COMPONENTS**

Course Outcomes:

1. To understand the physical construction, working and operational characteristics of Semiconductor devices.
2. To understand the working of transistors, its various configuration and their applications.
3. Able to design simple circuits containing non-linear elements such as transistors using the concepts of load lines and operating points.
4. To analyze the basic principle, operation and applications of JFET and MOSFET
5. To analyze various parameters of power amplifier.

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
4	**0**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**MAGNETIC AND DIELECTRIC MATERIALS**	
	Magnetic materials: ferro magnetic, ferri magnetic, antiferro magnetic, para and diamagnetic materials with examples, magnetically soft and hard materials,dielectric parameters, polarization, polarizability, types of polarization, internal or local electric field , derivation of lorentz equation , clausius - mossotti equation, dielectric loss and breakdown, ferroelectric, piezo electric & pyroelectric materials.	11
II	**CONDUCTING AND SUPERCONDUCTING MATERIALS**	
	Conductivity of pure metals & alloys, temperature coefficient of resistivity, high conductivity materials, high resistivity materials, heating elements, fuses, contact materials, connectors, switches, heat sinks, fixed and variable resistors non linear resistors, resistors used in electronic circuits, superconductivity, type I & II materials, high temperature superconductivity, applications of superconductivity.	9
III	**SEMICONDUCTING MATERIALS**	
	Semiconductors, band gap, electron & hole mobilities. Purification & doping of semiconductor materials, characteristics of semiconductor devices, diodes, zener & breakdown diodes, tunnel diodes, varactors, transistors (BJT, FET, MOSFET, UJT), DIAC, SCR & TRIAC, hall effect devices.	9
IV	**SEMICONDUCTOR FABRICATION AND OPTICAL PROPERTIES OF MATERIALS**	
	LSI, VLSI ,Czochralski Crystal Pulling Technique, Fabrication of linear & digital ICs, CMOS devices, Energy levels and spontaneous emission of light,Stimulated emission,Absorption reflection and refraction of light ,Interaction of light with electrons in solids,Optical effects in semiconductors,LED, LASERS, Optical communication	7
V	**NANOMATERIALS**	

	Introduction - Nanomaterials: definition, properties, Types: Nanoparticles, Synthesis by Chemical reduction method, Nanoporous materials: Synthesis by Sol-gel method, Nanowires: Synthesis by VLS mechanism, Carbon Nanotubes: Singlewalled and multiwalled nanotubes, Mechanical and electrical properties ,Applications, Synthesis: Electric arc discharge method , Physical Vapour Deposition (PVD), Chemical Vapour Deposition (CVD), Laser Ablation method.	9

Text book :

1.Electrical engineering materials –S.P.Seth Dhanpat rai & Sons
2.Introduction to Nanotechnology, Charles P.Poole Jr, and Frank J Owens .Wiley Interscience

Reference Books :

1.Electronic engineering materials and devices-Allison

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 405**

Title of the Course : **BASIC ELECTRICAL MACHINE**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**0**	**0**	**3**	**3**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**Transformer**	
	Construction and working principle of single phase transformer, effect of loading, open circuit and short circuit tests, regulation, efficiency, all day efficiency. Construction and principle of three phase transformer, connections (Y-Y, Δ-Δ, Y- Δ, Δ –Y), parallel operation, auto transformer.	9
II	**D. C. Generator**	
	Construction, principle, emf generated, Types according to methods of excitation, commutator and commutation action, armature reaction, characteristics, applications.	9
III	**D C Motor**	
	Construction, principle, Comparison of motor and generator action, back emf, torque equation, Types according to methods of excitation, characteristics, applications, Starting and speed control.	9
IV	**Induction Motor**	
	Construction and principle of three phase induction motor, types, torque, slip, torque-slip characteristic equivalent circuit, No load and Blocked rotor test, starting, speed control(Only introduction of stator and rotor side methods are expected) and applications. Single phase induction motor : principle of operation, starting methods (Split phase and capacitor start), Shaded pole motor, Universal motor.	9
V	**Synchronous Machines**	
	Principle of alternator, types, phasor diagram, equation of induced emf, alternator on load, voltage regulation, methods to find voltage regulation (direct loading and synchronous impedance).Principle of synchronous motor, starting of motor, equivalent circuit, V and inverted V curves. (Cylindrical pole machine studies are expected)	9

Text Books :

1. A Text Book of Electrical Technology, Volume II, by B.L.Theraja and A.K.Theraja, S.Chand and Co. Ltd.
2. Basic Electrical Engineering, by V.N.Mittal and Arvind Mittal, Tata McGraw Hill
3.Electric Machines, By I.J.Nagrath and D.P.Kothari, Tata McGraw Hill

Reference Books :

