BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

I - SEMESTER B.E. (COMMON TO ALL BRANCHES)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
1BEAB01	**Applied Mathematics – I**	3	1	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
1BEAB02	**Applied Physics – I**	2	0	-	2	2	**40**	**05**	**05**	50	20	**-**	**-**	-	-
1BEAB03	**Applied Chemistry –I**	2	0	-	2	2	**40**	**05**	**05**	50	20	**-**	**-**	-	-
1BEAB04	**Basic Electrical Engineering**	3	1	-	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
1BEAB05	**Engineering Graphics**	3	1	-	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
1BEAB06	**Indian Constitution, Ethics and Human Rights**	1	0	0	1	2	**-**	**40**	**10**	50	20	**AUDIT SUBJECT**			
1BEAB07	**Applied Physics - I Lab**	0	0	3/2	1	-	**-**	**-**	**-**	-	-	**10**	**15**	25	12
1BEAB08	**Applied Chemistry – I Lab**	0	0	3/2	1	-	**-**	**-**	**-**	-	-	**10**	**15**	25	12
1BEAB09	**Basic Electrical Engineering Lab**	0	0	3	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
1BEAB10	**Engineering Graphics Lab**	0	0	3	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
		14	3	09	23	-									
		29			**23**	**-**	**-**			**450**	**-**	**-**	**-**	**150**	**-**
						600									

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

II - SEMESTER B.E. (COMMON TO ALL BRANCHES)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
2BEAB01	**Applied Mathematics – II**	3	1	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
2BEAB02	**Applied Physics – II**	2	0	-	2	2	**40**	**05**	**05**	50	20	**-**	**-**	-	-
2BEAB03	**Applied Chemistry –II**	2	0	-	2	2	**40**	**05**	**05**	50	20	**-**	**-**	-	-
2BEAB04	**Programming in 'C'**	2	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
2BEAB05	**Engineering Mechanics**	3	1	-	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
2BEAB06	**Environmental Studies**	1	0	0	1	2	**-**	**40**	**10**	50	20	**AUDIT SUBJECT**			
2BEAB07	**Applied Physics - I Lab**	0	0	3/2	1	-	**-**	**-**	**-**	-	-	**10**	**15**	25	12
2BEAB08	**Applied Chemistry – I Lab**	0	0	3/2	1	-	**-**	**-**	**-**	-	-	**10**	**15**	25	12
2BEAB09	**Programming in 'C' Lab**	0	0	3	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
2BEAB10	**Engineering Mechanics Lab**	0	0	3	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
2BEAB11	**Mechanical Workshop Lab**	0	0	3	2							**25**	**25**	50	25
		13	3	12	24	-									
		28			**24**	**-**	**-**			**450**	**-**	**-**	**-**	**200**	**-**
						650									

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

III - SEMESTER B.E. ELECTRICAL (ELECTRONICS & POWER) ENGINEERING

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
3BEEE01	Applied Mathematics – III	3	0	0	3	3	80	10	10	100	40	-	-	-	-
3BEEE02	Network Analysis	3	1	-	4	3	80	10	10	100	40	-	-	-	-
3BEEE03	C & Data Structures	3	0	-	3	3	80	10	10	100	40	-	-	-	-
3BEEE04	Electronic Devices & Circuits	3	0	-	3	3	80	10	10	100	40	-	-	-	-
3BEEE05	Power Generation Systems	3	0	0	3	3	80	10	10	100	40				
												-	-	-	-
Laboratories/ Practical															
3BEEE06	Network Analysis	-	-	2	1	-	-	-	-	-	-	25	25	50	25
3BEEE07	C & Data Structures	-	-	2	1	-	-	-	-	-	-	25	25	50	25
3BEEE08	Electronic Devices & Circuits	-	-	2	1	-	-	-	-	-	-	25	25	50	25
TOTAL		15	01	06	19	500						150			
		21			**19**	**650**									

