APPENDIX t A

FOUR YEARS DEGREE COURSE IN ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CREDIT GRADE 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		
EP-301	Applied Mathematics t III	4	0	0	4	3	80	10	10	100	40	-	-	-	-
EP-302	Network Analysis	4	1	-	4	3	80	10	10	100	40	-	-	-	-
EP-303	C & Data Structures	4	1	-	4	3	80	10	10	100	40	-	-	-	-
EP-304	Electronic Devices & Circuits	3	1	-	3	3	80	10	10	100	40	-	-	-	-
EP-305	Power Generation Systems	4	0	0	4	3	80	10	10	100	40	-	-	-	-
Laboratories/ Practical															
EP-306	Network Analysis	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-307	C & Data Structures	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-308	Electronic Devices & Circuits	-	-	3	2	-	-	-	-	-	-	25	25	50	25
TOTAL		19	03	09	25	500						150			
SEMESTER TOTAL		**31**			**25**	**650**									

(Note : One Lecture of one hour is equal to one credit, One Tutorial / Practical of three hours is equal to one credit, One Tutorial/ Practical of two hours is equal to one credit, One Practical/Lab, without theory paper of one hour equal to one credit)

APPENDIX t A

FOUR YEARS DEGREE COURSE IN ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CREDIT GRADE 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		
EP-401	Electrical Engineering Mathematics	4	0	0	4	3	80	10	10	100	40	-	-	-	-
EP-402	Electrical Machines t I	4	1	-	4	3	80	10	10	100	40	-	-	-	-
EP-403	Analog & Digital Circuits	3	1	-	3	3	80	10	10	100	40	-	-	-	-
EP-404	Electrical Measurements & Instrumentation	3	1	-	3	3	80	10	10	100	40	-	-	-	-
EP-405	Electro Magnetic Fields	4	1	0	5	3	80	10	10	100	40	-	-	-	-
Laboratories/ Practical															
EP-406	Electrical Machines t I	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-407	Analog & Digital Circuits	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-408	Electrical Measurements & Instrumentation	-	-	3	2	-	-	-	-	-	-	25	25	50	25
TOTAL		18	04	09	25	-	500				-	150			
SEMESTER TOTAL		**31**			**25**	**-**	**650**								

(Note : One Lecture of one hour is equal to one credit, One Tutorial / Practical of three hours is equal to one credit, One Tutorial/ Practical of two hours is equal to one credit, One Practical/Lab, without theory paper of one hour equal to one credit)

APPENDIX t A

FOUR YEARS DEGREE COURSE IN ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CREDIT GRADE 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		
EP-501	Electrical Machines t II	4	1	-	4	3	80	10	10	100	40	-	-	-	-
EP-502	Microprocessors & Microcontroller	3	1	-	3	3	80	10	10	100	40	-	-	-	-
EP-503	Signals & Systems	3	1	0	4	3	80	10	10	100	40	-	-	-	-
EP-504	Electrical Power System t I	4	1	0	5	3	80	10	10	100	40	-	-	-	-
EP-505	Industrial Economics & Management	3	0	0	3	3	80	10	10	100	40	-	-	-	-
EP-506	Advanced Communication Skills	-	2	0	-	AUDIT COURSE *									
Laboratories/ Practical															
EP-507	Electrical Machines t II	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-508	Microprocessors & Microcontroller	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-509	Advanced Electrical Workshop	-	-	2	2	-	-	-	-	-	-	25	25	50	25
TOTAL		17	06	08	25		500					150			
SEMESTER TOTAL		**31**			**25**		**650**								

(Note : One Lecture of one hour is equal to one credit, One Tutorial / Practical of three hours is equal to one credit, One Tutorial/ Practical of two hours is equal to one credit, One Practical/Lab, without theory paper of one hour equal to one credit)

