SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)

SYLLABUS

For

B.Tech.Electronics & Communication
III- Semester

Swami Vivekanand University, Sironja Sagar
2013-2014

Swami Vivekanand University, Sagar (M.P.)

Scheme of Examination

B.Tech. : Electronics & Communication Engg. (EC)

Semester -III

S. No.	Subject Code	Subject Name	PERIODS PER WEEK				DISTRIBUTION OF MARKS				Total Marks
							Theory		Practical		
			L	T	P	C	End Sem.	Mid Sem.	External	Internal	
1	BE-301	Mathematics-III	3	1	0	4	80	20	-	-	**100**
2	EC-302	Network Analysis	3	1	0	4	80	20			**100**
3	EC-303	Digital Electronics	3	1	2	6	80	20	50	50	**200**
4	EC-304	Electronic Devices	3	1	2	6	80	20	50	50	**200**
5	EC-305	Electronic Instrumentation	3	1	2	6	80	20	50	50	**200**
6	EC-306	Seminar/GD	0	0	2	2	-	-	-	50	**50**
7	EC-307	Project - III	0	0	4	4	-	-	50	50	**100**
8	EC-308	Lang Lab-**C**	0	0	2	2				50	**50**
Total			**15**	**5**	**14**	**34**	**400**	**100**	**200**	**300**	**1000**

B.E. 301 - ENGINEERING MATHEMATICS III

Unit I

Fourier Series: Introduction of Fourier series , Fourier series for Discontinuous functions, Fourier series for even and odd function, Half range series Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform.

Unit II

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, second shifting property, Laplace transform of the derivative, Inverse Laplace transform & its properties, Convolution theorem.

Unit III

Second Order linear differential equation with variable coefficients : Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method

Unit IV

Linear and Non Linear partial differential equation of first order: Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation, charpit's method. Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff. equation of nth order with constant coefficients. Separation of variable method for the solution of wave and heat equations

Unit V

Vector Calculus: Differentiation of vectors, scalar and vector point function, geometrical and physical importance of Gradient, divergence and curl, unit vector and directional derivative, Line integral, surface integral and volume integral, Gauss divergence, Green's, and Stoke's theorem

References

(i) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
(ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
(iii) Advance Engineering Mathematics by D.C. Agarwal
(iv) Mathematics for Engineers by S . Arumungam , SCITECH Publuication
(v) Engineering Mathematics by S S Sastri. P.H.I.

EC - 302 Network Analysis

Unit-I

Introduction to circuit elements R, L, C and their characteristics in terms of linearity and time dependence, KCL and KVL analysis, dual networks, analysis of magnetically coupled circuits, Dot convention, coupling co-efficient, Tuned circuits, Series and parallel resonance, voltage and current sources, controlled sources.

Unit-II

Transient analysis: Transients in RL, RC and RLC circuits, initial conditions, time constants, networks driven by constant driving sources and their solutions.

Steady state analysis: - Concepts of phasors and vectors, impedance and admittance. Node and mesh analysis of RL, RC and RLC networks with sinusoidal and other driving sources. Resonance Circuits.

Unit-III

Network topology, Concept of Network graph, Tree, tree branches and links, cut set and tie set schedules. Network Theorems – Thevenin, Norton, Superposition, Reciprocity, Compensation, Maximum power transfer and Millmans theorems, problems with controlled sources.

Unit-IV

Network function & Two port networks concept of complex frequency.Network functions of one and two ports, poles and zeros network of different kinds. Necessary conditions for driving point & transfer function.

Two port parameters– Z, Y, ABCD, hybrid parameters, their inverse and image parameters, relationship between parameters. Interconnection of two port networks, Terminated two port networks.

Unit-V

Frequency domain analysis – Laplace transform solution of Integral-differential equations. Transform of waveform – step, ramp, Gate and sinusoidal functions. Initial and final value theorem. Network Theorems in frequency domain. Fourier Series, Trigonometric & exponential form of fourier series, Fourier series of basic functions.

References:

1. M.E. Van Valkenburg: Network Analysis, PHI
2 Chakraborti: Circuit Theory, Dhanpat Rai.
3. Hayt W.H. & J.E. Kemmerly: Engineering Circuit Analysis, TMH
4. Mesereau and Jackson: Circuit Analysis- A system Approach, Pearson.
5 Roy Choudhary D: Network and systems, New Age Pub
6 William D Stanley : Network Analysis with Applications, Pearson Education

List of experiments (Expandable)

All experiments (wherever applicable) should be performed through the following steps.

Step 1: Circuit should be designed/drafted on paper.

Step 2: The designed/drafted circuit should be simulated using Simulation Software.

Step 3: The designed/drafted circuit should be tested on the bread board and compare the results with the simulated results.

Step 4: The bread board circuit should be fabricated on PCB by one batch using PCB machine.

1. To Verify Thevenin Theorem.

2. To Verify Superposition Theorem.

3. To Verify Reciprocity Theorem.

4. To Verify Maximum Power Transfer Theorem.

5. To Verify Millman's Theorem.

6. To Perform Open Circuit Test on Two Port Network.

7. To Perform Short Circuit Test on Two Port Network.

8. To Find Frequency Response of LRC Series Circuit.

9. To Find Frequency Response of LRC parallel Circuit

EC - 303 Digital Electronics

Unit-I

Review of Number systems and Binary codes, Binary arithmetic – addition, subtraction, multiplication and division algorithms. **Boolean algebra**: theorems and functions, Simplification of Boolean functions, minimization techniques, Karnaugh's map method, Quine and McCluskey's method, realization of various binary functions using AND ,OR , NOT,XOR logic gates.