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

IV - SEMESTER B.E. ELECTRICAL (ELECTRONICS & POWER) ENGINEERING

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
4BEEE01	Electrical Engineering Mathematics	3	0	0	3	3	80	10	10	100	40	-	-	-	-
4BEEE02	Electrical Machines – I	3	1	-	4	3	80	10	10	100	40	-	-	-	-
4BEEE03	Signals & Systems	3	0	0	3	3	80	10	10	100	40				
4BEEE04	Electrical Measurements & Instrumentation	3	0	-	3	3	80	10	10	100	40	-	-	-	-
4BEEE05	Electro Magnetic Fields	3	0	0	3	3	80	10	10	100	40	-	-	-	-
Laboratories/ Practical															
4BEEE06	Electrical Machines – I	-	-	2	1	-	-	-	-	-	-	25	25	50	25
4BEEE07	Simulation In Electrical Circuits	-	-	2	1	-	-	-	-	-	-	25	25	50	25
4BEEE08	Electrical Measurements & Instrumentation	-	-	2	1	-	-	-	-	-	-	25	25	50	25
TOTAL		15	01	06	19	-	500				-	150			
		22			**19**	**-**	**650**								

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

V - SEMESTER B.E. ELECTRICAL (ELECTRONICS & POWER) ENGINEERING

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
5BEEE01	Electrical Machines – II	3	1	-	4	3	80	10	10	100	40	-	-	-	-
5BEEE02	Microprocessors & Microcontroller	3	0	-	3	3	80	10	10	100	40	-	-	-	-
5BEEE03	Analog & Digital Circuits	3	0	-	3	3	80	10	10	100	40	-	-	-	-
5BEEE04	Electrical Power System – I	3	0	0	3	3	80	10	10	100	40	-	-	-	-
5BEEE05	IDCS - I	3	0	0	3	3	80	10	10	100	40				
5BEEE06	Industrial Economics & Management	**3**	**0**	**0**	**3**	**3**	**80**	**10**	**10**	**100**	**40**	-	-	-	-
Laboratories/ Practical															
5BEEE07	Electrical Machines – II	-	-	2	1	-	-	-	-	-	-	25	25	50	25
5BEEE08	Microprocessors & Microcontroller	-	-	2	1	-	-	-	-	-	-	25	25	50	25
5BEEE09	Analog & Digital Circuits	-	-	2	1	-	-	-	-	-	-	25	25	50	25
TOTAL		18	01	06	22		600					150			
		25			**25**		**750**								

IDCS – I : 1) Power Station Practice 2) Optimization Technique

Note: Students will have to opt for Inter Disciplinary Cluster Subject (IDCS) offered from the other courses of the University/College/Institution.

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

VI - SEMESTER B.E. ELECTRICAL (ELECTRONICS & POWER) ENGINEERING

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
6BEEE01	High Voltage Engineering	4	0	-	4	3	80	10	10	100	40	-	-	-	-
6BEEE02	Control Systems - I	3	1	-	4	3	80	10	10	100	40	-	-	-	-
6BEEE03	Electrical Power System – II	4	0	0	4	3	80	10	10	100	40	-	-	-	-
6BEEE04	Design of Electrical Machines	3	0	0	3	3	80	10	10	100	40	-	-	-	-
6BEEE05	**IDCS - II**	3	0	0	3	3	80	10	10	100	40				
6BEEE06	Business Communication	-	3	0	-	AUDIT COURSE *									
Laboratories/ Practical															
6BEEE07	High Voltage Engineering	-	-	2	1	-	-	-	-	-	-	25	25	50	25
6BEEE08	Control Systems - I	-	-	2	1	-	-	-	-	-	-	25	25	50	25
6BEEE09	Minor Project & Seminar *	-	-	2	1	-	-	-	-	-	-	25	25	50	25
TOTAL		17	04	06	21		500					150			
		27			**21**		**650**								

IDCS – II: 1) Energy Audit and Management 2) Electrical Installation and Costing

Note: Students will have to opt for Inter Disciplinary Cluster Subject (IDCS) offered from the other courses of the University/College/Institution.