APPENDIX t A

FOUR YEARS DEGREE COURSE IN ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CREDIT GRADE 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		
EP-601	High Voltage Engineering	4	0	-	4	3	80	10	10	100	40	-	-	-	-
EP-602	Digital Signal Processing	3	1	0	3	3	80	10	10	100	40	-	-	-	-
EP-603	Control System Engineering	4	1	-	4	3	80	10	10	100	40	-	-	-	-
EP-604	Electrical Power System t II	4	0	0	4	3	80	10	10	100	40	-	-	-	-
EP-605	Electrical Machine Design	4	0	0	4	3	80	10	10	100	40	-	-	-	-
EP-606	Professional Ethics & Personality Development	-	2	0	-	AUDIT COURSE *									
Laboratories/ Practical															
EP-607	High Voltage Engineering	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-608	Control System Engineering	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-609	Minor Project & Seminar *	-	-	2	2	-	-	-	-	-	-	25	25	50	25
TOTAL		19	04	08	25		500					150			
SEMESTER TOTAL		**31**			**25**		**650**								

(Note : One Lecture of one hour is equal to one credit, One Tutorial / Practical of three hours is equal to one credit, One Tutorial/ Practical of two hours is equal to one credit, One Practical/Lab, without theory paper of one hour equal to one credit)

***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.**

APPENDIX t A

FOUR YEARS DEGREE COURSE IN ENGINEERING & TECHNOLOGY-
COURSE AND EXAMINATION SCHEME WITH CREDIT GRADE 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		
EP-701	Power Electronics	4	1	-	4	3	80	10	10	100	40	-	-	-	-
EP-702	Power System Protection & Switchgear	4	0	-	4	3	80	10	10	100	40	-	-	-	-
EP-703	Electrical Energy Utilization	4	0	0	4	3	80	10	10	100	40	-	-	-	-
EP-704	Power System Operation & Control	3	1	0	3	3	80	10	10	100	40	-	-	-	-
EP-705	Elective t I	3	0	0	3	3	80	10	10	100	40	-	-	-	-
Laboratories/ Practical															
EP-706	Power Electronics	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-707	Switchgear & Protection	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-708	Modeling & Electrical Simulation	-	1	2	2	-	-	-	-	-	-	25	25	50	25
EP-709	Major Project Seminar	-	-	3	1	-	-	-	-	-	-	25	-	25	13
TOTAL		18	03	11	25		500					175			
SEMESTER TOTAL		**32**			**25**		**675**								

(Note : One Lecture of one hour is equal to one credit, One Tutorial / Practical of three hours is equal to one credit, One Tutorial/ Practical of two hours is equal to one credit, One Practical/Lab, without theory paper of one hour equal to one credit)

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

APPENDIX t A

FOUR YEARS DEGREE COURSE IN ENGINEERING & TECHNOLOGY
COURSE AND EXAMINATION SCHEME WITH CREDIT GRADE 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		
EP-801	Computer Applications in Power System	4	1	-	4	3	80	10	10	100	40	-	-	-	-
EP-802	Power System Operation & control	3	1	0	4	3	80	10	10	100	40	-	-	-	-
EP-803	Advanced Electrical Drives	4	1	0	5	3	80	10	10	100	40	-	-	-	-
EP-804	Elective t II	3	0	0	3	3	80	10	10	100	40	-	-	-	-
Laboratories/ Practical															
EP-805	Computer Applications in Power System	-	-	3	2	-	-	-	-	-	-	25	25	50	25
EP-806	Major Project	-	-	6	6	-	-	-	-	-	-	75	75	150	75
EP-807	Industrial Training **	-	-	1	1	-	-	-	-	-	-	25	-	25	13
TOTAL		14	03	10	25		400					225			
SEMESTER TOTAL		27			25		625								

(Note : One Lecture of one hour is equal to one credit, One Tutorial / Practical of three hours is equal to one credit, One Tutorial/ Practical of two hours is equal to one credit, One Practical/Lab, without theory paper of one hour equal to one credit)

Elective – II : ***(1) F ACTS & Reactive Power Controller*** ***(2) Electrical Installation & Design*** ***(3) Embedded Systems*** ***(4) Power Quality***

