OFFICE OF THE REGISTRAR :: DIBRUGARH UNIVERSITY :: DIBRUGARH

No. DU/DR-A/8-1/21/334 Date: 11.03.2021.

NOTIFICATION

Sub: **Syllabi of Skill Enhancement Course (SEC) for B.A./B.Sc./B.Com. Programmes in CBCS.**

Under report to the Under Graduate Board, the Hon'ble Vice-Chancellor, Dibrugarh University is pleased to approve the draft of the following syllabi as the Two (02) Credit Skill Enhancement Courses (SECs) in Electronics for the B.A./B.Sc./B.Com. Programmes in CBCS with immediate effect.

- ***Repairing and Maintenance of Electronic Appliances.***

Issued with due approval.

(Dr. B.C. Borah)
Joint Registrar (Academic)
Dibrugarh University

Copy to:

1. The Hon'ble Vice-Chancellor, Dibrugarh University, for favour of information.
2. The Deans, Dibrugarh University, for kind information.
3. The Heads/Chairpersons of the Teaching Departments/Centres of Studies, Dibrugarh University, for kind information.
4. The Director, IQAC, Dibrugarh University, for information.
5. The Controller of Examinations, Dibrugarh University, for information.
6. The Director, College Development Council, Dibrugarh University, for information.
7. The Principals of the Colleges/Institutes affiliated to Dibrugarh University offering B.A./B.Sc./B.Com. Programes in CBCS for kind information and necessary action.
8. The Joint Registrar (Administration), Dibrugarh University, for information.
9. The Joint/Deputy Controllers of Examinations-'C' and 'A', Dibrugarh University, for information.
10. The Academic Officer, Dibrugarh University, for information.
11. The System Administrator, Dibrugarh University, for information.
12. The Programmer, Dibrugarh University, requesting him to upload the notification in the website.
13. File.

(Dr. B.C. Borah)
Joint Registrar (Academic)
Dibrugarh University

Skill Enhancement Course in Electronics

Course Title: Repairing and Maintenance of Electronic Appliances

Course Code: SEC

Total Credit assigned: 02 (each paper)

Course Structure

Course Code	Course Name	Type	Marks		
			IA	End Sem	Total
SEC-I	Basics of Electronics	Theory	5	20	25
	Practical on basic Electronics	Practical	5	20	25
SEC-II	Electronic appliances and fault finding	Theory	5	20	25
	Practical on Electronic appliances	Practical	5	20	25

Course Title: Repairing and Maintenance of Electronic Appliances
Course Code: SEC-1
Basic Electronics
Part A: Theory (In-Semester: 5, End Semester: 20)

Course Objective:

The course is designed with an objective to

- To familiar the students with the active and passive components
- To know about semi conductor devices
- To understand the rectifier and power supply
- To acquire basic knowledge about testing of various electronic components
- To gain practical knowledge about soldering and desoldering
- To enable students to know about the various test and measuring instruments and practical approaches to troubleshooting
- To gain knowledge about the maintenance of electronics equipments

UNIT-I (Marks-05)

Electric Charge, Voltage, Electric Current, Ohm's Law, KCL, KVL
Introduction to Components: Passive components: Resistor, Capacitor and Inductor, Types of resistor, color code, power ratings, Types of Capacitors, fixed and variable capacitors, Inductors, types, Series and parallel combination of resistor, capacitor and inductor, Transformer, Relay, Fuses, Transducers (LDR, Thermistor, Photodiode, IR Diode, LVDT).

UNIT-II (Marks-05)

Conductor, semiconductor, Insulator, Intrinsic and Extrinsic Semi-Conductors, P and N type semiconductors, PN junction Diodes, forward and reverse biasing, Basic rectifier circuits, Half wave, full wave and bridge rectifiers, principle of operations, filter circuits, zener diode, switching diode, Varactor diode, photo diode, light emitting diode, IR source and Detectors, Optical Isolators, Bipolar Junction Transistors: CB, CE, CC Configurations, load line, Operating point

UNIT-III (Marks-05)

Transformers and Power supply: Different type of transformers, Description of different type of power supply, switch mode power supply (SMPS), Principle of SMPS, block diagram of SMPS, Zener diode as voltage regulators, voltage regulator IC 78XX, 79XX,
Multimeters, Analog Multimeter, Digital Multimeter, Frequency meters, Oscilloscope: dual trace oscilloscopes, Digital storage oscilloscope, controls on digital oscilloscope, Measurements with oscilloscope, Precautions in use of an oscilloscope, Oscilloscope probes, Logic analyzer, testing and measurement of resistor, capacitor and inductors and semiconductor devices.