***The marks allotted for TW shall be granted on the basis of work carried out by the candidate in pursuing the Minor Project, its results & the Seminar delivered on the same topic. However, the POE marks shall be granted on the basis of viva voce, conducted as per University norms. Each GROUP of Minor Project shall comprise of NOT MORE THAN THREE students.**

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

VII - SEMESTER B.E. ELECTRICAL (ELECTRONICS & POWER) ENGINEERING

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
7BEEE01	Power Electronics	3	0	-	3	3	80	10	10	100	40	-	-	-	-
7BEEE02	Power System Protection & Switchgear	3	0	-	3	3	80	10	10	100	40	-	-	-	-
7BEEE03	Electrical Energy Utilization	3	0	0	3	3	80	10	10	100	40	-	-	-	-
7BEEE04	Control Systems - II	3	1	0	4	3	80	10	10	100	40	-	-	-	-
7BEEE05	Core Elective – I (CE – I)	4	0	0	4	3	80	10	10	100	40	-	-	-	-
Laboratories/ Practical															
7BEEE06	Power Electronics	-	-	2	1	-	-	-	-	-	-	25	25	50	25
7BEEE07	Switchgear & Protection	-	-	2	1	-	-	-	-	-	-	25	25	50	25
7BEEE08	Major Project Seminar	-	-	2	1	-	-	-	-	-	-	25	-	25	13
TOTAL		16	01	06	20		500					125			
		23			**20**		**625**								

Core Elective – I : ***(1) EHV AC-DC Transmission (2) Artificial Intelligence (3) Modeling of Electrical System***
(4) Programmable Logic & Sequential Systems

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

VIII - SEMESTER B.E. ELECTRICAL (ELECTRONICS & POWER) ENGINEERING

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
8BEEE01	Advanced Electrical Drives	3	1	0	4	3	80	10	10	100	40	-	-	-	-
8BEEE02	FACTS	3	0	0	3	3	80	10	10	100	40				
8BEEE03	Core Elective – II (CE – II)	4	0	0	4	3	80	10	10	100	40	-	-	-	-
8BEEE04	Open Elective(OE)	2	0	0	2	3	80	10	10	100	40				
Laboratories/ Practical															
8BEEE05	Computer Applications in Power system	-	-	2	1	-	-	-	-	-	-	25	25	50	25
8BEEE06	Major Project	-	-	6	6	-	-	-	-	-	-	75	75	150	75
8BEEE07	Industrial Training **	-	-	1	1	-	-	-	-	-	-	25	-	25	13
TOTAL		12	01	9	21		400					225			
		22			**21**		**625**								

Core Elective – II (CE – II): (1***) Power System Operations & Control (2) Electrical Installation & Design (3) Power Quality 4) Computer Methods in Power System***

***Open Elective* (OE) : (1) _____ (2) _____ (3) _____**

Industrial Training : Every student shall undergo relevant Industrial Training of TWO WEEKS and shall submit a comprehensive report, signed by the Competent Authority from the concerned Industry. This Training may be taken up by the students preferably at the end of VI – Semester of their Course. One separate period (as practical) is allotted to facilitate proper assessment of industrial training by the staff.

GONDWANA UNIVERSITY, GADCHIROLI

FACULTY OF ENGINEERING & TECHNOLOGY

CONSOLIDATED STATEMENT OF VARIOUS PARAMETERS IN TEACHING & EXAMINATION SCHEME OF
B.E. ELECTRICAL (ELECTRONICS & POWER) ENGINEERING

SR.NO.	SEMESTER	NO. OF THEORY SUBJECTS	NO. OF LABS/ PRACT	TEACHING HOURS (TH) (L+T)	TEACHING HOURS (PRACT)	TOTAL CREDITS	MAX. THEORY MARKS	MAX. PRACT MARKS	MAX. MARKS TOTAL
1	I	06	04+01*	14+3	09	23	450	150	600
2	II	06	05+1*	13+3	12	24	450	200	650
3	III	05	03	15+1	06	**19**	500	150	650
4	IV	05	03	15+1	06	**19**	500	150	650
5	V	06	03	18+1	06	**22**	600	150	750
6	VI	05+01*	03	17+4	06	**21**	500	150	650
7	VII	05	03	16+1	06	**20**	500	125	625
8	VIII	04	02**+IND. TR.**	12+1	9	**21**	400	225	625
		43	**26+02* +IND. TR**	**120 +15**	**60**	**169**	**3900**	**1300**	**5200**