*****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 (A)	04	04+01*	16	15	26	400	200	600
2	II (B)	05	04	20	11	28	450	200	650
3	III	05	03	22	09	**25**	500	150	650
4	IV	05	03	22	09	**25**	500	150	650
5	V	05+01*	03	23	08	**25**	500	150	650
6	VI	05+01*	03	23	08	**25**	500	150	650
7	VII	05	04	21	11	**25**	500	175	675
8	VIII	04	02**+IND. TR.**	17	10	**25**	400	225	625
		40	**26+01* +IND. TR**	**164**	**81**	**204**	**3750**	**1400**	**5150**

***Audit course : No University examiv_š]}vA□Z_ooA__A_}v_µ_š__A(}ŒA_h_/dA_KhZ^_XA,}Á_À_ŒUA__□__A}vA/vš_Œv_oA_À_oµ_š]}vUAšZ_A__v_]__š_[□A‰_Œ(}Œu_v__A□Z_ooA__APŒ___d in thre**
i.e. A,B and C, which will be reflected in their Memo of Marks to be given by the University.
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GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. III SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: APPLIED MATHEMATICS -III

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
04	00	00	04	04

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	NA	NA	NA

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	15
II	**Matrices** Inverse of matrix by ad-joint 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	11
III	**Matrices** Cayley-,_u]oš}vAdZ_}Œ_uAUA^ÇoÀ_ š_Œ[AdZ_}Œ_uAAA~statements only), Solution of second order linear differential equation with constant coefficient by matrix method. Largest Eigen value and corresponding eigen vector by iteration.	11
IV	**Partial Differential Equations** >]v__ŒAW_Œš]_oA_]((_Œ_vš]_oA_‹µ_š]}v A(]Œ šAA}Œ__ŒA_v_A(]Œ šA__PŒ__A]X_XA>_PŒ_vP_[A form, Linear homogeneous equations of higher order with constant coefficients Method of separation of variables	11
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.	12
		60

Recommended Books

1. Higher Engineering Mathematics By B.S.Grewal
2. Probability and Statistics by Murray R Spiegel
3. Higher Engineering Mathematics By H.K.Dass
4. A Text Book of Engineering Mathematics by N.P. Bali and Manish Goyal

GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. III SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: NETWORK ANALYSIS

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
04	01	03	05+03=08	04+02=06

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	25	25	50

UNIT	CONTENTS	HOURS
I	Nodal and Mesh analysis of networks, source transformation, mutual inductances in mesh and nodal analysis, Duality.	12
II	E_šÁ}ŒlAdZ_}Œ_u□A~_‰‰o]__š]}v□Aš}A__Av_šÁ}Œl□□WA^µ‰_Œ‰}□]š]}vAšZ_}Œ_uUAdZ_À_v]v[□AšZ_}Œ_uUAE}Œš}v[□AšZ_}Œ_uUAD_Æ]uµuA‰}Á_ŒAšŒ_v□(_ŒAšZ_}Œ_uUAZ__]‰Œ}_]šÇAšZ_}Œ_uUAD]oou_v[□AšZ_}Œ_uUAC}u‰_v□_š]}vAšZ_}Œ_uUAd_oo_P_v[□AšZ_}Œ_uX	12
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.	12
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.	12
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.	12
		60

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

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(Minimum Eight practical based on above syllabus)

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GONDWANA UNIVERSITY, GADCHIROLI

COURSE : **B.E. III SEMESTER (ELECTRONICS & POWER ENGG.)**
SUBJECT: **C & DATA STRUCTURE**

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
04	01	03	08	04+02 = 06

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	25	25	50

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.	12
II	**Introduction to Data Structure** Arrays, Matrix Manipulation , **Searching & Sorting Algorithms** Quick Sort, Merge Sort, Heap Sort, selection & Bubble Sort, Linear Search, Binary Search.	12
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.	12
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	12
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.	12
		60

Recommended Books:

1. Fundamentals of Data Structures by Horowitz & Sahani , Galgotia Publication
2. C & Data Structures by P. S. Deshpande, O. G. Kakde, Edition 2008, Dreamtech Press Publication
3. Programming in ANSI C by E. Balguruswamy, 6th Edition
4. Let us C by Y.P. Kanetkar, 8th Edition, BPB Piblication.

