BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

ELECTRONICS TECHNOLOGY

TECHNOLOGY CODE: **668**

5th SEMESTER

DIPLOMA IN ENGINEERING

PROBIDHAN-2016

ELECTRONICS TECHNOLOGY (668)

5th SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total
						Theory		Practical		
						Cont. assess	Final exam	Cont. assess	Final exam	
1	66851	Radio & Television Engineering	3	3	4	60	90	25	25	200
2	66852	Electronic Measuring Instruments	2	3	3	40	60	25	25	150
3	66853	Advanced Communication Engineering	3	3	4	60	90	25	25	200
4	66854	Advanced Digital Electronics	3	3	4	60	90	25	25	200
5	66855	Electronic Servicing -II	0	3	1	-	-	25	25	50
6	69054	Environmental Studies	2	0	2	40	60	-	-	100
7	65851	Accounting Theory & Practice	2	3	3	40	60	50	-	150
Total			**15**	**18**	**21**	**300**	**450**	**175**	**125**	**1050**

66851 Radio & Television Engineering

T	P	C
3	3	4

OBJECTIVES

Upon completion of these content student will be able to achieve and acquire knowledge, skills and attitude in the area of radio & television engineering special emphasis on:

- Radio wave & its applications.
- TV Communication System.
- TV Transmission & Reception.
- Circuits of TV Receiver.
- Digital TV System.

SHORT DESCRIPTION

Radio wave & its applications: Picture Signal, Principle of TV Signal Propagation, Factors related with TV Communication system, TV Camera, TV signal (CVS/CCVS) Processing, Block diagram of TV Transmitter & Receiver, Picture Tube, Circuit Diagram of TV Receiver, TV Transmitting & Receiving Antenna, Booster, Test signal and Test equipment , Digital Television System.

DETAIL DESCRIPTION

Theory:

1. **Understand the Radio frequency spectrum & its applications.**
   - 1.1 Define radio wave.
   - 1.2 Classify Radio wave & its allocation.
   - 1.3 Describe electromagnetic wave.
   - 1.4 Describe the radiation properties of electromagnetic wave.
   - 1.5 Civil applications of radio wave.
2. **Understand the Picture signal & TV Signal Processing.**
   - 2.1 Define picture signal.
   - 2.2 Describe the properties of Picture signal.
   - 2.3 Define Picture element, Gross structure, Fine structure, Image continuity and tonal gradation.
   - 2.4 Describe the elementary idea of the role of TV camera, TV transmitter, propagation of signal, reception through antenna, TV receiver for TV communication.
   - 2.5 Describe the CCTV, MATV, CATV and satellite TV communication with applications.
   - 2.6 Describe the factors affecting range of TV coverage such as line of sight propagation, earth's curvature, antenna heights and power of transmitter.
3. **Understand the factors of TV system.**
   - 3.1 Define Picture scanning.
   - 3.2 Describe scanning lines and scanning methods.
   - 3.3 Define field, frame, persistence of vision, flicker, picture element, aspect ratio, interlace error.
   - 3.4 Mention the Standard of CCIR, CCIR-B, & FCC in Television system.
   - 3.5 Mention the frequency range, sound and picture carrier of various bands and channels in the VHF & UHF range used in Bangladesh.

4. Understand the features of TV Camera.

4.1 State the principle of photoelectric conversion through camera tube.
4.2 Classify TV Camera.
4.3 Draw the basic Block Diagram of a TV Camera.
4.4 Explain the principle of operation of Videcon, Plumbicon, Silicon diode Array Videcon, CCD camera tubes.
4.5 Describe the construction of Videcon, Plumbicon, Silicon diode Array Videcon, CCD camera tubes.
4.6 Explain gamma and gamma correction.
4.7 Define image lag, sensitivity and dark current of a camera tube.

5. Understand the Features of Composite Video Signal (CVS).

5.1 Define Composite Video Signal.
5.2 Formation of composite video signal.
5.3 Explain the need for sync, blanking and equalizing pulses.
5.4 Describe the need for VSB transmission in television broadcasting.
5.5 State the reason for employing AM for vision and FM for sound.
5.6 Mention the reason for using negative modulation for TV transmission.

6. Understand the features of Colour Composite Video Signal (CCVS).

6.1 Define Three Colour Systems.
6.2 Define Hue, Saturation & Brightness of RGB.
6.3 Describe Colour Difference Signal.
6.4 Describe Luminance & Chrominance Signals.
6.5 Define Colour Triangle & Chromaticity Diagram.
6.6 Describe the formation of Colour Composite Video Signal.
6.7 Describe the compatibility factors in B&W and Colour Transmission.

7. Understand the features of TV Transmitter.

7.1 Draw the block diagram of a standard TV transmitter.
7.2 Level the signals at input and output of each block.
7.3 Describe the functions of each block.
7.4 State standard TV Channels Characteristics & TV Transmission Standards.
7.5 Describe TV Transmitter Power.

