

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 : Electronics & Tele.

Sem :Third

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
CH-03	Energy Ecology Environment & Society	3	1	-	10	20	30	70	100	4
MA-03	Mathematics - III	3	1	-	10	20	30	70	100	4
EE-12	Network Analysis & Synthesis	3	1	-	10	20	30	70	100	4
EC-01	Electronic Instrumentation	3	1	-	10	20	30	70	100	4
EC-03	Electronic Devices	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
EC-02L	Electronic Instrumentation Lab	-	-	2	20	-	20	30	50	2
EE-13L	Network Analysis & Synthesis Lab	-	-	2	20	-	20	30	50	2
CS-05L	Computer Prog.Lab - II	-	-	2	20	-	20	30	50	2
EC-04L	Electronic Devices & Circuits Lab	-	-	2	20	-	20	30	50	2
EC-59L	Self Study/ Professional Activity	-	-	2	50	-	50	-	50	2
EC-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	
	ENERGY ECOLOGY ENVIRONMENT & SOCIETY	CH03	Min “D”	Min “D”	5.0

ENERGY ECOLOGY ENVIRONMENT & SOCIETY

Unit I : Energy sources and energy storing devices

World and Indian energy scenario, types of energy sources – renewable and non-renewable energy sources. Solar energy storage ,application & maintenance of solar cell panel, introduction & applications of hydro, wind, biomass, ocean, tidal, wave and geothermal. Synergy between energy and environment. Global environment issues, greenhouse gas emission, global warming, green energy solution.

Batteries – Primary and Secondary batteries- Alkaline battery – Lead (Pb) acid storage battery , Ni-cadmium battery ,Lithium battery ,Fuel cell , Hydrogen Oxygen fuel cell ,Photo galvanic cell.

Unit II : Ecosystem Structure & scope of ecology, Natural cycles of the environment, Hydrogen cycle, Oxygen Cycle, Carbon cycle, Nitrogen cycle, Phosphate cycle, Sulphur cycle, Biodiversity.

Society:- Environmental problems and impact of P.A.T(Population, Affluence and Technology). Environmentally beneficial and harmful technologies, environment impact assessment policies (EIA).Ethics and regulatory act of environment.

Soil Pollution_ Sources & control measures. MSW, HWM.

Unit III :Air pollution- Chemical composition of atmosphere, -primary, Secondary; pollutants, Chemical and photochemical reaction, effects of CO, SO_x, NO_x, HC and particulates. Causes & effects of acid rain, ozone depletion: Monitoring and control of air pollutants.

Noise pollution- introduction physiological effect, measurement and control of noise pollutants.

Unit IV : Water pollution- sources causes of water pollution , types and nature of water pollutant. Pollution load determination i.e. particulates ,suspended matter, total dissolved solids ,dissolved gases DO, BOD & COD. EL NINO phenomenon. Waste water treatment

Domestic – Aerobic & anaerobic treatment. Industrial waste water treatment (ETP plant.) Electro dialysis membrane technique and filtration by activated charcoal and synthetic resins.

Unit V : Corrosion & its prevention- Theories of Corrosion and Mechanism – Dry (Direct Chemical attack), Wet (Electro Chemical Theory) Atmospheric corrosion, Galvanic Series, Galvanic & Concentration Cell Corrosion, Corrosion by sea water. Factors Influencing & control of Corrosion – Proper Design, Use of pure metal and metal alloys, passivity, cathodes protection – Sacrificial anode and Impressed Current. Modifying the environment, Use of inhibitors.

TEXT BOOKS

1. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi
2. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.
3. A text book of Environmental Chemistry and Pollution control by S.S. Dara & Dr. D. D. Mishra, S. Chand & Co, New Delhi
4. Energy,Environment Ecology and Society by Dr.Pushpendra,Vayu Education of India New Delhi .
5. Energy, Environment Ethics and Society, by Dr.S.Deswal & Dr.A.Deswal Dhanpat Rai Publishing Company, New Delhi

REFERENCE BOOKS

1. J.C. Kuriakose and J. Rajaram, “Chemistry in Engineering and Technology”, Vol.1 & 2, Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi
2. Mars G. Fontana, “Corrosion Engineering”, Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi.
3. F.Chau, Y. Liang, J. Gao and X. Shao, “Chemometrics”, Wiley Inter Science.