UNIT-IV (Marks-05)

Concept of maintenance, Principles of Maintenance, Benefits of Maintenance, System Approach to maintenance, challenges in Maintenance, Maintenance Objectives, Types of Maintenance systems, Effects of Maintenance.

Soldering Tools, Soldering Iron, Soldering Station, Dry Solder Joint, Cold Solder Joint, Good and Bad Solder Joints, Soldering Material, Soldering Techniques, Tools used for De-Soldering, De-Soldering Techniques, Precautions during Soldering and De-Soldering.

Recommended Books:

1. Electronic Devices and Circuits - Robert Bolystead
2. Electronic devices and circuits - Millman & Halkias
3. Principle of Electronics – V. K. Mehta
4. Modern Electronic Equipment: Troubleshooting, Repair and Maintenance – R. S. Khandpur
5. Textbook of Electrical Technology - B. L. Theraja

Practical on basic Electronics

Part B: Practical (In-Semester: 5, End Semester: 20)

(One experiment to be performed in 2 hours)

1. Verification of Ohm's Law
2. Identification of components and devices, study of colour code of resistances, condensers
3. Study the series and parallel combination of resistor, capacitor and inductor.
4. Testing of semiconductor devices (PN Junction diode, transistor)
5. Testing of resistor, capacitor and inductor
6. Testing of Field Effect Transistor
7. Testing of transformer
8. Study of CRO and determination of amplitude, frequency and time period of observed voltage waveform.
9. Study of P-N junction diode characteristics.
10. Study of zener diode characteristics and determination of breakdown voltage.
11. Study of common-emitter transistors characteristics and determination of βdc.
12. Study of Hall wave rectifier and determination of ripple factor and efficiency.
13. Study of Full wave rectifier and determination of ripple factor and efficiency.
14. Study of Regulated Power Supply
15. Experiments on Soldering and De-soldering skills for constructing a simple circuit on PCB.

Course Title: Repairing and Maintenanc of Electronic Appliances
Course Code: SEC-II
Electronics appliances and fault finding

Part A: Theory (In-Semester: 5, End Semester: 20)

Course Objective:

The course is designed with an objective to

- Equip the students with basic knowledge of various electronic appliances and understand the principle of operation and its care, maintenance and troubleshooting procedure.

UNIT-I

(Marks-05)

Fault Detection and troubleshooting, Nature of faults, Fault location procedure, Fault finding aids, Service and maintenance manuals and instruction manuals, Importance of Service Manual, Component Data Book, Test and measuring instruments, special tools, Troubleshooting techniques, Grounding systems in Electronic Equipment, Safety and precaution in handling electronic equipment

UNIT-II

(Marks-05)

Introduction to Television Principle and Theory, scanning, synchronization and blanking pulses, interlace scanning, composite video signal, block diagram of B/W TV receiver, balun booster, tuners, Functional description of IF amplifiers, video detector, video amplifiers, audio power amplifier, loud speaker, Description of picture tubes, Colour TV receivers, Primary colours, Fault finding and rectification of colour TV receivers trouble shooting. Working functions of LCD TV, LED TV, and introduction to HDTV.
Basic principle of AM and FM radio receiver, block diagram, Characteristics of a receiver, Super heterodyne receiver, alignment of receiver

UNIT-III

(Marks-05)

Solar energy, Solar PV cells and Modules, Solar cell: Structure, characteristics, Solar panel: Size, orientation, IV characteristics, Solar electric system – solar panels, Batteries, Controller, inverter, electrical devices, connecting everything together and installation, solar LED Lighting

Functional Block Diagram of Computer, CPU, Cables and connectors, CPU Cooling, Motherboard, different section of motherboard, Sockets and slots, Device Controllers, Input devices, Output devices, Main and Auxiliary memory, RAM and its types: SDRAM, EDORAM, DDR Series, Flash RAM. Memory modules, SIMM and DIMMs, Secondary Memory: Hard Disc Drive, Floppy Disc, CDROM, CD R/W, DVD, Pen Drive, flash memories: Mini/micro SD Card. Formatting and Utility Tools for drivers, Different type of computer software, formatting and installation of software.