8. Understand the features of Monochrome & Colour TV Receiver & Picture Tube.

8.1 Draw the block diagram of a black and white (B&W) TV receiver.
8.2 Describe the functions of each block.
8.3 Draw the block diagram of a colour TV receiver.
8.4 Describe the functions of each block.
8.5 Describe the construction & working principle of a B & W picture tube
8.6 Describe the basic idea of LCD, LED & Plasma picture tube.
8.7 Describe the construction & working principle of different type of colour picture tube.
8.8 Describe the Electrostatic & electromagnetic Beam defection system.
8.9 Differentiate between camera tube and picture tube.

9. Understand the circuit diagram of TV (IC/ Transistor/Hybrid Models) Receiver.

9.1 Describe the Function of Electronic Tuner.
9.2 Draw the Block Diagram of a RF Tuner (VHF & UHF).
9.3 Describe the operation of Video IF & Video Amplifier.

9.4 Describe the operation of Sound IF, FM detector & Keyed AGC Circuit.
9.5 Describe the operation of Vertical & Horizontal Deflection Circuit.
9.6 Describe the operation of Fly back Transformer & Generation of EHT Voltage.
9.7 Describe the operation of AFPC, Colour killer, SC oscillator, CBA, Burst blanking, colour matrix colour difference amplifier.
9.8 Describe typical faults in TV receiver circuit.

10. Understand the features of TV Transmitting & Receiving antenna and Booster.

10.1 State different types of TV Transmitting antenna.
10.2 Mention the procedure of installation of TV Transmitting antenna.
10.3 Mention the different types of TV Receiving antenna.
10.4 Describe the procedure of installation of Yagi antenna.
10.5 Explain the operation of Booster antenna.

11. Understand test equipment and test charts.

11.1 Mention the alignment and servicing equipment of television.
11.2 Describe the standard test charts and their interpretation & use.
11.3 Describe the use of B & W test pattern generators for receiver test and alignment.
11.4 Describe signal injectors and their uses for fault finding.
11.5 Explain typical fault charts.
11.6 Describe trouble shooting procedure of TV receiver.
11.7 Mention the safety precautions in television servicing.

12. Understand Digital TV System.

12.1 Define Digitization Principle.
12.2 Define Pixel array, Scanning notation, Viewing distance & angle, Aspect ratio, Frame rate and Refresh rate.
12.3 Describe Raster Scanning & Scan line waveform in DVB system.
12.4 Describe Digital Video & Audio signals.
12.5 Illustrate MAC signal, D_2-MAC/ packet signal, MAC decoding & interfacing
12.6 Advantages of MAC signal.

PRACTICAL:

1. Identify with physical layout, location of stages and major components of a Black and White & colour TV receiver.

1.1 Select a TV receiver and required tools & materials.
1.2 Open the TV cover and Dislock mother board circuit from body.
1.3 Trace the physical layout.
1.4 Identify the location of stages and associate components number.
1.5 Identify the location of major components in the physical circuit.
1.6 Re-assemble the TV Receiver in previous condition.

2. Locate all controls and effect of adjustments of controls on the performance of TV receiver.

2.1 Select a TV receiver and required tools & materials.
2.2 Open the TV cover and Dislock mother board circuit from body.
2.3 Find the location of different control knobs.
2.4 Switch on the power Knob.

2.5 Adjust each control knob.
2.6 Monitor the effect on Sound & Picture of TV receiver.
2.7 Adjust the controls for best performance.
2.8 Re-assemble the TV Receiver in previous condition.

3. Test the power supply stage with typical fault conditions.

3.1 Select a TV receiver with required tools and materials.
3.2 Identify the power supply stage.
3.3 Measure voltages at test points.
3.4 Create some faults.
3.5 Monitor the effect.
3.6 Remove the fault and monitor the operation.

4. Reassemble CRT and allied parts of a TV receiver.

4.1 Select a TV receiver with tools and equipment.
4.2 Open the TV cover and Dislock mother board circuit from body.
4.3 Identify the mechanism of mounting CRT.
4.4 Identify the mechanism of CRT Drive system.
4.5 Dismount magnets, Deflection coils, earth straps and High voltage connection of CRT.
4.6 Re-assemble the parts again.
4.7 Adjust the Magnets and Deflection coils for best performance.
4.8 Re-assemble the TV Receiver in previous condition.

5. Test the TV CRT and associated circuits.

5.1 Select the TV receiver with required tools and materials.
5.2 Open the TV cover and Dislock mother board circuit from body.
5.3 Check continuity of filament and Deflection coils of CRT,
5.4 Switch on the power supply.
5.5 Measure the CRT pin voltages.
5.6 identify the fault and make remedy.
5.7 Re-assemble the TV Receiver in previous condition.

6. Test the tuner stage with typical fault conditions.

6.1 Select a TV receiver and required tools & materials.
6.2 Open the TV cover and unlock mother board circuit from body.
6.3 Switch on the power supply.
6.4 Identify the condition of Video and Audio quality.
6.5 Change tuner adjustment.
6.6 Monitor the performance.
6.7 Measure the tuner operating voltages.
6.8 Adjust the tuner for best operation.
6.9 Re-assemble the TV Receiver in previous condition.

7. Test the horizontal sweep circuit with common faults.

7.1 Select a TV receiver with required tools and materials.
7.2 Open the TV cover and unlock mother board circuit from body.
7.3 Switch on the power supply.
7.4 Monitor the picture quality.
7.5 Make some common faults in Horizontal oscillator or horizontal sweep circuit and monitor the effect.

