JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)
Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)
Scheme of Study and Examination (w.e.f. July 2010)

B.E. Second Year **Branch : Electrical** **Sem :Fourth**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
					SESSIONAL EXAM			ESE	SUB TOTAL	
		L	T	P	TA	CT	TOTAL			
EE-09	Electrical Machines - I	3	1	-	10	20	30	70	100	4
EE-11	Drawing Estimating & Costing	3	1	-	10	20	30	70	100	4
EE-16	Power System	3	1	-	10	20	30	70	100	4
EE-14	Analog & Digital Electronics	3	1	-	10	20	30	70	100	4
EE-12A	Network Analysis & Synthesis	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
EE-10L	Electrical Machines - I Lab	-	-	2	20	-	20	30	50	2
EE-17L	Power System Lab	-	-	2	20	-	20	30	50	2
EE-15L	Analog & Digital Electronics Lab	-	-	2	20	-	20	30	50	2
EE-13L	Network Analysis & Synthesis Lab	-	-	2	20	-	20	30	50	2
EE-55L	Professional Activity	-	-	2	50	-	50	-	50	2
EE-60L	Seminar/Group Discussion	-	-	2	50	-	50	-	50	2
	Total	**15**	**5**	**12**	**230**	**100**	**330**	**470**	**800**	**32**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 800
Total Periods : 32, Total Credits : 32

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**ELECTRICAL MACHINES-I**	EE-09	Min "D"	Min "D"	5.0

ELECTRICAL MACHINES -I

Unit I 1 phaseTransformers: Construction, working principle, emf equation, equivalent circuit, phasor diagrams, voltage regulation, efficiency, all day efficiency calculation, ratio polarity, load test, S.C. & O.C. test, rating of transformers.

UnitII 3 Phase transformers: construction, advantages of 3 phase transformers, connections (Δ- Δ, Δ-Y, Y- Δ, Y-Y, open Δ), vector phase group, 3 phase to 2 phase conversion (Scott connection) and its applications, 3 phase to 6 phase transformation, three winding transformers, its equivalent circuit,sumpner's back to back test,parallel operation and load sharing, problem of circulating current and harmonics in three phase transformer, cooling, conservator breather, buchholz relay.

Unit III DC Machine(I): Constructional features, emf equation, classification on the basis of excitations, armature winding, lap winding, wave winding, operation as generator, operating characteristics, armature reaction & commutation, compensating winding, losses efficiency, power output equation.

Unit IV DC MachinesII: Operation as motor, torque equation, operating circuits of motor, types of DC motors, starting and speed control, ward Leonard method, solid state control, Swinburn's test, Hopkinson's test, braking, starters.

Unit V Induction motor: Construction, working principle, double revolving field theory, Phasor diagram, equivalent circuit. Determination of equivalent circuit, parameter by no load and block rotor test, starting methods and types of 1-φ Induction motor.

References:

1. Nagrath and Kothari "Électrical Mchines", TMH Publication.
2. P.S.Bhimbra ,"Electrical Machinery" Khanna. Publication
3. Langs Dorf "AC machines" TMH Publication
4. Ashfaq Hussain "Electrical Machines" Dhanpat Rai. Publication
5. H.Cotton," Electrical Technology" CBS Publication

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**DRAWING ESTIMATING & COSTING**	EE-11	Min "D"	Min "D"	5.0

DRAWING ESTIMATING & COSTING

Unit I Conventional symbols for electrical and electronics components, instrument and equipments. Lamps circuits, corridor wiring, staircase wiring and god own wiring. Fluorescent, sodium, mercury, neon sign, battery charging, house appliance.

Unit II Under ground cables, cable joints and multi-core cables, types of three phase cables, Insulators, bushing, DC and AC motor starter.

Unit III Pole and Pipe earthing, service connection, I-E rules for ground clearance, wiring of technical institution, pole mounted transformer, developed diagram of DC and AC machine winding.

Unit IV Internal winding of DC machine, plan elevation and side view of transformer, DC machine, Synchronous machine and Induction motor.

Unit V Plan, circuit diagram, estimating and costing of internal house wiring.

Reference Books:

1. Dragan C.R.," Electrical Drawing & Estimating",.
2. Narang K.L,"Electrical Engineering Drawing".
3. S.L.Uppal.,"Estimating and Costing ".

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**POWER SYSTEM**	EE-16	Min "D"	Min "D"	5.0

POWER SYSTEM

Unit I Transmission Systems: Various systems of AC transmission and their comparison, comparison of HVAC & HVDC transmission, their merits & demerits, substation layout, voltage regulators.