***Audit course : No University examination shall be conducted for AUDIT COURSE. However, based on Internal Evaluation, the Candidate's performance shall be graded in three categories i.e. A,B and C, which will be reflected in their Memo of Marks to be given by the University.**

SUBJECT WISE BOARD OF STUDIES AFFILIATION

BOARD OF STUDIES	SUBJECT CODES
APPLIED SCIENCES & HUMANITIES	3BEEE01, 4BEEE01
COMPUTER	3BEEE03, 3BEEE07
ELECTRONICS	3BEEE04, 3BEEE08, 4BEEE03, 5BEEE02, 5BEEE03, 5BEEE08, 5BEEE09
MECHANICAL	5BEEE06
ELECTRICAL	REST ALL, EXCEPT ABOVE ENLISTED

Gondwana University CBCS Pattern 2017 w.e.f 2018
III Semester B.E. (Electrical Engineering)

Course Code: 3BEEE01

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
3	**1**	**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	09
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	09
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	09
IV	**Partial Differential Equations**	
	Linear Partial Differential Equations -first order & first degree i.e. Lagrange's form, Linear homogeneous equations of higher order with constant coefficients ,Method of separation of variables.	09
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.	09

A 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

GONDWANA UNIVERSITY, GADCHIROLI

III Semester B.E. Electrical Engineering, With Choice Based Credit System

Course code: 3BEEE02

Title of Course: Network Analysis

Course Scheme					Course Scheme Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	1	02	06	05	3	10	10	80	100

Unit	Contents	Hours
UNIT I	Nodal and Mesh analysis of networks, source transformation, mutual inductances in mesh and nodal analysis, Duality.	**9**
UNIT II	NetworkTheorems(Applicationstoacnetworks):Superpositiontheorem,Thevenin's theorem,Norton'stheorem,Maximumpowertransfertheorem,Reciprocitytheorem, Millman'stheorem,Compensationtheorem,Tellegen'stheorem.	**9**
UNIT III	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**
UNIT IV	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 behavior, 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 behavior from the Pole and Zero plot.	**9**
UNIT V	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**
	Total	**45**

Course Outcome:
At the end of the course, students will demonstrate the ability to

1. Make use of mesh and nodal analysis to solve the network.
2. Apply network theorems to solve ac network.
3. Solve network problems using graph theory.
4. Examine behavior of the network using Laplace transformation.
5. Determine different parameters of two port networks and their relationship.

Text/Reference Books

(1) NetworkanalysisbyM.E.VanValkenburg,PrenticeHallofIndiaPvt.Ltd.
(2) LinearnetworktheorybyKelkarandPandit,Pratibhapublication,Nagpur.
(3) ngineeringNetworkanalysisandfilterdesignbyGopalBhise,PremChaddha,D.Kulshreshtha,Umeshpublication,Delhi.
(4) Circuittheorybya.Chakrabarti,DhanpatRaiandco.
(5) CircuitandNetworksbyA.Sudhakar,Shyammohan,TataMcGrawHill.

GONDWANA UNIVERSITY, GADCHIROLI

III Semester B.E. Electrical Engineering, With Choice Based Credit System

Course code: 3BEEE03
Title of Course: C & Data Structures

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction to C Programming** Variables, Datatypes, Declarations, Operators, Expressions, Decision Making the While, The For, The Do While Loops, Nesting of loops, Switch, Defining & Using Functions, Parameter passing, Recursion, Pass by value, Pass by Reference, Storage Classes.	09
II	**Introduction to Data Structure** Arrays, Matrix Manipulation ,Searching & Sorting Algorithms, Quick Sort, Merge Sort, Heap Sort, selection & Bubble Sort, Linear Search, Binary Search.	09
III	**Structures & Pointers** Using structures, arrays of structures, Pointers for structure, pointer to pointer Linked Lists: Singly Linked List, Examples on linked list, circular linked list, doubly linked list & dynamic storage management.	09
IV	**Stacks & Queues** Stacks & Queues using array, Fundamentals, Evaluation of expressions, Polish expressions & their compilation, Application of stacks, Multiple stacks & Queues, Priority queues, Circular Queue	09
V	**Trees** Basic Terminology, Basic trees, Binary tree representations, binary tree traversals, binary search trees, Application of trees. **Graphs** Definition & terminology, Graph representation : matrix representation of Graph, List of structure, other representation of graphs, Breadth First Search, Depth First Search, Hash Tables.	09
	Total	45