7.6 Remove the fault for normal operation and monitor the raster/picture on the screen.
7.7 Re-assemble the TV Receiver in previous condition

8. Test the vertical Deflection with common faults.

8.1 Select a TV receiver with required tools and materials.
8.2 Open the TV cover and unlock mother board circuit from body.
8.3 Switch on the power supply.
8.4 Make some common fault in Vertical oscillator or Vertical deflection circuit and monitor the effect.
8.5 Monitor the performance of vertical Deflection circuit.
8.6 Remove the faults and monitor the raster/picture on the screen.
8.7 Re-assemble the TV Receiver in previous condition.

9. Test the EHT and other high voltage section of a TV receiver.

9.1 Select a TV receiver with required materials and equipment.
9.2 Open the TV cover and unlock mother board circuit from body.
9.3 Switch on the power supply.
9.4 Measure the presence of high voltage.
9.5 Identify the associated circuits for high voltage.
9.6 Create common fault and monitor the raster on TV screen.
9.7 Remove the faults.
9.8 Re-assemble the TV Receiver in previous condition.

10. Test the vision IF and detector stage with common faults.

10.1 Select a TV receiver with required tools and materials.
10.2 Open the TV cover and unlock mother board circuit from body.
10.3 Trace the connection of the circuit.
10.4 Switch on the power supply.
10.5 Monitor the input and output wave shapes.
10.6 Create some fault in the circuit.
10.7 Monitor the effects.
10.8 Remove the faults and monitor the result.
10.9 Re-assemble the TV Receiver in previous condition.

11. Test the IFPC stage with common faults.

11.1 Select a TV receiver with required tools and materials.
11.2 Open the TV cover and unlock mother board circuit from body.
11.3 Identify the IFPC stage.
11.4 Switch on the power supply.
11.5 Monitor input and output wave shapes.
11.6 Create some faults in the stage and monitor the effect.
11.7 Remove the fault.
11.8 Re-assemble the TV Receiver in previous condition.

12. Test the sound stage with typical fault conditions.

12.1 Select TV receiver with required materials and tools.
12.2 Open the TV cover and unlock mother board circuit from body.
12.3 Identify the sound stage.
12.4 Switch on the power supply.
12.5 Measure sound and wave shapes at test point.

12.6 Create some faults in the circuit and listen the effect.
12.7 Remove the fault.
12.8 Re-assemble the TV Receiver in previous condition.

13. Test the video amplifier stage with typical fault conditions.

13.1 Select a TV receiver with required tools and materials.
13.2 Open the TV cover and unlock mother board circuit from body.
13.3 Identify the video amplifier stage.
13.4 Switch on the power supply.
13.5 Monitor the wave shapes at test points.
13.6 Create some faults and monitor the effect.
13.7 Remove the fault.
13.8 Re-assemble the TV Receiver in previous condition.

14. Visit a Television studio and prepare a report.

REFERENCE BOOKS

1. Monochrome and Color Television - R R Gulati
2. Basic Television and Video Systems – Benrard Grob
3. Digital Television: Technology and Standar - Jhon F. Arnold
4. Television and Video Engineer - A M Dhake, MGH
5. elevision Engineering and Video System - R G Gupta, MGH

66852 Electronic Measuring Instruments

T	P	C
2	3	3

OBJECTIVES

Upon completion of these contents student will be able to achieve and acquire knowledge, skills and attitude in the area of Electronic Measuring Instrument special emphasis on:

- Classification of Measuring Instrument
- Indicating, Recording & Integrating Instruments
- Electronic Instruments.
- Digital Instruments.
- Special type meters.

SHORT DESCRIPTION

Measuring Instrument & its classification; Indicating instruments, Moving coil & moving iron type indicating instrument, Ammeter, Voltmeter & Multimeter; recording and integrating; Electronic Instrument; Digital instruments; Oscilloscope, LCR meter, Q-meter, Frequency meter, Distortion meter, Power factor meter, RX meter, psopho meter & microwave power meter.

DETAIL DESCRIPTION

Theory:

1. **Understand measuring instruments and its classification.**
   - 1.1 State measuring instrument.
   - 1.2 Mention different types of measuring instruments.
   - 1.3 Describe absolute and secondary instruments.
   - 1.4 List different types of secondary instruments.
2. **Understand indicating instruments.**
   - 2.1 State principle of indicating instrument.
   - 2.2 Define torque.
   - 2.3 Describe the basic construction of Indicating instrument
   - 2.4 State the torque weight ratio
   - 2.5 Describe deflecting, controlling and damping torque.
   - 2.6 Describe spring control and gravity control.
   - 2.7 State different types of damping.
   - 2.8 Solve problems related to spring control and gravity control system.
3. **Understand the moving coil.**
   - 3.1 Describe the construction and working principle of permanent magnet moving coil instruments.
   - 3.2 Explain the torque equation of the moving coil instrument.
   - 3.3 Mention the advantages and disadvantages of permanent magnet moving coil instruments.
4. **Understand the operation of ammeters, voltmeters & analog Multimeter.**
   - 4.1 Describe the principle of operation of ammeter and voltmeter.
   - 4.2 Distinguish between ammeter and voltmeter.

