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)

BE (PTDC)   **Sem : Third**   **Branch : Electrical Engineering**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
					SESSIONAL EXAM			ESE	SUB TOTAL	
		L	T	P	TA	CT	TOT			
MA-03	Mathematics - III	3	1	-	10	20	30	70	100	4
EE-07	Electrical Measurement & Measuring Instrument	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-08L	Electrical Measurement & Measuring Instrument 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-54L	Professional Activity - II	-	-	2	20	-	20	30	50	2
	Total	**12**	**4**	**8**	**150**	**80**	**230**	**370**	**600**	**24**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total
Marks 600 Total Periods : 24, Total Credits : 24

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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	
	MATHEMATICS- III	MA03	Min "D"	Min "D"	5.0

MATHEMATICS – III

Unit – I : Fourier Series : Conditions for a fourier expansion, having finite number of discontinuities, change of interval and half- rang series.

Laplace transform and inverse Laplace transform of simple functions, their elementary properties and application in solution of ordinary differential equations.

Unit – II : Analytic functions, Harmonic conjugates, Cauchy-Reimann equations, line integral, cauchy's theorem, Cauchy's integral formula, poles, residues, Residues theorem, evaluation of real integral, Bilinear transformation.

Unit – III : Difference operators, errors and approximation, interpolation (Newtons interpolation formulae, Central interpolation formulae, Lagranges interpolation, Newtons divided difference interpolation – formula inverse interpolation.

Numerical differentiation, maxima and minima.

Unit – IV : Numerical integration by using simpson's method, weddels rule, Gauss-Legendre open quadrature formula.

Solution of algebraic and transcendental equations by using Regula-Falsi, Newton-Rephson, iterative, Graffes root squaring method, Bairstow's method.

Unit – V : Solution of simultaneous algebraic equatins by using gauss elimination, Gauss-Jorden, Crout's jacobbi iterative, Gauss-siedal, Relaxation methods.

Solution of ordinary differential equations (Taylor series, Picard's Modified Euller method, Runge-kutta, predictor corrector method.)

References :
1. Laplace transform, by R.V. Churchill
2. Higher Engineering Mathematics by B.V Ramanna, TMH
3. Advanced Engineering Mathematics by Kreysizig E, willey Eastern Limited.
4. Introductory Methods of Numerical Analysis by S.S. Sastry
5. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.

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Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS	EE07	Min "D"	Min "D"	5.0

ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS

Unit I **Measurement and error, Accuracy and precision, sensitivity, resolution, Error & Error analysis, Effect of temperature, Internal friction, Stray field, Hysteresis and Frequency variation & method of minimizing them, Loading effects, due to shunt connected and series connect ed instruments, Testing & calibration of instruments.**

Galvanometers – Theory & operation of ballistic galvanometer, D'arsonal galvanometer, galvanometer motion & damping, Sensitivity, Flux meter, Vibration galvanometer, Spot deflection galvanometer.

Unit II **Definition of analog & digital instruments, Classification of analog instruments, their operating principle, Operating force, Damping, Controlling.**

PMMC, MI, Electrodynamometer, Hotwire, Electrostatic, Induction, Rectifier, Ferro dynamic & Electro thermic, Expression for control & deflection torque, their advantages, disadvantages & error. Extension of range of instruments using shunt & multiplier.

Unit III **Instrument transformers – Potential and current transformers, ratio and phase angle errors, testing of instrument transformers, Difference between CT and PT, errors and reduction of errors.**

Measurement of Power – Power in AC and DC Circuit, Electrodynamometer, types of wattmeter, Construction, theory, operation & error. Measurement of power in three phase circuit, one, two & three wattmeter method, Measurement of reactive power by single wattmeter. Measurement of power using CTs & PTs.

Unit IV **Measurement of Energy – induction type energy meter – construction & operation, electronic energy meter, construction and working, testing of energy meter.**

Potentiometer – DC potentiometer standardization – Lab type Crompton's potentiometer, application of DC potential meter.

Unit V Miscellaneous Instruments & Measurements

Power factor meter , Frequency meter, Multimeter, Megger & Ratiometer.

Resistance Measurement – Classification of low, medium & high resistance – Voltmeter, Ammeter, Wheatstone Bridge, Kelvin's double bridge & loss of charge methods, Earth resistance measurement.

Magnetic Measurement – B-H Curve, Hysteresis Loop determination, Power loss in sheet metal – Lloyd Fischer square for measurement of power loss

Books Recommended:

1. E W Golding & F C Widdis, Vedition, ," Electrical Measurement & Measuring Instruments ",Wheeler Publishing
2. A.K. Sawhney," Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai & Sons Publications
3. Buckingham & Price ,"Electrical Measurements", Prentice Hall

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Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	**P**	
B.E.	**ANALOG & DIGITAL ELECTRONICS**	EE14	Min "D"	Min "D"	5.0

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.

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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	
	NETWORK ANALYSIS & SYNTHESIS	EE12A	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 Analysis
Fourier 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

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			T	P	
	ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS LAB	EE08L	Min "D"	Min "D"	5.0

List of Experiments

1. Measurement of resistance by Wheatstone bridge.

2. Measurement of low resistance by Kelvin's double bridge.

3. To calibrate AC watt-hour meter by a standard wattmeter.

4. Study of Llyod's Fischer square method.

5. To plot the following characteristics of a given CT.

    a. Burden V/S Secondary current

    b. Burden V/S Secondary voltage

6. Measurement of three phase power by two wattmeter method.

7. Measurement of high resistance by using megger.

8. Study of earth tester and measurement of earth resistance.

9. Testing of energy meter.

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			T	P	
B.E.	**ANALOG & DIGITAL ELECTRONICS LAB**	EE15L	Min "D"	Min "D"	5.0

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

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Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	NETWORK ANALYSIS & SYNTHESIS LAB	EC13L	Min "D"	Min "D"	5.0

NETWORK ANALYSIS & SYNTHESIS LAB

1. To verify the operation of parallel resonance RLC circuit and measurement of resonance frequency and band with.

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.

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B.E.	PROFESSIONAL ACTIVITY - II	EE54L	Min "D"	Min "D"	5.0

PROFESSIONAL ACTIVITY- II
(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.

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