Text Book/s:

1. Fundamentals of Data Structures by Horowitz & Sahani, Galgotia Publications, 1999
2. Algorithms, Data Structures & Programs by Niclaus Worth, Printice Hall ltd
3. Data Structures in C/C++ by Tananbaum, Tata McGraw Hill
4. An introduction to Data Structures with Applications by Trembley & Sonerson, Tata McGraw Hill

Reference Book/s :-

1. Data Structure & Program design in C by Kruse, Leung & Tondo, PHI
2. Data Structure Through C, BPB Pub.

GONDWANA UNIVERSITY, GADCHIROLI

III Semester B.E. Electrical Engineering, With Choice Based Credit System

Course Code : 3BEEE04
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)

GONDWANA UNIVERSITY, GADCHIROLI

III Semester B.E. Electrical Engineering, With Choice Based Credit System

Course code: 3BEEE05

Title of Course: Power Generation Systems

Course Scheme					Course Scheme Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	-	--	03	03	3	10	10	80	100

Unit	Contents	Hours
UNIT I	Coal, oil and natural gas, water, power, nuclear fission & fusion, their scopes and Potentialities for energy conversion. **Power Generation** Different factors connected with a generating stations, connected load, maximum demand , demand factor, load factor, diversity factor, plant capacity and utilization factor, load curve, load duration curve, load survey, base load and peak load station , advantages of interconnection	**9**
UNIT II	**Thermal Power Plant** Selection of site, working of various parts: Economizer, air pre-heater, condenser, cooling tower, coal handling system, ash handling system., cost of generation. Effect of different factors on cost..	**9**
UNIT III	**Hydro Power Plant** Hydrology, stream flow, flow duration curve, power duration curve, mass curve reservoir capacity, types of hydro plants and their field of use, Pumped storages plant & their utility, surge tanks, governing characteristics of turbine and hydro generators.	**9**
UNIT IV	**Nuclear Station** Principle of nuclear energy, materials , types of nuclear reactors, breeder reactors, location, material for moderator and control rods, cost economics **Tariff** Different consideration of flat rate and two part, three part, and block rate tariff. Economical choice.	**9**
UNIT V	**Non-conventional Sources of energy** Solar Energy : Introduction, principle & applications, Photovoltaic Cell, A basic photovoltaic system integrated with grid, use of photovoltaic system, solar energy storage. Solar electric power generation Wind Energy: Introduction, Principle & Applications, Wind Energy conversion, basic components of wind electric system, wind electrical generation. Biogas Plants and Applications, , Biomass Plants and applications	**9**
	Total	**45**

Course Outcome:

At the end of the course, students will demonstrate the ability to

1. Understand the various sources of energy and various factors associated with the power generation
2. Understand the working of Thermal, Hydro and Nuclear Power plant
3. Estimate the tariff
4. Understand the generation of Electricity from Non-conventional Energy Sources.

Text/Reference Books

1. Elements of Electrical Power Station Design by M.V. Deshpande
2. Electrical Power Stations by Car
3. Electrical Power Station Control by H.P. Young
4. Non-conventional Energy sources by G.D. Rai
5. Energy conservation and Power Generation by L.D. Agrawal and G.K. Mittal

Gondwana University CBCS Pattern 2017 w.e.f 2018-19
IV Semester B.E. (Electrical Engineering)

Course Code: 4BEEE01

Title of the Course: ELECTRICAL ENGINEERING MATHEMATICS

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	**Z- Transform**	
	Definition and propertie , Inverse Z-transform by partial fractions and convolution theorem. Application to solve difference equation with constant coefficients.	09
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.	09
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	09
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.	09
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	09