4.3 List various types of ammeter and voltmeter.
4.4 State the uses of multimeter.
4.5 Describe the block diagram of an analog multimeter.

5. Understand the recording and integrating instruments.

5.1 State principle of recording instrument.
5.2 State principle of integrating instrument.
5.3 Explain the basic constructional diagram of Energy meter.
5.4 Describe the construction & working principle of maximum demand indicator.

6. Understand the Electronic Instruments

6.1 State principle of electronic instrument.
6.2 Classify electronic instrument.
6.3 Advantages of electronic instruments.

7. Understand digital Instruments.

7.1 Explain the principle of operation of digital instruments.
7.2 Describe the advantages of digital instruments.
7.3 Describe the operation of transistor voltmeter (TVM).
7.4 Describe the operation of ramp type digital voltmeter (DVM).
7.5 Describe the operation of successive approximation digital voltmeter.
7.6 Describe the block diagram of digital multimeter.

8. Understand the principle and operation of oscilloscope.

8.1 State the basic principle of oscilloscope.
8.2 Mention the types of oscilloscope.
8.3 Mention the important features of cathode ray oscilloscope
8.4 Describe the block diagram of oscilloscope.
8.5 Describe the operation of dual trace oscilloscope.
8.6 Describe the operation of digital oscilloscope.

9. Understand LCR & Q- meter.

9.1 State the Principle of LCR meter.
9.2 Draw the block diagram of LCR meter.
9.3 Describe the operation of LCR meter.
9.4 State the Principle of Q- meter.
9.5 Draw the block diagram of Q- meter.
9.6 Describe the operation of Q- meter.

10. Understand Frequency meter

10.1 State the Principle of Frequency meter.
10.2 Draw the block diagram of Frequency meter.
10.3 Describe the operation of Frequency meter

11. Understand Power factor meter & Megger.

11.1 State the Principle of ***Power factor*** meter.
11.2 Draw the block diagram of Power factor meter.
11.3 Describe the operation of Power factor meter.
11.4 State the Principle of ***Megger***.
11.5 Draw the block diagram of ***Megger***.
11.6 Describe the operation of ***Megger.***

12. Understand RX meter, psopho meter & microwave power meter.

12.1 State the Principle of ***RX*** meter.
12.2 Draw the block diagram of ***RX*** meter.
12.3 Describe the operation of ***RX*** meter.
12.4 State the Principle of ***Psopho*** meter.
12.5 Draw the block diagram of ***Psopho*** meter.
12.6 Describe the operation of ***Psopho*** meter.
12.7 State the Principle of ***Microwave power*** meter.
12.8 Draw the block diagram of ***Microwave power*** meter.
12.9 Describe the operation of ***Microwave power*** meter.

PRACTICAL:

1. Study of measuring instruments.

1.1 Select at least eight different measuring instruments.
1.2 Identify the types of given instruments.
1.3 Detect the ranges of instruments.
1.4 Identify the control knobs, terminals, ports & other features.

2. Perform the operation of indicating instruments.

2.1 Select an indicating instrument (Galvanometer).
2.2 Select the necessary tools required.
2.3 Open the meter cover and Dislock circuit from body.
2.4 Identify moving coil, graduation scale plate, deflecting niddle, circuit and battery case.
2.5 Monitor the operation of moving system.
2.6 Disassemble the moving iron parts, controlling and damping section of a moving iron instrument.
2.7 Check the balancing system of the moving parts.
2.8 Assemble the parts as original of both instruments.

3. Perform the operation of ammeter (AC & DC).

3.1 Select ammeters.
3.2 Select the necessary tools required.
3.3 Open the cover of ammeter.
3.4 Disassemble the parts of the meter.
3.5 Identify the parts of the meter.
3.6 Identify the shunt resistances used for meter range.
3.7 Identify the types of meter (AC or DC).
3.8 Assemble the parts as original of both instruments.

4. Study of voltmeter (AC & DC).

4.1 Select voltmeters.
4.2 Select the necessary tools required.
4.3 Open the cover of voltmeter.
4.4 Disassemble the parts of the voltmeter.
4.5 Identify the parts of the meter.
4.6 Identify the multiplier resistances used for meter range.
4.7 Identify the types of meter (AC or DC).
4.8 Assemble the parts as original of both instruments.

5. Perform the operation of analog multimeter.

5.1 Select the multimeter.
5.2 Select the necessary tools required.
5.3 Open the cover of multimeter.
5.4 Disassemble the parts of the multimeter.
5.5 Identify the parts of the meter.
5.6 Identify the different sections of multimeter.
5.7 Assemble the parts as original multimeter.

6. Study of Energy meter.

6.1 Select a single phase energy meter.
6.2 Select the necessary tools required.
6.3 Open the cover of energy meter.
6.4 Disassemble the parts of the energy meter.
6.5 Identify the parts of the meter.
6.6 Identify the different sections of energy meter.
6.7 Assemble the parts as original of energy meter.

7. Study of digital multimeter.

7.1 Select a digital multimeter.
7.2 Select the necessary tools required.
7.3 Open the cover of digital multimeter.
7.4 Disassemble the parts of the digital multimeter.
7.5 Identify the parts of the meter.
7.6 Identify the different sections of digital multimeter.
7.7 Assemble the parts as original digital multimeter.