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 Euler 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 Kreyszig E, willey Eastern Limited.
4. Introductory Methods of Numerical Analysis by S.S. Sastry
5. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.

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	EE12	Min “D”	Min “D”	5.0

Network Analysis & Synthesis

Unit I

Introduction to circuit elements R,L,C and their characteristics in terms of linearity & time dependant nature, voltage & current sources controlled & uncontrolled sources KCL and KVL analysis, Nodal and Mesh analysis, analysis of magnetically coupled circuits, Transient analysis :- Transients in RL, RC & RLC Circuits, initial conditions, time constants. Steady state analysis- Concept of phasor & vector, impedance & admittance, Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices, dual networks, Dot convention, coupling co-efficient, tuned circuits, Series & parallel resonance.

Unit II

Network Theorems for AC & DC circuits- Thevenins & Norton's, Superpositions, Reciprocity, Compensation, Substitution, Maximum power transfer, and Millman's theorem, Tellegen's theorem, problems with dependent & independent sources.

Unit III

Laplace transform method of network characterization -impulse response and transfer function of system- poles and zeros , transform of waveform synthesized with step ramp, Gate and sinusoidal functions, causality and stability, Frequency domain analysis – Laplace transform solution of Integro-differential equations, Initial & final value theorem, Network Theorems in transform domain.

Unit – IV

Two port networks -Characteristic Parameters of symmetrical and asymmetrical two port networks and their design: image impedance ,iterative impedance, characteristic impedance, propagation coefficient, image transfer coefficient ,iterative transfer coefficient, Lattice and Bridged-T networks, reactive matching networks, matching techniques, Insertion Loss, symmetrical and asymmetrical attenuators and their design.

Unit V

Passive Filters: Analysis and design of Low pass, high pass, band pass and band elimination filters, m-derived filters, composite filters, Filter specifications, Butterworth approximation, Chebyshev approximation, elliptic function approximation, frequency transformation.

Positive real function, LC, RL, RC, and RLC network synthesis, Foster and Cauer network, minimum positive real function, Brune's method, Bott-Duffin method, Synthesis-Coefficient.

Textbooks:

1. J.D. Ryder: Networks and Transmission Lines, 2nd edition, PHI
2. M.E. Van Valkenburg, Network Analysis, (PHI)
3. M.E. Valkenberg: Introduction to Modern Network synthesis, Wiley Eastern Ltd.
4. F.F.Kuo, Network Analysis.
5. Mittal GK; Network Analysis; Khanna Publisher
6. Mesereau and Jackson; Circuit Analysis- A system Approach; Pearson.
7. Sudhakar & Pillai; Circuit & Networks- Analysis and Synthesis; TMH

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	
	ELECTRONIC INSTRUMENTATION	EC01	Min “D”	Min “D”	5.0

ELECTRONIC INSTRUMENTATION

Unit-I Qualities of measurement – Performance characteristics, Static characteristics, Error in measurement, Types of static error, Sources of error, Dynamic Characteristics, Statistical Analysis, Standard.

Measurements of Current, Voltage, Power and Impedance - DC and AC Ammeter, DC Voltmeter-Chopper type and solid-state, AC voltmeter using Rectifier, Average, RMS, Peak Responding voltmeters, Ohm-meter, Shunt type Ohm-meter, Power meter, Bolometer and Calorimeter.

Unit-II Cathode Ray Oscilloscope (CRO): Different parts of CRO, Block diagram, Electrostatic focusing, Electrostatic deflection, Post deflection acceleration, Screen for CRTs, Graticules, Vertical and Horizontal deflection system, Time base circuit, Oscilloscope Probes, Applications of CRO, Special purpose CROs-Multi input, Dual trace, Dual beam, Sampling, Storage (Analog and Digital) Oscilloscope.