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

GONDWANA UNIVERSITY, GADCHIROLI

IV Semester B.E. Electrical Engineering, With Choice Based Credit System

Course code: 4BEEE02 **Title of Course: Electrical Machines -I**

Course Scheme					Course Scheme Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	02	06	05	3	10	10	80	100

Unit	Contents	Hours
UNIT I	Review of single phase transformer, Three phase Transformer operation and principle, OC. & SC. test on three phase transformer, determination of equivalent circuit parameters, Regulation, Efficiency, Polarity test,	**09**
UNIT II	Various connections with vector groups, Three phase to two phase conversion. Parallel operation of three phase transformer, Auto-transformer, Sumpner's Test	**09**
UNIT III	Construction, Basic principle and operation, emf generated, Types according to methods of excitation, Commutation and armature reaction, Compensating winding, Inter-poles, Characteristics, applications	**09**
UNIT IV	Construction, principle, Comparison of motor and generator action, Back EMF, torque equation, Types according to methods of excitation, characteristics, applications, Starting and speed control of dc shunt and series motor, Constant horse power & constant torque drive of D.C. Motor.	**09**
UNIT V	Types of induction motor and production of torque. Torque-slip characteristics. No load blocked rotor test, equivalent circuit & determination of equivalent circuit parameters. Circle diagram, losses, efficiency, double cage motor, operating characteristics & influence of machine parameter on the performance of motor.	**09**
	Total	**45**

Course Outcome:

CO-1 Identify different parts of single phase and 3 phase transformers.
CO-2 Explain the principle of operation of single and three phase transformers.
CO-3 Illustrate the principles of generation of force and EMF governing the Electromechanical Energy conversion.
CO-4 Select d.c. machine for specific applications

Text Books:

1) Electric Machines, By I.J.Nagrath and D.P.Kothari, Tata McGraw Hill
2) Electrical machinery by Dr.P. S. Bimbhra, Khanna Publisher
3) Performance & Design Of AC Machines By M.G Ray, CBS Publishers & Distributors
4) Electric Machines by Ashfaq Husain, Dhanpat Rai and Co.
5) Electric Machinery by A.E. Fitzgerald, C.Kingsley Jr and Umans, McGraw Hill

Reference Books:

1) Theory and Performance of Electrical Machine by J. B. Gupta, S.K.Katariya and Sons
2) Electrical Machines by P.K.Mukharjee and S.Chakraborty, Dhanpat Rai Publication

GONDWANA UNIVERSITY, GADCHIROLI

IV Semester B.E. Electrical Engineering, With Choice Based Credit System

Course Code : 4BEEE03
Title of the Course : **SIGNALS AND SYSTEMS**

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**

COURSE OBJECTIVES:

The aim of the course is for:

1. Understanding the fundamental characteristics of signals and systems.
2. Understanding signals and systems in terms of both the time and transform domains, taking advantage of the complementary insights and tools that these different perspectives provide.
3. Development of the mathematical skills to solve problems involving convolution, filtering and modulation.

Unit	Contents	Hours
I	**INTRODUCTION TO SIGNALS AND SYSTEMS**	
	Introduction, Continuous Time and Discrete Time signals, Elementary Signals: Unit Impulse, Unit Step, Ramp, Rectangular, Triangular, Signum, Sinc, Exponential and Sinusoidal, Transformation of Independent Variable: Time Shifting, Time Scaling and Time Reversal, Classification of Signals: Periodic and Aperiodic, Even and Odd, Energy and Power, Causal and Non causal. Systems: Definition, Classification: Linear and Non Linear, Time Variant and Invariant, Causal and Non-causal, Static and Dynamic, Stable and Unstable, Invertible and Non Invertible, Incrementally linear Systems.	10
II	**LINEAR TIME INVARIANT SYSTEMS**	
	Discrete-Time LTI Systems: The Convolution Sum, Continuous-Time LTI Systems: The Convolution Integral, Properties of Linear Time-Invariant Systems: Invertibility, Causality, Stability, Unit step response of an LTI System, Causal LTI Systems Described by Differential and Difference Equations.	9
III	**FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS**	
	The Response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous-Time Periodic Signals, Convergence of the Fourier Series, Properties of Continuous-Time Fourier Series, Fourier Series Representation of Discrete-Time Periodic Signal, Properties of Discrete-Time Fourier Series, Fourier Series and LTI Systems.	9
IV	**FOURIER TRANSFORM**	
	Representation of Aperiodic Signals: The Continuous-Time Fourier Transform, The Fourier Transform for Periodic Signals, Properties of the Continuous-Time Fourier Transform, The Discrete-Time Fourier Transform (DTFT), DTFT of Discrete Periodic Signals, Properties of the DTFT.	9
V	**THE LAPLACE TRANSFORM**	
	The Laplace Transform, The Region of Convergence for Laplace Transforms, The Inverse Laplace Transform, Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot, Properties of the Laplace Transform, Laplace Transform Pairs, Analysis and Characterization of LTI Systems Using the Laplace Transform, The Unilateral Laplace Transform.	8