8. Study of digital multimeter.

8.1 Select a digital multimeter.
8.2 Select the necessary tools required.
8.3 Open the cover of digital multimeter.
8.4 Disassemble the parts of the digital multimeter.
8.5 Identify the parts of the meter.
8.6 Identify the different sections of digital multimeter.
8.7 Assemble the parts as original digital multimeter.

9. Study of Cathode Ray Oscilloscope.

9.1 Select a cathode ray oscilloscope.
9.2 Identify the beam control system.
9.3 Connect the signal probe to oscilloscope input.
9.4 Switch on the power supply of CRO.
9.5 Operate the position control knobs and monitor the HDL on oscillograph.
9.6 Select Volt/div. knob and monitor its operation.
9.7 Select Time/div. knob and monitor its operation.
9.8 Monitor the position of deflection beam in X-Y operation.

10. Study of Power factor meter & Magger.

10.1 Select a power factor meter.
10.2 Select the necessary tools required.
10.3 Open the cover of power factor meter.

10.4 Identify the parts of the meter.
10.5 Select a magger.
10.6 Open the cover of magger.
10.7 Identify the parts of the magger.
10.8 Assemble the power factor meter & magger.

11. Study of Distortion meter & microwave power meter.

11.1 Select a Distortion meter.
11.2 Select the necessary tools required.
11.3 Open the cover of distortion meter.
11.4 Identify the parts of the meter.
11.5 Identify the controlling knobs of distortion meter.
11.6 Select a microwave power meter.
11.7 Identify the controlling knobs of the meter.
11.8 Monitor the result of changing position of controlling knobs.

REFERENCE BOOKS

1. Measurement & Measuring Instruments – Goldings
2. A course in Electrical and electronic measurements and instrumentation – A. K. Sawhrey.
3. A Text Book of Electrical Technology – B.L. Theraja
4. Electric Instrumentation

66853 Advanced Communication Engineering

T	P	C
3	3	4

OBJECTIVES

Upon completion of these contents student will be able to achieve and acquire knowledge, skills and attitude in the area of Advanced Communication Engineering special emphasis on:

- Switching systems.
- Communication system
- Networking devices
- Mobile communication
- Wi-Fi, Wi-Max.

SHORT DESCRIPTION

Switching systems, DSL, ADSL; Optical fiber communication, light source & Detector for optical fiber communication system; Satellite communication, special purpose communication satellite; Network and network switching device; SONET, ATM ,ISDN; Interface standard, Network & networking devices; mobile communication & cellular system; Bluetooth, Wi-Fi .

DETAIL DESCRIPTION

Theory:

1. **Understand Switching System.**
   - 1.1 Mention the elements of switching system.
   - 1.2 State the classification of switching system.
   - 1.3 Describe centralized and distributed SPC switching system.
   - 1.4 Explain the technique of circuit switching, message switching and packet switching.
   - 1.5 Mention the advantages and disadvantages of different types of switching.
2. **Understand Digital Switching System.**
   - 2.1 State digital switching.
   - 2.2 Describe the digital signal encoding.
   - 2.3 Describe space division switching.
   - 2.4 Describe analog time division and digital time division switching.
   - 2.5 Describe STS & TST switching.
3. **Understand Digital Subscriber Line (DSL) Technology**
   - 3.1 State DSL & ADSL.
   - 3.2 State the principle of DSL
   - 3.3 Discuss encoding and modulation in DSL.
   - 3.4 Mention the frequency spectrum of ADSL.
   - 3.5 Describe the topology & frame format for DSL system
   - 3.6 Describe the topology & frame format for ADSL system
   - 3.7 Mention the advantage and disadvantage of DSL & ADSL
4. **Understand the optical fiber communications.**
   - 4.1 Define optic fiber.
   - 4.2 Describe the basic construction of an optic fiber.
   - 4.3 Discuss type of optic fiber.
   - 4.4 Describe the block diagram of an optical fiber communication system.

4.5 Explain propagation of light waves in optical fiber.
4.6 State acceptance angle and numerical aperture of a fiber.
4.7 Mention the advantages and disadvantages of optic fibers.

5. Understand the light sources and detector for optical fiber.

5.1 Describe the structure of LED.
5.2 Explain the method of fiber LED coupling.
5.3 Describe the laser operation.
5.4 Describe the structure of semiconductor laser diode.
5.5 Mention the advantages of semiconductor laser diode.
5.6 Describe the basic principle of photo detectors.
5.7 State the characteristics of photo detector.

6. Understand optical fiber joints, couplers and isolators.

6.1 List the possible misalignment occur during fiber joints
6.2 Mention the constraint for joining fibers.
6.3 Define fiber splice.
6.4 Describe different fiber splices.
6.5 List different type of fiber connectors.
6.6 Describe fiber couplers.
6.7 Describe optical Isolators and circulators

7. Understand the satellite communication system.

7.1 Define satellite.
7.2 Describe the satellite orbits.
7.3 State the classification of satellite.
7.4 Describe the satellite earth station with block diagram.
7.5 State the footprint & location of satellite.
7.6 Describe the block diagram of Transponder.
7.7 Discuss the tracking and ranging system of communication satellites.
7.8 Describe the components of satellite electric power system.