Unit II Overhead Transmission Lines: Types of conductors, Line parameters: calculation of inductance and capacitance of single circuit transmission lines, three phase lines with stranded and bundle conductors, generalized ABCD constants and equivalent circuits of short, medium & long lines. Line performance, regulation and efficiency of short, medium and long lines, series and shunt compensation, FACTS. Real & Reactive power flow, surge impedance,SIL.

Unit III Distribution systems: Primary and secondary distribution systems, concentrated and Uniformly distributed loads on distributors fed at one and both ends, ring distribution, voltage drop and power loss calculations, Feeders Kelvin's law and modified Kelvin's law for feeder conductor size and its limitations.

Unit IV Overhead Line Insulators: Types, string efficiency, grading ring, preventive maintenance. Mechanical design of transmission lines: Different types of tower, sag-tension calculations, strings charts, vibration dampers, line supports, spacing of conductors and ground. Corona losses, radio and audio noise, transmission line- communication line interference.

Unit V Cables:Classification, construction and characteristics of different types.
Insulation resistance and capacitance, grading (capacitance and inter sheath), phenomenon of dielectric losses, dielectric stress and sheath loss in cables.

References:

1. Nagrath I J and Kothari DP; "Power System Engineering", Tata McGraw Hill.
2. John S. Grainger and W.D. Stevenson Jr., "Power System Analysis", McGraw Hill.
3. Deshpande M V; "Electric Power System Design", TMH.
4. Central Electricity Generating Board; "Modern Power System Practice", Vol 1-8 Pergamon Oxford.
5. James J. Burke, "Power Distribution Engineering: Fundamentals and Applications", Marcel Dekker.
6. Westinghouse Electric Corporation; Electric Transmission & Distribution Reference Book; East Pittsbrg.
7. Wadhwa C L ; "Electrical Power System" Wiley Eastern Limited.
8. Ashfaq Hussain; "Electrical Power System".
9. Gupta B R; "Power System Analysis and Design"Ray; "Electric Power System

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**ANALOG & DIGITAL ELECTRONICS**	EE-14	Min "D"	Min "D"	5.0

ANALOG & DIGITAL ELECTRONICS

Unit I Transistor Circuits: BJT; operation, characteristics, hybrid model, h- parameters, (CE, CB & CC Configuration), Analysis of transistor, amplifier circuits using h-parameters, emitter- follower, Miller's theorem, frequency response of RC coupled amplifiers. Transistor Biasing: Operating point bias stability, bias compensation.

Unit II Transistors at high frequencies, CE short circuit current gain, frequency response, gain band with, emitter follower at high frequencies. Feedback amplifier: General feedback structure, properties of negative feedback, Sinusoidal Oscillator; RC phase shift, wein bridge oscillator, Hartley & Collpitt's oscillators, crystal oscillator.

Unit III Operational amplifiers: Input and output resistance, open loop gain, bias currents, Offset currents and voltages, differential mode gain, common mode gain, CMRR, Negative feedback, Inverting and non inverting amplifiers, frequency response, Barkhausen's criteria, Differentiator, integrator & logarithmic amplifiers.

Unit IV Digital Electronics I: Review of number system, logic gates, logic families, Minimization techniques. Combinational Circuits: Encoders, decoders, multiplexers, parity detectors comparators. Sequential Circuits: Flip flops, JK, RS, D, T, master slave, shift registers, counters, latches.

Unit V Digital Electronics II Memories: Static & dynamics RAM, ROM, EPROM, PLAs, D/A and A/D conversion techniques.
Schmidtt's trigger, IC 555 timer circuit.

Text books:

1. Taub & Schilling, "Digital Electronics" TMH.
2. Malvino & Leech, "Digital Principles & Application" TMH.
3. R.A.Gayakwad, "Op amps and Linear Integrated Circuits" PH India.
4. Millman J. & Gabriel A., "Microelectronics" TMH.
5. Anand Kumar, "Switching Theory & Logic Design" PHI.
6. Boylestad & Nashelsky, "Elex. Devices & Circuits" Pearson.
7. Millman & Halkias, "Integrated Electronics" TMH.
8. Paul Horowitz & Winfield Hill, "The Art of Electronics".
9. Morris Mano, " Logic & Computer Design Fundamentals" PHI.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**NETWORK ANALYSIS & SYNTHESIS**	EE-12A	Min "D"	Min "D"	5.0

NETWORK ANALYSIS & SYNTHESIS

Unit I : Transient and steady state analysis of first order system, response of RL, RC system for different input signal.

Unit II : Transient and steady state analysis of second order system, Response of LC, RLC system for different input signal.

Unit III : Laplace Transformation and its Application in Circuit AnalysisFourier series: Introduction, exponential form, trigonometry form, symmetry in Fourier series, frequency spectrum amplitude spectrum.