TEXT BOOKS:

1. "Signals and Systems" by Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, Publication: Prentice Hall of India.
2. "Signals and Systems" by P. Ramesh Babu, R. Ananda Natarajan, SciTech Publications (India).

REFERENCE BOOKS:

1. "Signals and Linear Systems" by Gabel R.A. and Robert R.A, John Wiley and Sons, New York.
2. "Systems and Signal Analysis" by C. T. Chen Publication: Oxford University Press, India.
3. "Introduction to Signals and Systems" by Michael J. Robert, Publication: Tata Mc-Graw Hill.
4. "Signals and Systems" by S. Haykin and B. V. Veen, Publications: John Wiley and Sons, Inc.
5. "Signals and Systems Analysis using, Transform Methods and MATLAB" by M. J. Roberts Tata McGraw-Hill Publishing Company Limited.

GONDWANA UNIVERSITY, GADCHIROLI

IV Semester B.E. Electrical Engineering, With Choice Based Credit System

Course code: 4BEEE04
Title of Course: Electrical Measurement and Instrumentation

Course Scheme					Course Scheme Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	--	02	05	04	3	10	10	80	100

Unit	Contents	Hours
UNIT I	**MEASURING INSTRUMENTS** Classification, deflecting, controlling, damping torques. Basic principles of operation of Ammeter & Voltmeter, PMMC, Moving Iron, and Electrodynamometer type instruments. Principle of operation, Torque Equation, Errors, merits & demerits of each type. Analog & Digital instruments. Advantages of digital instruments. Absolute & secondary Instruments. , Indicating & Recording type instruments. Shunt & Multiplier	**9**
UNIT II	**GENERALIZED INSTRUMENTATION SYSTEM** General block diagram of instrumentation system, Active and passive transducers. Strain Gauges, Resistive, Inductive & Capacitive Transducers. Transducers for measurement of Displacement, Velocity, Force, & Torque. Static and dynamic characteristics and performances of instruments. Statistical treatment of measurement errors. Gaussian error distribution, probability tables, combination of errors	**9**
UNIT III	**MEASUREMENT OF POWER & ENERGY** Measurement of active & reactive power in single & three phase circuits, using dynamometer type instruments. Errors in Power Measurement. Measurement of Energy in single & three phase circuits using indication type instruments. Errors in energy measurements. Maximum Demand Indicator.	**9**
UNIT IV	**MEASUREMENT OF CIRCUIT PARAMETERS** Measurement of low resistance by Kelvin's Double bridge. Measurement of Medium Resistance by Wheatstone Bridge. Measurement of high resistance by loss of charge method. Earth Resistance Tester. Measurement of Inductance & Capacitance: General theory of AC bridges, study of Maxwell, De sauty's & Schering bridges, detectors of AC bridges.	**9**
UNIT V	**MISCELLANEOUS MEASUREMENTS** Temperature Measurement: Laws of thermo-electric circuits, thermocouples, thermistors, optical pyrometers, temperature compensation of temperature sensors. Pressure measurement: Manometer, Bellows, Bourdon tube, Diaphragms. Power factor & Frequency Measurement. General Theory of Instrument Transformer, extension of range using CT &PT and its applications	**9**
	Total	**45**

Course Outcome:

CO-1 To develop an understanding of construction and working of different measuring instruments.
CO-2 To develop an understanding of different types of interferences, it's causes and methods for it's reduction.
CO-3 To develop an understanding of construction and working of different AC and DC bridges and it's application.
CO-4 To develop an ability to use measuring instrument, AC and DC bridges for measurement.
CO-5 To develop an understanding of CT & PT and it's application.