8. Understand the special purpose communication satellite.

8.1 Describe the very small terminals (VSATs).
8.2 Describe the function of international telecommunication satellite (INTERSAT).
8.3 Describe mobile satellite (MSAT) communication system.
8.4 Explain the Global positioning system (GPS).
8.5 Describe the block diagram of a handheld GPS receiver.
8.6 Compare the satellite communication with respect to fiber optic communication.
8.7 Mention the applications of satellite.

9. Understand the data communication network and switching device.

9.1 Define the term network.
9.2 State the types of network.
9.3 Describe Network Addressing.
9.4 Describe the network topologies.
9.5 State the various types of protocols.
9.6 Explain the term Token passing and VOIP.
9.7 Describe MODEM & function of MODEM.
9.8 Describe the function of Hubs.

10. Understand Synchronous Optical Network (SONET) & Synchronous Digital Hierarchy (SDH).

10.1 Define SONET & SDH
10.2 Mention the characteristics of SONET & SDH.
10.3 State SONET Signal Hierarchy.
10.4 Mention SONET components.
10.5 Describe SONET Network and Layers.
10.6 Recognize the SONET Frame Format.
10.7 Describe SONET Multiplexing.
10.8 Explain SONET Topologies.

11. Understand asynchronous & synchronous data transmission.

11.1 Define synchronous and asynchronous transmission.
11.2 Mention the advantages and disadvantages of digital transmission.
11.3 Define ATM technology.
11.4 State the concepts of ATM.
11.5 Mention the Advantages of ATM.
11.6 State ATM Header Structure.
11.7 Describe ATM Layers.

12. Understand the Integrated Services Digital Network (ISDN).

12.1 Define ISDN.
12.2 Mention the ISDN services.
12.3 Mention the advantages of ISDN.
12.4 Describe the ISDN interfaces.
12.5 Describe the ISDN channels.
12.6 Describe the ISDN switching, functional grouping and reference points.

13. Understand Mobile communication.

13.1 State mobile communication.
13.2 Describe Cellular telephone system.
13.3 Describe the basic composition of mobile communication system.
13.4 Explain Cellular telephone system.
13.5 Describe cell splitting, frequency reuse, roaming, and handoff in cellular telephone.
13.6 Mention the channels and bands of different Cellular telephone system.
13.7 Describe the subscriber identification techniques.

14. Understand GSM network.

14.1 Define GSM.
14.2 Describe the architecture of GSM.
14.3 Describe the typical call flow sequence in GSM.
14.4 Describe Short Message Management Protocol.
14.5 Describe the block diagram of a mobile phone hand set.
14.6 State characteristics of smart phone
14.7 Describe Bluetooth, Wi-MAX ,Wi-Fi & WAP.

15. Understand Network & Submarine cable.

15.1 Define STP & UTP cables.
15.2 State the characteristics of STP & UTP cables.
15.3 Define submarine cable.
15.4 Describe the construction of submarine cable.
15.5 Classify submarine cable.
15.6 Advantages of submarine cable for DATA communication.

PRACTICAL:

1. **Study of fiber optic cable.**
   - 1.1 Collect a Piece of fiber optic cable.
   - 1.2 Find different section of fiber optic cable.
   - 1.3 Find the layers of optical fiber.
   - 1.4 Draw different section of fiber optic cable
2. **Study of optical fiber.**
   - 2.1 Collect Fiber Optic Trainer.
   - 2.2 Connect optic fiber with source & detector.
   - 2.3 Switch on the Fiber Optic Trainer.
   - 2.4 Monitor the signal transmission (Light Beam) through fiber.
3. **Study the characteristics of optical fiber.**
   - 3.1 Collect Fiber Optic Trainer.
   - 3.2 Connect optic fiber with source & detector.
   - 3.3 Switch on the Fiber Optic Trainer.
   - 3.4 Calculate numerical aperture of optical fiber.
   - 3.5 Calculate critical angle of optical fiber.
4. **Study of optical fiber joint.**
   - 4.1 Collect two pieces of optic fiber.
   - 4.2 Collect Splices machine.
   - 4.3 Insert the optic fibers to the splices machine.
   - 4.4 Make joint.
   - 4.5 Test the continuity of joint fiber.
5. **Test the operation of Hub & Router.**
   - 5.1 Collect Hub & Router.
   - 5.2 Connect Hub & Router with Network.
   - 5.3 Configure PC with Hub & Router.
   - 5.4 Monitoring signal.
6. **Study of UTP & STP cables and connectors.**
   - 6.1 Collect required tools, tester & materials.
   - 6.2 Identify colour & colour selection for desire connection.
   - 6.3 Make sure the matching of connector pins with respective color of cables.
   - 6.4 Prepare the connection.
   - 6.5 Test the connection.
7. **Perform connection between UTP cable & RJ 45 connectors.**
   - 7.1 Collect required tools, tester & materials.
   - 7.2 Prepare the cable for straight through connection.
   - 7.3 Make the connection.
   - 7.4 Prepare the cable for cross over connection
   - 7.5 Make the connection
   - 7.6 Test the connections.
8. **Set up a LAN.**
   - 8.1 Collect Server & PC, Hub, UTP cables & connectors,
   - 8.2 Collect Tools & Cable tester.
   - 8.3 Collect network operating system software.
   - 8.4 Connect hardware's.