Unit IV : Two Port Network Analysis

Introduction, network element, classification of network, network configuration, recurrent network, z parameter, y parameter, h parameter, ABCD parameter.

Condition of reciprocity and symmetry, inter- relationships, interconnections, image impedances.

Unit V Synthesis: Concept of stability of system (polynomial ratio) from pole zero concept,

Hurwitz polynomials, properties of Hurwitz polynomials.

Concept of network synthesis, procedure of synthesis, LC network synthesis, foster's canonic form, cauer canonic form of reactive network, application of foster and cauer forms.

Reference Books:

1. M.E.Vanvalkenburg "Network Analysis" Prentice Hall .
2. M.E.Vanvalkenburg "Network Synthesis " John Wiley & sons

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**ELECTRICAL MACHINE LAB-I**	EE-10L	Min "D"	Min "D"	5.0

ELECTRICAL MACHINE LAB-I

Experiments

1. To perform OC & SC test on single phase transformer.
2. To perform back to back test on two, 1-φ transformer.
3. To perform three to two phase conversion using Scott's connection.
4. To perform speed control of DC shunt motor using armature and field control.
5. To determine magnetization characteristics of DC generator.
6. To determine η of DC motor by using Swinburn's test.
7. To perform lord test on Dc generator.
8. To study different methods of starting of single phase induction motor.
9. To perform no load and block for test on single phase induction motor.
10. Study of DC motor starters.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**POWER SYSTEM LAB**	EE-17L	Min "D"	Min "D"	5.0

POWER SYSTEM LAB

List of Experiments

1. Electrical design of transmission line.
2. Mechanical design of transmission line.
3. Drawing of tower structure
4. Drawing of insulators.
5 Study about different types of cables.
6 Study of different types of Distribution Systems
7 Fault detection of cable by using Megger.
8 Simulation of Ferranti effect using MATLAB.
9 Modeling & Simulation of Transmission line parameter using MATLAB.
10 Programmers based on sag calculation for different land terrain

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**ANALOG & DIGITAL ELECTRONICS LAB**	EE15L	Min "D"	Min "D"	5.0

ANALOG & DIGITAL ELECTRONICS LAB

List of Experiments

1. Study of semiconductor devices (like diode, transistor etc).
2. Study of various configurations of transistor connection.
3. Study of OP-AMPs.
4. Verification of characteristics of amplifiers.
5. Verification of Boolean algebra and study of logic gates.
6. Verification of De- Morgan's Theorem.
7. Study of output of S.R. latch and verification of excitation table.
8. Study of output of J.K latch and verification of excitation table
9. Study of output of J.K master slave latch.
10. Study of full adder/ half adder.
11. Study and verification of parity detector

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**NETWORK ANALYSIS & SYNTHESIS LAB**	EE13L	Min "D"	Min "D"	5.0

NETWORK ANALYSIS & SYNTHESIS LAB

List of Experiments

1. To verify the operation of parallel resonance RLC circuit and measurement of resonance frequency and band width.
2. To verify the operation of series resonance RLC circuit and measurement of resonance frequency and band width.
3. To verify the frequency characteristics of high pass RC circuit.
4. To verify the frequency characteristics of low pass RC circuit.
5. To study of Y parameters & Z parameters of two port T network.
6. To study of network theorems in AC circuit
   a. Thevenin's b. Norton's c. Superposition
7. To study of network functions.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**PROFESSIONAL ACTIVITY- I**	EE-55L	Min "D"	Min "D"	5.0

PROFESSIONAL ACTIVITY- I
(Suggested Exercise)

- Student shall visit a nearby Industry and shall prepare a technical report suggesting some improvement in operation.
- Student shall Design and fabricate a new laboratory equipment. He shall prepare a design report.
- Student shall improve an existing lab equipment and prepare chart or lab manual .
- Student shall publish a review paper in some Indian Journal.
- Student shall make a report on an Industry employing latest technology/ Innovation.
- Student shall prepare a working model of a machine part.
- Student shall make a software/ comp. program for the Institute to enhance efficiency in its working.
- Student shall prepare a detailed project report to start a small-medium enterprise.
- A group of student shall register with the Industry cell and submit a report on work done there about Institute-Industry linkage.
- Experimental work on a new set of equipments.
- Seminar Presentation with a report submitted to the supervisor.

Note : The list of activities can be modified as per requirements of the department.

A hand written report of about 30 pages duly signed by the student and the concerned teacher should be submitted.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC EE	**SEMINAR/GROUP DISCUSSION**	EE-60L			5.0

Objectives of Group Discussion & Seminar is to improve the Mass Communication and Convincing/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point presentation.