Text Books / Reference Books

1. Electrical Measurement & Measuring Instruments by Golding
2. Instrumentation Devices and Systems by Rangan
3. Electronic Instrumentation & Measurement Technique by W.D. Cooper
4. Electrical and Electronics Measurement & Instrumentation by A.K. Sawhney.
5. Measurement System Application and Design E.O. Doeblin McGraw Hill
6. Instrumentation for Engineering Measurements Dalley Railey, Mc Connel John Wiley & Sons
7. Electrical Instrumentation H. S. Kalsi Tata McGraw Hill Education Pvt. Ltd. 2nd revised

GONDWANA UNIVERSITY, GADCHIROLI

IV Semester B.E. Electrical Engineering, With Choice Based Credit System

Course code: 4BEEE05 Title of Course: Electro Magnetic Fields

Course Scheme					Course Scheme Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	--	--	03	03	3	10	10	80	100

Unit	Contents	Hours
UNIT I	**Vector Analysis and Coulomb's Law** Vector analysis: Idea of vector & scalars, vector algebra, vector addition, vector subtraction, dot product, scalar product in Cartesian co-coordinator system, conversion of variables from Cartesian to cylindrical system and vice-versa. Spherical co-ordinate system, transformation of Cartesian to spherical and vice versa.	09
UNIT II	**Coulomb's law, Volume Charge Density** Static Electric field, Electric Field Intensity and density: field of 'n' point charges, field due to continuous volume charge distribution, field of line charge, field of sheet charge. Introduction and application of Gauss law, divergence theorem.	09
UNIT III	**Energy and Potential** Energy: Expended in moving a point charge in an electric field. Line Integral. Potential: Potential difference and potential , potential field of a point charge, Potential gradient, Energy Density in Electrostatic Field, Dipole and Dipole Moment.	09
UNIT IV	**Conductors, Dielectric and Capacitance and Poisson's and Laplace Equation** Conductors : Current & Current Density, Continuity of Current , Metallic Conductors, Conductor Properties and Boundary Conditions, Nature of Dielectric Materials.Capacitance: Capacitance Capacitance of Parallel Plate Capacitor, Capacitance of Two Wire Line, Poisson's and Laplace's Equations. Uniqueness Theorem and different Examples.	09
UNIT V	**Steady Magnetic, Time Varying fields & Uniform Plane Waves** Steady Magnetic fields : Biot Savert's law, Ampere's circuital law, Curl, Strokes Theorem, Magneticflux And Magnetic Flux Density, Scalar & Vector magnetic potential . Time Varying Fields : Maxwell's equations: Faraday's Law, Displacement Current and density. U P W: Elementary Idea of electromagnetic waves, Uniform Plane Waves.	09
	Total	45

Course Outcome:

CO-1 Apply vector calculus to static electric-magnetic fields in different engineering situations
CO-2 Solve the problems in different EM fields in different coordinate system using vector mathematics
CO-3 Estimate electric and magnetic field intensity and densities of different shape of field in three dimension.
CO-4 Understand and analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems.
CO-5 Describe and analyze electromagnetic wave propagation in free-space

Text Books / Reference Books

1) Hayt W.H : Engineering Electromagnetics, Macgrawhills Education 2017
2) TVS Arun Murthy: Electromsgnetic Fields
3) Joseph A Edminister: Theory and problem of Electromagnetic with Maths. 2nd Edition Macgrawhills
4) G. S. N. Raju: Electromagnetic Field Theory and Transmission Lines, Pearson. 2006
5) S. Baskaran and K. Malathi: Electromagnetic Field and Waves, Scitech Pub. 2013
6) R. S. Kshetrimayum, Electromagnetic Field Theory, Cengage Learning. 2012
7) J. D. Kraus: Electromagnetic. 5th edition, MGH. 1999