(Minimum Eight Practicals based on above syllabus)

GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. III SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: ELECTRONIC DEVICES AND CIRCUITS

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
03	01	03	07	03+02 = 05

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	25	25	50

UNIT	CONTENTS	HOURS
I	**Semiconductor Devices and Applications** Diode as a Half Wave Rectifier, Full Wave Rectifier, Breakdown in diodes, Zener and Avalanche Mechanism, Voltage regulator using Zener Diode, Characteristics of BJT, Biasing of BJT, Fixed Bias, Collector to Base Bias, Self Bias, Stability Factor, Thermal Runaway, Thermal compensation	11
II	**Small Signal Analysis of BJT** Two Port Network, H Parameters, Small Signal Analysis of CB, CE & CC Amplifiers, Millers Theorem, High Input Impedance Circuits, Bootstrapping	09
III	**Power Amplifiers** Classification of amplifiers, Class A, Class B, Class AB, Push pull Configuration, Complementary Symmetry, Harmonic Distortion, Cross Over Distortion	07
IV	**Oscillators** Feedback Topologies, Voltage Shunt, Voltage Series, Current Shunt & Current Series Feedback, Barkhausen Criterion, Hartley, Colpitt, RC Phase Shift, Wein Bridge & Crystal Oscillator.	09
V	**FET and its Analysis** JFET: Principle of Operation, Characteristics, Biasing, Small signal Analysis of CG, CS, & CD amplifiers, MOSFET: Principle of Operation, Characteristics, Enhancement Type, Depletion Type MOSFET	09
		45

Recommended Books

1. Electronic Devices and Circuits tMillman and Halkias
2. Integrated Electronics -Jacob Millman and Christos C. Halkias
3. Electronic Devices and Circuits- Allen Mottershead .
4. Electronic Devices and Circuits-S.Salivahanan and N.Suresh Kumar.
5. Electronic Principles tAlbert Malvino

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(Minimum Eight Practical based on above syllabus)

GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. III SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: POWER GENERATION SYSTEMS

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
04	00	00	04	04

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	NA	NA	NA

UNIT	CONTENTS	HOURS
I	**Sources of Electrical Energy** 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	04 08
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.	12
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.	06 06
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.	06 06
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	06 06
		60

Recommended 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

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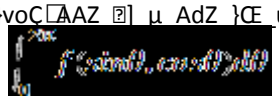
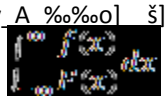
GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. IV SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: ELECTRICAL ENGINEERING MATHEMATICS

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
04	00	00	04	04

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	NA	NA	NA

UNIT	CONTENTS	HOURS
I	**Z- Transform** Definition and properties, Inverse Z-transform by partial fractions and convolution theorem. Application to solve difference equation with constant coefficients.	10
II	**Complex Variables** Analytic functions Cauchy Riemann conditions, Conjugate functions, Singularities, C_µ_ZÇ[/vš_PŒ_oAšZ_}Œ_uA_v_AC_µ_ZÇ[A/vš_PŒ_oA&}ŒuµO_A~š_š_u_všAA}voÇ >_µŒ_vš[AdZ_}Œ_uA~š_š_u_všA}voÇAAZ] µ AdZ }Œ_uA_v_A ‰‰o] š]}vA}(AAŒ_]_µ1 s to evaluate Real integral of the form  and  where F(x) has no zeros on real axis.	14
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.	11
IV	**Numerical Methods** ^}oµš]}vA}(A}Œ_]v_ŒÇA(]ŒšA}Œ__ŒA(]ŒšA__PŒ__A_]((_Œ_vš]_oA_‹µ_š]}vA_ÇAd_Ço}Œ[A_Œ]_A method, , Runge-<µšš_AðšZA}Œ__ŒAu_šZ}_UA_µo_Œ[Au}_](]__Au_šZ}_UAD]ov_[AWŒ__]_š}ŒA Corrector method. Largest Eigen values and corresponding Eigen vector by iteration method.	11
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.	14
		60