Unit-II

Universal gates: NAND, NOR, realization of boolean function using universal gates. Half and full adder, half and full subtractor, Series and parallel adder, BCD adders, lookahead carry generator. Decoders, Encoders, multiplexers and de-multiplexers. Analysis and design of combination circuits, realization of various Boolean functions using NAND, NOR gates and multiplexers.

Unit-III

Multivibrators: Astable, Monostable and bistable multivibrators, 555 timer chip and its application in multivibrators.
Flip-Flops: R-S, Clocked R-S, T, D, J-K, race around problem, Master-slave J-K., State and Excitation Tables. **Shift registers and counters** :synchronous and asynchronous counters, Binary ripple counter, up-down counter, Johnson and ring counter. Analysis and Design of Sequential Circuits.

Unit-IV

Semiconductor memories: Organization and construction of RAM, SRAM, DRAM, RAMBUS ROM, PROM, EPROM, EEPROM, PAL and PLAs etc

Unit-V

Logic families: RTL, DTL, TTL, ECL, IIL, PMOS, NMOS and CMOS logic etc. Interfacing between TTL and MOS, vice-versa.

References:

1. M. Mano : Digital Logic and Computer Design, Pearson Education
2. W.H. Gothman : Digital Electronics, PHI.
3. Millman and Taub : Pulse, Digital and Switching Waveforms, MGH
4. Salivahanan and Ari Vahagan : Digital Circuits and Design, Vikas Publishing House
5. Leach and Malvino : Digital Principles and Applications, TMH

List of Experiments (Expandable):

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1. To test and study of operation of all logic Gates for various IC's.
2. Implementation of AND, OR, NOT, NOR, X-OR and X-NOR Gates by NAND and NOR Universal gates.
3. Binary Addition by Half Adder and Full Adder circuit.
4. Binary Subtraction by Half Subtractor and Full Subtractor circuit.
5. Design a BCD to excess-3 code converter.
6. Verification of the Demorgan's Theorem.
7. Study of RS, JK, T & D flip-flops.
8. Multiplexer/Demultiplexer based boolean function realization.
9. Study and Application of 555 timer (Astable, Monostable, Schmitt trigger, VCO

EC - 304 Electronic Devices

Unit-I

Semiconductor: Intrinsic and Extrinsic, p-type and n-type, energy band gap and its diagrams, majority and minority charge carriers, charge density in semiconductor, generation and recombination of charges, process of diffusion, diffusion and drift currents, p-n junction, depletion layer, potential barrier, electric field, forward and reverse biased junction, PN diode, current equation, V-I characteristics, cut in voltages of Si and Ge diode, power dissipation, Hall effects and its applications.

Unit-II

Diode Applications: PN junction diode as rectifier, clipper and clamper, The diode as a circuit element, The Load line concept, Clipping circuits, Clipping at two independent levels, Comparators, Sampling Gate, Rectifiers, Capacitor filter additional diodes circuits.

Unit-III

Diodes Family: Zener diode, Characteristics and used as a voltage regulator, avalanche diode, Varactor diode, Schottky diode, Tunnel Diode, PIN diode, LED, photodiodes, phototransistors,

Unit-IV

Bipolar junction transistor: construction and working of PNP and NPN transistor. Mode of transistors- CB, CE and CC-configuration, input and output characteristics, region of operation, active, cutoff and saturation region
Ebers-Moll model, power dissipation in transistor, Photo transistor,

Unit-V

FET construction- Construction, n channel and p channel, characteristics, parameters, Equivalent model and voltage gain, Enhancement and depletion MOSFET and its Characteristics, analysis of FET in various configuration, Uni-junction Transistor (UJT) : Principle of operation, characteristics.

References:

1. Boylestad and Nashelsky: Electronic Devices and Circuit Theory, Pearson Education

2. Millman and Halkias: Integrated electronics, TMH

3. Graham Bell: Electronic Devices and Circuits, PHI

4. Sendra and Smith: Microelectronics, Oxford Press.

5. Donald A Neamen: Electronic Circuits Analysis and Design, TMH

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1. V-I characteristics of various Diodes (p-n, Zener, Varactor, Schottky, Tunnel, Photodiode etc)

2. Characteristics of Transistors (BJT and FET)

3. Study of Power electronic devices (Diac, Triac, SCR, Power MOSFET, IGBT etc).

EC - 305 Electronic Instrumentation

Unit-I

Measurement and Error: Accuracy and Precision, Sensitivity, Linearity, Resolution, Hysteresis, Loading Effect. 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, Multi-meter, Power meter.

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 - 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 , 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.

Unit-IV

Signal generator & Display: Signal and Function Generators, Sweep Frequency Generator, Pulse and Square Wave Generator, Beat Frequency Oscillator, Digital display system and indicators, Classification of Displays, Display devices, Light Emitting diodes (LED), Liquid Crystal Display (LCD).

Unit-V

Digital Measurement and Instruments: Advantages of Digital Instrument over Analog Instrument, Digital-to-analog conversion (DAC) - Variable resistive type, Binary Weighted ladder, R-2R ladder Type, Practical DAC.

Analog-to-digital Conversion (ADC) - Ramp Technique, Dual Slope , Integrating Type (voltage to frequency), Successive Approximations, digital voltmeters and multi-meters, Resolution and sensitivity of digital meter, PLC structure, principle of operation, response time and application.

References:

1. H. S. Kalsi: Electronics Instrumentation, TMH.

2. K. Sawhney: Instrumentation and Measurements, Dhanpat Rai and Co.

3. Helfric and Cooper: Modern Electronic Instrumentation and Measurement Techniques; Pearson.

List of Experiments:

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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 thermistor, RTD and thermocouple.
6. Optical Transducer- Photo conductive, Photo voltaic, Photo-diode, Photo-Transistor
7. Design of digital to analog converter.
8. PLC operation and applications (for example: relay, timer, level, traffic light etc.)