Unit-III AC Bridges: Maxwell’s bridge (Inductance and Inductance-Capacitance), Hay’s bridge, Schering bridge (High voltage and Relative permittivity), Wein bridge, Wagner earth detector, Impedance measurement by Q-meter.

Non-Electrical Quantities (Transducer): Classification of Transducers, Strain gauge, Displacement Transducer- Linear Variable Differential Transformer (LVDT) and Rotary Variable Differential Transformer (RVDT), Temperature Transducer- Resistance Temperature Detector (RTD), Thermistor, Thermocouple, Piezo-electric transducer, Optical Transducer- Photo emissive, Photo conductive, Photo voltaic, Photo-diode, Photo Transistor, Nuclear Radiation Detector.

Unit-IV Wave Analyzer (Frequency selective and Heterodyne), Harmonic Distortion Analyzer, Spectrum Analyzer, Signal and Function Generators, Sweep Frequency Generator, Pulse and Square Wave Generator, Beat Frequency Oscillator.

Unit-V Digital Measurement and Instruments: Advantages of Digital Instrument over Analog Instrument, Digital-to-analog conversion (DAC) - Variable resistive type, R-2R ladder Type, Binary ladder, Weighted converter using Op-amp and transistor, Practical DAC. Analog-to-digital Conversion (ADC) -Ramp Technique, Dual Slope Integrating Type, Integrating Type (voltage to frequency), Successive Approximations, digital voltmeters and multi-meters, Resolution and sensitivity of digital meter, PLC structure, principal of operation, response time and application.

Textbooks:

1. Instrumentation and Measurements: A. K. Sawhney
2. Modern Electronic Instrumentation and Measurement Techniques: Helfric and Cooper
3. Electronic Instrumentation: H. S. Kalsi

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	
	ELECTRONIC DEVICES	EC03	Min “D”	Min “D”	5.0

ELECTRONIC DEVICES

UNIT-I JUNCTION DIODE

Fabrication techniques of P-N Junctions, unsymmetrical junctions, open circuit P-N Junction, energy band diagram of an open circuit P-N junction, voltage current relationship of P-N junction diode, Diode resistance, The current components in an P-N junction diode, diode characteristic and its temperature dependence, Junction capacitances, junction diode switching times

UNIT-II DIODE CIRCUITS

Diode as a circuit element, Piece-wise linear model, Load line concept, P-N junction diode as a Rectifier, Half wave rectifier, Full-wave rectifier-Center-tapped and Bridge rectifier, Analysis of filters with Rectifiers-L,C,LC & Pi Filters, Voltage Multipliers, Clipper circuits - series and parallel clipper circuits, Clamper circuits - positive and negative clamper circuits, Comparators.

UNIT-III JUNCTION TRANSISTORS - BJT

Transistor fabrication techniques, Basic transistor operation, Transistor biasing, Current components in a transistor, Current amplification factors, Relationship between α and β , Base spreading resistance, Ebers -moll model, Transistor circuit configuration, Common Base Configuration, Early effect and Base width Modulation, Common Emitter Configuration, Common Collector Configurations, Comparison of Characteristics of transistors in different Configurations, Transistor as an amplifier, Transistor load lines, Transistor Maximum Ratings.

UNIT - IV JUNCTION FIELD -EFFECT TRANSISTOR - FET

Junction Field - Effect transistor (JFET), Static Characteristics curves of FET, The pinch-off voltage(V_p), Volt-ampere characteristics of JFET, FET as a Voltage dependent resistor, Metal-Oxide Semiconductor FET (MOSFET), Enhancement MOSFET(n-Channel, p-Channel), Depletion type MOSFET (n-Channel, p-Channel), Gate Protection in MOSFET, Symbols & Small Signal Models of JFET & MOSFET, Comparison of JFETs & MOSFETs,

UNIT- V SPECIAL SEMICONDUCTOR DEVICES

Thermistors, Sensistors, & Barretters, Gunn- Effect, Breakdown Diode, IMPATT & TRAPATT Devices, PIN Diode, Backward Diode, Schottky Diode, Tunnel Diode, Light Absorption Photoconduction, Photoconductive Devices- Photoconductive cells & Photodiodes, Photovoltaic effect and Solar cells, Light emitting diode(LED), Thyristors- SCR,TRAIC,DIAC,SCS, Unijunction Transistor, Principle of Operation, Characteristic & Applications.