Recommended Books

1. Higher Engineering Mathematics by B.S.Grewal
2. Probability and Statistics by Murray R Spiegel
3. Higher Engineering Mathematics by H.K.Dass
4. A Text Book of Engineering Mathematics by N.P. Bali and Manish Goyal

.....12/-

GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. IV SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: ELECTRICAL MACHINES-I

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
04	01	03	08	04+02 = 06

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	25	25	50

UNIT	CONTENTS	HOURS
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,	12
II	Various connections with vector groups, Three phase to two phase conversion. Parallel operation of three phase transform_ŒUA^µu‰v_Œ[Aš_šUA_µš}šŒ_v(}Œu_Œ	14
III	Construction, Basic principle and operation, emf generated, Types according to methods of excitation, Commutation and armature reaction, Compensating winding, Inter-poles, Characteristics, applications	10
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.	10
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	14
		60

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.

Reference Books -

1. _X_XA&]šÌP_Œ_o_UACX<]vP o_ÇA:ŒA_v_Ahu_v U__o__šŒ]_AD__Z]v_ŒÇ_A
McGraw Hill, International Student Edition.
2. Theory and Performance of Electrical Machine by J. B. Gupta, S.K.Katariya and Sons
3. Electrical Machines by P.K.Mukharjee and S.Chakraborty, Dhanpat Rai Publication

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(Minimum Eight practical based on above syllabus)

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GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. IV SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: ANALOG & DIGITAL CIRCUITS

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
03	01	03	07	03+02 = 05

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	25	25	50

UNIT	CONTENTS	HOURS
I	**Introduction to Combinational logic** Standard representation for logic functions, Karnaugh Map representation for logic functions, Simplification of sum of products and product of sums, minimization of logical functions for minterms & maxterms [up to 4 var]__o_□□U_}v[šA__Œ_A_}v_]š]}v□UA__□]PvA_Æ_u‰o_□WA_Œ]šZ09š]_A Circuits, BCD to seven segment decoders, Code converters ,Adders, Subtractors, (Half & Full), Look ahead carry , ALU, Digital comparator, Parity generator , Parity checker, Multiplexers and Demultiplexers and their use in combinational logic design, Decoders, Encoders	
II	**Introduction to Sequential logic** One bit memory cell , Introduction to Latches, Concept of clock, Flip-Flops: SR,JK,D,T, Master slave JK Flip-Flop, Use of reset and clear terminals , Characteristics table , Excitation tables Conversion of one type of Flip-Flop to another type of Flip-Flop, applications of Flip-Flops, Registers, Shift registers, Counters (Synchronous, Asynchronous),UP/DOWN Counters, Ring counter, Johnson counter	07
III	**Basic Operational Amplifier** Block Diagram of Operational Amplifier, Operational Amplifier characteristics [ideal and non-ideal] , Operational Amplifier Transfer characteristics, Study of IC uA 741,Offset nulling, I/p bias current, I/P offset voltage, O/P offset voltage, Slew rate, CMRR, SVRR, Unity gain bandwidth, Thermal Drift, Gain Bandwidth Product, Error measurement of various parameters	09
IV	**Linear Applications of Operational Amplifier** Inverting, non-inverting Amplifier, Voltage Follower, Summing amplifiers, integrator, differentiator, Differential amplifier, bridge amplifiers, instrumentation amplifiers, Precision rectifiers, Voltage to current converter, RMS to DC converter, constant current source, constant voltage source	09
V	**Non-linear Applications of operational amplifiers &Timer circuits** OP-AMP circuits for clipping, clamping ,Comparator, Log amplifier, Antilog amplifier, Schmitt Trigger, Astable, monostable & bistable multivibrators using OP-AMP & 555 Timer IC, Wein Bridge Oscillator , RC phase shift Oscillator, Active filters tButterworth filter up to 4th order	11
		45

