Scheme & Syllabus

of

B.Sc. Electronics

Maintenance Course

Ist & IInd Semester

w.e.f. July 2011

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Indore (M.P.), 452001

SEMESTER SYSTEM, 2011-2014

PROPOSED SCHEME FOR B.Sc. ELECTRONIC MAINTENANCE

CLASS/ SEMESTER	B. Sc (Elex)	CCE 30%	Min Marks	Term End Exam (70 %)	Min Marks	Total 100%
Sem -I	EL-1101 Components & Networks	30	10	70	24	100
	EL-1102 Practical	-	-	-	-	50
Sem-II	EL-1201 Electronic Devices	30	10	70	24	100
	EL-1202 Practical	-	-	-	-	50

Note:

1. CCE – Continuous Comprehensive Evaluation.
2. Individual passing required for theory and practical subjects.

SEMESTER - I
PAPER - I
EL1101: Components and Networks

Unit 1: **Basic Components** **10 Hrs**

Circuit symbols, working principle, classification according to construction, specifications, and applications of passive components – Resistors & Color Coding, Inductors, Transformers, Switches, Relays(Electromagnetic),Thermistor, LDR, Micro-Phone and Loud-Speakers.

Unit 2: Capacitors **10 Hrs**

Capacitors: - Capacitance, Capacitor Specifications, Classification of Capacitor- Fixed (Mica, Paper, Ceramic, Plastic, Electrolytic etc.), Variable capacitor (Trimmer, Padder, Gang). Stray Capacitance, Leakage Resistance, Testing of Condenser, Area of Application, Problem related to Electrical Energy Storage.

Unit 3: **Basic Circuits** **10 Hrs**

Concept of Ideal and Practical Voltage and Current Sources, Internal Resistance, AC and DC Sources, Ohms Law, AC Currents & Voltages, Expression for RMS value & Mean Value, j Operator, study of LR, CR , Series & Parallel resonance circuit, Expression for Q factor & Band width in resonance circuit, Phase relationship between Current & Voltage in different circuits. Numerical on Quality Factor, Power Factor, Bandwidth Calculations.

Unit 4: **Network Theorems** **10 Hrs**

Kirchhoff's Current and Voltage Law, Application of KVL& KCL to simple DC Resistive Networks. Thevenin's and Norton's Theorems and corresponding equivalent of simple Resistive Networks. Superposition Theorem, Maximum Power Transfer Theorem, Loop Current and Node Voltage Analysis Methods.

Unit5: Filters **10 Hrs**

Types of filters: Choke input (inductor) filter, Shunt Capacitor filter, L section, π section and T filters, Low Pass, High Pass, Band Pass and Band Reject Filters.

Text Books

1. B.L. Theraja : Electrical Technology, S. Chand & Co Ltd.
2. Bernard Grob: Basic Electronics, McGraw-Hill Publishing Co.

Problem Solving Book

1. Schaum Series : Electric Circuits, TMH

Note: Faculty teaching the subject will also given to students the besides 50 hours teaching the appropriate exercises and assignments.

Semester - I

EL1102: Practical

1. **Identification of Components / Tools**
   a) Minimum 10 different types of components must be given.
   b) Identification based on visual inspection / data sheets be carried out.

2. Use of Multimeter (Analog and Digital)
   a) Measurement of AC/DC voltage and Current – on different ranges.
   b) Measurement of R.
   c) Testing of L, C, Diodes & Transistors.

3. Study of Function Generator / CRO

   a) Understand how to use Function Generator / CRO.
   b) Study of Front panel controls.
   c) Measurement of Amplitude and Frequency of different Waveforms.
   d) Demonstrate the use of Component Testing.

3. Verification of KCL / KVL, Network Theorems: Thevenin's, Norton's, Maximum Power Transfer, Superposition Theorem.
4. Design, build and test Low pass and High pass RC Filters.
5. Charging and Discharging of Capacitors in R-C Circuits.

SEMESTER - II
PAPER - I
EL1201: Electronic Devices

Unit 1: Semiconductors **10 Hrs**

Conductors, Semiconductors and Insulators. Their classification on the basis of Band Theory, Intrinsic and Extrinsic semiconductor, Diode current equation (Derivation not required), Drift & Diffusion.

Unit 2: P-N junction **10 Hrs**

P-N junction- Forward and Reverse bias of Diode. Concept of recombination of carriers, temperature variation of Forward and Reverse Current through the P-N Junction. Characteristics of Forward & Reverse Bias Diode, Dynamic and Static Resistances, Voltage dependent Junction Capacitance of a P-N junction.

Unit -3: Special Diodes **10 Hrs**

Zener Diode, its construction and characteristics. Temperature coefficient of Zener Diode. Zener Diode as Voltage Regulator, Schottky Diode, Power Diode, Tunnel Diode, LED, Solar Cell, Photodiodes.

Unit -4: BJT **10 Hrs**

BJT, construction and characteristics in different configuration, comparative merits and demerits, biasing of transistor: different methods, load line, Q point and thermal stability. Transistor as an ON/OFF switch. Transistor as a black box: h-parameter concept only. Qualitative analysis of h-parameter model in CE, CB and CC mode.

Unit -5: Power Devices **10 Hrs**

Construction, characteristics and uses of SCR, DIAC, TRIAC, UJT and Optocoupler devices.

Text Books

1) R. Boylestad, L.Nashelsky : Electronic Devices and Circuit Theory, Pearson. Education
2) Debashis De and Kamakhya Prasad Ghatak: Basic Electronics, Pearson Publication

Reference Books

1) Malvino : Electronics Principles, TMH
2) Millman and Halkias : Integrated Electronics, TMH
3) Bernard Grob : Basic Electronics, McGraw-Hill Publishing Co.

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SEMESTER - II

EL1202 : Practical

1. Study of Forward and Reverse Bias characteristics of PN Junction Diode.
2. Study of Forward and Reverse Bias characteristics of LED.
3. Study of Breakdown Characteristics and Voltage Regulation action of Zener Diode.
4. Study of Forward and Reverse Bias Characteristics of Power Diode.
5. Study of Forward and Reverse Bias Characteristics of SCR.
6. Study of Forward and Reverse Bias Characteristics of DIAC.
7. Study of Forward and Reverse Bias Characteristics of TRIAC.
8. Study of Forward and Reverse Bias Characteristics of UJT.
9. To study the characteristics of PNP transistor in CB and CE configuration.
10. To study the characteristics of NPN transistor in CB and CE configuration.
11. To study the characteristics of Emitter Follower.
12. To study photo diode characteristics
13. To study optocoupler
14. To find the Q- point of a bipolar junction transistor
15. To study transistor as a switch
16. To study I-V characteristics of a solar cell as a function of light intensity.