8.5 Install necessary software.

8.6 Configure Server & PC

8.7 Test the functioning of networking

9. Perform DSL connection.

9.1 Collect necessary tools & equipments.

9.2 Make connection between existing LAN or desired PC with DSL/ADSL modem.

9.3 Configure the connections.

9.4 Test the connection.

9.5 Monitor the operation.

10. Study cellular communication.

10.1 Collect Cellular communication trainer,

10.2 Collect Tools & accessories.

10.3 Insert SIMs into the trainer.

10.4 Complete connections.

10.5 Dial recepant SIM number.

10.6 Listen ring tone to the receiver end.

10.7 Start conversation.

10.8 Close the connection.

REFERENCE BOOKS

1. Telecommunication Switching and Networks - P. Gnanasivam
2. Data Communication and Networking - Behrouz A. Forouzan
3. Principles of Communications Satellites. - Gray D. Gordon and Walter L. Morgan.
4. Mobile and Personal Communication Systems and Services. - Raj Panday
5. Optical fiber communication principles and practice - John M. Senior.

66854 Advanced Digital Electronics

T	P	C
3	3	4

OBJECTIVES

Upon completion of this content student will be able to achieve and acquire knowledge, skills and attitude in the area of Advanced Digital Electronics special emphasis on:

- Timers, counters & shift registers and their applications.
- Semiconductor memories.
- ALU & CU.
- A/D and D/A converters.
- Programmable logic arrays and programmable array logic
- PLD & simple computer (SAP-1 & SAP-2)

SHORT DESCRIPTION

Digital timers, counters & shift registers: Semiconductor memory & Memory organization, memory Read/Write Operation: ALU & CU: A/D & D/A Conversion system: PLA & PAL system: PLD operations, SAP-1 & SAP-2.

DETAIL DESCRIPTION

Theory:

1. **Understand different type of flip-flops**
   - 1.1. Explain the operation of basic SR latch, D flip-flop, clocked flip-flop, J-K flip-flop, Toggle operation & J-K master-slave flip-flop.
   - 1.2. State the concept of positive & negative edge triggering and level triggering.
   - 1.3. Describe the pin diagram of commonly used flip-flop IC's.
2. **Understand Timer, Registers and their application.**
   - 2.1. Define timer & clock generator.
   - 2.2. Describe the operation of 555 timer circuit.
   - 2.3. Define data shift register.
   - 2.4. Mention different types of shift registers.
   - 2.5. List the different types of common shift register IC chips.
   - 2.6. Describe the operation of buffer register.
   - 2.7. Explain the basic principle of operation of SISO, SIPO, PISO & PIPO shift register.
   - 2.8. Describe the operation of shift left, shift right and universal shift registers.
   - 2.9. Mention the use of shift registers.
3. **Understand Counters and their application.**
   - 3.1. Define binary counter.
   - 3.2. State the difference between asynchronous and synchronous operation.
   - 3.3. Describe the operation of a binary up - down counter.
   - 3.4. State the modulus of a counter.
   - 3.5. Describe the principle of MOD counter & divide - by- n counter.
   - 3.6. Describe the operation of decade counter.
   - 3.7. State the principle of ring & Johnson counter.
   - 3.8. State the application of different types of counters.
4. **Understand semiconductor memories.**
   - 4.1. List the type of memories.
   - 4.2. Describe the principle of serial and parallel access memory.
   - 4.3. Explain the internal organization of semiconductor memory.
   - 4.4. Describe the technique of memory addressing.

4.5. Explain the read and write operation of semiconductor memory.
4.6. Explain the principle of operation of static and dynamic RAM.
4.7. Describe the principle and operation of ROM, PROM, EPROM and EEPROM.
4.8. List the application of some commercial memory ICs.

5. Understand arithmetic logic circuit.

5.1. Mention the basic principle of ALU.
5.2. List the application of ALU.
5.3. Identify some commercial ALU chips.
5.4. Mention the principle of digital comparators.
5.5. Mention the principle of binary rate multiplier with block diagram.
5.6. List the application of digital comparators.
5.7. Identify some commercial comparators and binary rate multiplier ICS.

6. Understand D/A converter.

6.1. Mention the principle of level conversion.
6.2. Describe the principle of D/A conversion.
6.3. Mention the types of D/A converter.
6.4. Explain the operation of a binary weighted D/A and R-2R ladder D/A converter.
6.5. State the terms – resolution, percentage of resolution, accuracy, Offset error and settling time as specification of D/A converter.
6.6. State the application field of D/A converter.
6.7. List the application of popular D/A converter ICS.

7. Understand A/D converter.

7.1. State the principle of A/D conversion.
7.2. List the type of A/D converter.
7.3. State the working principle of 3-bit parallel A/D converter.
7.4. Describe the operation of Digital Ramp A/D converter
7.5. Explain the principle of operation of successive approximation, dual slope and Flash A/D converter.
7.6. State the terms – resolution, accuracy, and conversion time as specification of A/D converter.
7.7. List the applications of popular A/D converter ICS.
7.8. Describe the operation of sample & hold circuits and its application.