Recommended Books

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(Minimum Eight practical based on above syllabus)

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GONDWANA UNIVERSITY, GADCHIROLI

COURSE : B.E. IV SEMESTER (ELECTRONICS & POWER ENGG.)
SUBJECT: ELECTRICAL MEASUREMENTS & INSTRUMENTATION

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
03	01	03	07	03+02 = 05

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	25	25	50

UNIT	CONTENTS	HOURS
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	05 04
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	05 04
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.	05 04
IV	**MEASUREMENT OF CIRCUIT PARAMETERS** D__µŒ_u_všA }(A o}ÁA Œ_]š_v__A _ÇA <_oÀ]v[A _}µ_o_A _Œ]_P_XA A D__µŒ_u_všA }(A D__µuA 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, A µšÇ[A˜AAA^ Z Œ]vPA Œ] P UA š š}ŒA}(A C bridges.	05 04
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	05 04
		45

Recommended 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.

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(Minimum Eight practical based on above syllabus)

. **GONDWANA UNIVERSITY, GADCHIROLI**

COURSE : **B.E. IV SEMESTER (ELECTRONICS & POWER ENGG.)**
SUBJECT: **ELECTRO MAGNETIC FIELDS**

Lectures	Tutorial(s)	Practical	Total periods/week (each of 60 minutes duration)	Credits
04	01	00	05	05

Evaluation System						
Theory				Practical		
MSE	IE	ESE	TOTAL	TW	POE	TOTAL
10	10	80	100	NA	NA	NA

UNIT	CONTENTS	HOURS
I	s__š}ŒA_v_oÇ]A_v_A_}µo}u_[A>_Á 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.	14
II	_}µo}u_[Ao_ÁUAs}oµu_A_Z_ŒP_A__v]šÇ Static Electric field, _o__šŒ]_A&]_o_A/vš_v]šÇA_v_A__v]šÇWAA(]_o_A}(AZv[A‰}]všA_Z_ŒP_AU 10](]_o_A_µ_ to continuous volume charge distribution, field of line charge, field of sheet charge. Introduction and application of Gauss law, divergence theorem.	
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.	14
IV	_}v_µ_š}ŒUA_]_o__šŒ]_A_v_A__‰__]š_v__A_v_AW}]}v[A_v_A>_‰o___A_‹µ_š]}v Conductors :Current & Current Density, Continuity of Current , Metallic Conductors, Conductor Properties and Boundary Conditions, Nature of Dielectric Materials, Capacitance: Capacitance of Parallel Plate Capacitor, Capacitance of Two Wire Line, W}]}v[A_v_A>_‰o___[A_‹µ_š]}vXAhv]‹µ_v_AdZ_}Œ_uA_v_A_]((_Œ_všA_Æ_u‰o_X	10
V	**Steady Magnetic, Time Varying fields & Uniform Plane Waves** Steady Magnetic fields: B]}šA^_À_Œš[Ao_ÁUA_u‰_Œ_[A_]Œ_µ]š_oAo_ÁUACµŒoUA^šŒ}l_AdZ_}Œ_uUA Magnetic flux And Magnetic Flux Density, Scalar & Vector magnetic potential. Time Varying Fields: D_ÆÁ_oo[A_‹µ_š]}vWA&_Œ___Ç[A>_ÁUA_]‰o___u_všACµŒŒ_všA_v_A__v]šy. U P W: Elementary Idea of electromagnetic waves, Uniform Plane Waves.	12
		60

Recommended Books

1. Hayt W.H : Engineering Electromagnetics
2. N. N. Rao: Elements of Engineering Electromagnetics
3. TVS Arun Murthy: Electromsgnetic Fields
4. Joseph A Edminister: Electromagnetics (Schaums Outlines)

Note: Syllabus for the V to VIII Semester courses shall be prescribed in due course of *time*.