1.Electrical machinery by Dr.P. S. Bimbhra, Khanna Publisher
2.Performance & design of AC machine by M. G. Say, CSB Publishers & Distributors, New Delhi
3.Theory and Performance of Electrical Machine by J. B. Gupta, S.K.Katariya and Sons

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 406**

Title of the Course : **DIGITAL CIRCUITS AND FUNDAMENTALS OF MICROPROCESSORS**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**2**	**2**	**1**	**25**	**25**	**50**

It includes at least 7-8 programs based on the theory syllabus of Digital Circuits and Fundamentals of Microprocessors

List of suggested programs
1. To Study Adder, Subtractor Circuits
2. To Study Encoder, Decoder Circuits
3. To Study Multiplexer, Demultiplexer Circuits
4. To Study SR Latch , Flipflops
5. To Study of Counters
6. Writing programs for the addition & subtraction of two 16 bit numbers
7. Write a program to arrange a block of data in reverse order
8. Write a program to find largest number from given sequence of ten bytes
9. Write a program to separate even and odd numbers from given sequence of ten bytes

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 407**

Title of the Course : **BASIC ELECTRICAL MACHINES**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**2**	**2**	**1**	**25**	**25**	**50**

It includes at least 7-8 experiments based on the theory syllabus of Basic Electrical machines

List of suggested experiments
1. Magnetization characteristics of D.C. generator (separately excited)
2. To perform load test on cumulative compound motor
3. Open circuit /Short circuit test on 3Ø transformer
4. Load test on 3Ø Induction motor
5. Regulation of 3Ø Alternator by direct loading
6. Regulation of 3Ø Alternator by Open circuit /Short circuit test
7. Load test on shunt generator
8. Load test on cumulative compound generator

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 408**

Title of the Course : **PROGRAMMING PRACTICE (MATLAB / SCILAB)**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**2**	**2**	**1**	**25**	**25**	**25**

It includes at least 7-8 programs based on following syllabus

Contents

1. **INTRODUCTION TO MATLAB** (Command window, Figure window ,Current directory, Workspace, Command history, Figure Window, Editor Window, handling M files, general commands , Math and assignment operators)
2. **ARRAYS**(Creating arrays, different types of matrix arrays, addition, subtraction, transpose and other matrix operations)
3. **PLOTS**(Fundamentals of Plotting, Subplots, Legends, Titles and Labels, Printing and Saving Graphs , Loading Data Files , Other Interesting Features of Matlab Plotting)
4. **TRANSFORMS** (Z-transform, Laplace , Fourier . *Refer MATLAB demos*)
5. **STATISTICAL PARAMETERS** (Mean, Standard Deviation, Variance, coefficient of Kurtosis. *Refer MATLAB demos*)
6. **POLYNOMIALS** (Polynomial Evaluation: Addition, Scalar Multiple, Multiplication, division, derivatives, roots of polynomial)

References:

1. MATLAB / SCILAB Simulator latest version.
2. MATLAB ;A practical approach by Stormy Attaway
3. Getting started with MATLAB By Rudra Pratap

FOURTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 409**

Title of the Course : **PERSONAL PROFICIENCY I**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**2**	**2**	**1**	**50**	**0**	**50**

Contents
After completing this course the student should able to get proficiency in 1. Reading, Writing and Speaking Skills Effective reading: Uses of words, improving the vocabulary, The dictionaries and how to use them Writing skill: Writing letters at work, how to write reports, writing resume, job application, modes of address The skill of good speaking: improving your voice and speech, the art of conversation, public speaking, being interviewed by media, job interview, dealing with the boss, dealing with the subordinates, how to run a meeting, negotiating and selling. 2. Thinking skill: How to think, critical thinking and lateral thinking. 3. Memorising and memorising skills

Minimum 9 experiments based on above syllabus,

1. Vocabulary building (words/week)
2. Demonstration of audio, video CDs (LRs)
3. Reading and writing paragraphs from English daily.

1. Precise writing and comprehension.
2. Enriching communication with use of idioms and phrases.
3. Learning read/write/speak by listening to learning recourses
4. Supervised one to one, one to many and many to many communication (letter, extempore, board writing, telephonic conversation, debate, elocution etc.)
5. Demonstration of Audio, Video CDs of interviews, speeches etc.
6. Audio recording of the conversations and analyzing it offline.
7. Pronunciation of foreign language words commonly practiced. (French, Greek, Latin etc)
8. Six thinking hats/lateral thinking.
9. Practice of memorizing

References

1. Communication in English for technical students, by Orient Longman, TTTI Calcutta
2. How to write and speak better, Reader's digest, Touchan Books Limited. Editor John Ellison Kahn
3. Six Hat thinking, by E. D. Bono, Pengwin Books
4. English Grammar by Wren and Martin.
5. Word Power Made Easy by Norman Lewis, Goyal Saab, Goyal Publishers