UNIT-IV

(Marks-05)

Set-top box for cable TV and for DTH, Allignment of set-top box, **Microwave Oven**: Properties of microwave, Magnetrons, Waveguides, Microwave oven block diagram and working principle, **Washing Machines:** Electronic controller for washing machines, Washing machine hardware, Types of washing machines, **Air Conditioners:** Components of air conditioning systems, types, split air conditioners. **Home Inverter**, block diagram and working principal

Recommended Books:

1. Consumer Electronics - S P Bali
2. Consumer Electronics – B R Gupta and V Singhal
3. Modern Electronic Equipment: Troubleshooting, Repair and Maintenance – R. S. Khandpur
4. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting by R. G. Gupta Tata McGraw Hill Edition 2001
5. Electronic Testing and Fault Diagnosis by G. C. Loveday
6. Troubleshooting and repairing major appliances, Eric Kleinert, McGraw Hill
7. Colour Television, Theory and Practice: S P Bali, Tata Mc Graw Hill
8. Television engineering: A M Dhake, Tata Mc Graw Hill
9. Monochrome and Colour television: R R Gulati, Wiley Eastern.
10. Computer Motherboard Testing and Fault finding, S. K. Gupta
11. Upgrading and Repairing of PCs, Scott Muller
12. Introduction to PC Hardware and Trouble shooting, Mike Meyers, Tata McGraw-Hill,
13. Solar Electricity handbook, Michael Boxwell

14. Photovoltaic Design and Installation for dummies, Ryan Mayfield
15. Solar lighting, Ramchndra Pode, Boucar Diouf
16. Audio and Video systems Principles, Maintenance and Troubleshooting. - R.G. Gupta Tata Mc Graw Hill Publishing Co. Ltd
17. Electronic Instrumentation by A. K. Sahwney

Practical on Electronic Devices

Part B: Practical (In-Semester: 5, End Semester: 20)

(One experiment to be performed in 2 hours)

1) Study of Radio receivers- Identification of parts and sections alignments.
2) Assembling of AM / FM radio receiver and faults finding.
3) Experiments on AM/FM radio receiver and its alignment
4) Identification and study of TV receivers circuit diagram. (B/W & Colour)
5) Study of composite video signal, EHT stage, deflection circuit and fault arising due to degaussing section.
6) Study of controls of TV receiver
7) Identification of faults and rectification in various stages of TV receivers (B/W and Colour).
8) Fault finding and testing of power supplies.
9) Alignment of Dish TV with Fault Findings.
10) To study the characteristics of solar cell, study Illumination Characteristics, Current Voltage Characteristics, Power Load Characteristics, Area Characteristics and, Spectral Characteristics.
12. To plot the V-I Characteristics of the solar cell and hence determine the fill factor.
13. Experiment on Remove, Install and Troubleshooting of PCs components (RAM, HDD, DVD, SMPS, FANS, CMOS battery)
14. Study of Hardware components:- SMPS Power Supplies, Power Supply Connections, Cooling Fan, Cables & Connectors, Motherboard Connections, Motherboard Components, CPU (Processor), RAM (Memory), Hard Drive Connections, ROM Drives, Video Cards, Sound Cards
15. Study of Digital Computers and its type, Understanding of PCs system and its components / peripherals.
16. Identification and study of computer hardware
17. To study function and working of different parts of an Air Conditioning equipment.
18. To study basic components of Microwave Oven.
19. To study basic components of Washing Machine
20. To study basic components of single phase inverter.
21. To study the operation and waveforms of a single phase inverter with R and RL loads.