Text Books:

- 1.Integrated Electronics: Milman J. and Halkias
2. Microelectronics Circuits: Sedra A.S . and Smith K.C.
3. Electronic Devices & circuit Theory: Boylestad R. and Nashelsky L.
4. Pulse Digital and Switching Waveforms: Milliman J. and Taub H.
- 5.Electronic Circuits – Analysis and Design: Neamen
- 6.Electronic Circuits: Schilling D. L. and Belove C.

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	
	ELECTRONIC INSTRUMENTATION LAB	EC02L	Min “D”	Min “D”	5.0

ELECTRONIC INSTRUMENTATION LAB

List of Experiments (Expandable):

1. Study of CRO and Function Generator.
2. Displacement measurement by LVDT.
3. Force measurement by strain gauge.
4. Measurement of Capacitor, Self-induction using Q-meter.
5. Temperature measurement by thermister, RTD and thermocouple.
6. Optical Transducer- Photo conductive, Photo voltaic, Photo-diode, Photo-Transistor
7. Designe of digital to analog converter.
8. PLC operation and applications (for example: relay, timer, level, traffic light etc.)

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 LAB	EE13L	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 with.
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	
	COMPUTER PROGRAMING LAB-II	CS05L	Min “D”	Min “D”	5.0

Introduction

- Creation of Java, importance of Java to internet, Java buzzwords
- JVM –The heart of Java
- Java’s Magic Bytecode

Language Fundamentals

- The Java Environment:
- Installing Java.
- Java Program Development
- Java Source File Structure
- Compilation
- Executions.
- Basic Language Elements:
- Lexical Tokens, Identifiers
- Keywords, Literals, Comments
- Primitive Datatypes, Operators
- Assignments.
- Console Input and output in java
- Branch control and loop control statements

Object Oriented Programming

- Class Fundamentals.
- Object & Object reference.
- Creating and Operating Objects.
- Constructor & initialization code block.
- Use of Modifiers with Classes & Methods.

Extending Classes and Inheritance

- Use and Benefits of Inheritance in OOP
- Types of Inheritance in Java
- Inheriting Data Members and Methods
- Interfaces.

Exception Handling:

- The Idea behind Exception
- Exceptions & Errors
- Types of Exception
- Use of try, catch, finally, throw, throws in Exception Handling.

Thread :

- Understanding Threads
- Needs of Multi-Threaded Programming.
- Thread Life-Cycle

Applet

- Applet & Application
- Applet Architecture.
- Embedding Applets in Web page.

GUI Programming

- Components and Containers
- Basics of Components
- Using Containers
- Layout Managers
- AWT Components

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	
	ELECTRONIC DEVICES & CIRCUITS LAB	EC04L	Min “D”	Min “D”	5.0

ELECTRONIC DEVICES & CIRCUITS LAB (Suggested Exercise)

1. Study of V-I Characteristics of P.N. Junction diode (Zener Diodes.)
2. To study & plot the drain current vs drain voltage : Characteristics of F.E.T.
3. To study & plot the Characteristics of MOSFET
4. To study & plot the finding characteristics of a Silicon Controlled rectifier.
5. To study and plot V-I characteristics of U.I.T.
6. Experiment on Various clipper & clamper circuit
7. To study & plot the input output characteristics of Transistor CB, CC,CE, mode

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	
	SELF STUDY/ PROFESSIONAL ACTIVITY	EC59L	Min “D”	Min “D”	5.0

Objective of Self Study : is to induce the student to explore and read technical aspects of his area of interest/ hobby or new topics suggested by faculty.

Evaluation will be done by assigned faculty based on report/seminar presentation and viva.

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	
	SEMINAR/GROUP DISCUSSION	EC60L	Min "D"	Min "D"	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.