8. Understand the programmable logic arrays.

8.1. Define logic array.
8.2. State the principle of AND array & OR array.
8.3. Calculate Boolean calculation of Logic arrays.
8.4. Define PLA, PAL and GAL.
8.5. Discuss simplified logic diagram of PLA, PAL and GAL.
8.6. Describe the architecture of two input PLA, PAL and GAL.
8.7. State the basic feature of FPGA.

9. Understand the programmable logic devices.

9.1. Defines PLD.
9.2. State the advantages of PLD.
9.3. Describe the principle of PLD.
9.4. Describe the programming process of SPDL**.**
9.5. Describe the complex programmable logic device (CPDL).
9.6. Interpret standard PAL and GAL numbering.

10. Understand the organization of a SAP-1

10.1. State the meaning of SAP.
10.2. State the function of each stage of SAP-1 with block diagram.

10.3. State the function of control signals i.e. Enable, Load, Clock and Clear of each register IC.

10.4. State the instruction for accessing and storing data in RAM of SAP-1.

10.5. Describe the bus organization of SAP- 1.

11. Understand the Micro and Macro Instruction of SAP-1

11.1. Describe the function of controller sequencer.

11.2. State the control word/micro instruction of controller sequencer.

11.3. State the meaning of macro instructions and their corresponding Binary op-code used in SAP-1

11.4. State the concept of machine cycle, fetch cycle, execution cycle and Instruction cycle

11.5. Describe the fetching steps of micro instruction in different T states of SAP-1.

11.6. Describe the execution steps of micro instruction in different T states of SAP-1.

12. Understand the Organization & Instruction of SAP-2

12.1. State the function of each stage of SAP-2 with block diagram.

12.2. State the instruction for accessing and storing data in RAM of SAP-2.

12.3. State the meaning of macro instructions and their corresponding binary op-code used in SAP-2.

12.4. Describe the fetching steps of micro instruction in different T states of SAP-2.

12.5. Describe the execution steps of micro instruction in different T states of SAP-2.

PRACTICAL:

1. Verify the operation of Timer & Shift register.

1.1 Select 555 timer IC.

1.2 Connect 555 timers as a clock generator.

1.3 Observe the wave form in oscilloscope.

1.4 Select a SIPO shift register IC.

1.5 Connect the SIPO shift register circuits on Digital Trainer Board.

1.6 Apply clock input pulse to the circuit and observe the operation.

1.7 Select a PISO shift register IC.

1.8 Connect the PISO shift register circuits on Digital Trainer Board.

1.9 Apply clock input pulse to the circuit and observe the operation.

2. Verify the operation of Binary counter.

2.1 Select 4-Bit ripple counter IC.

2.2 Connect the Up/Down ripple counter circuit on Digital Trainer Board

2.3 Apply clock input pulse to the circuit and observe the operation of up-counting and down counting.

2.4 Select MOD-10 counter IC.

2.5 Connect the Decade counter circuit on Digital Trainer Board

2.6 Apply clock input pulse to the circuit and observe the Decade operation.

3. Verify the operation of a EPROM .

3.1 Select a EPROM IC.

3.2 Connect EPROM on EPROM Programmer

3.3 Apply input data and clock pulse to the circuit.

3.4 Observe the operation of the circuit and stored memory data in to the **EPROM**.

4. Verify the operation of an Arithmetic Logic Unit (ALU).

4.1 Select a ALU IC.

4.2 Connect ALU circuit on Digital Trainer Board.

4.3 Apply input data and clock pulses to the different input of the circuit.

4.4 Observe the operation of the circuit and detect the output result of ALU.

5. Verify the operation of D/A converter.

5.1 Select a D/A converter IC.

5.2 Connect a ladder R/2R D/A converter circuit on Digital Trainer Board.

5.3 Apply input data and clock pulses to the different input of the circuit.

5.4 Obserb the operation of the circuit and detect the output result of D/A converter.

6. Verify the operation of A/D converter.

6.1 Select an A/D converter IC.

6.2 Connect a 3-bit parallel A/D converter circuit on Digital Trainer Board.

6.3 Apply input data and clock pulses to the different input of the circuit.

6.4 Observe the operation of the circuit and detect the output result of A/D converter.

7. Show the operation of a dual slope A/D converter.

7.1 Select an A/D converter IC.

7.2 Connect a dual slope A/D converter circuit on Digital Trainer Board.

7.3 Apply input data and clock pulses to the different input of the circuit.

7.4 Observe the operation of the circuit and detect the output result of dual slope A/D converter.

8. Show the operation of Programmable Logic Device (PLD).

8.1 Select appropriate PLD IC.

8.2 Connect PLD Operational circuit on Trainer Board.

8.3 Apply input data and clock pulses to the different input of the circuit.

8.4 Observe the operation of the circuit and detect the output result PLD.

9. Show the operation of CPLD.

9.1 Select appropriate CPLD IC.

9.2 Connect CPLD Operational circuit on Trainer Board.

9.3 Apply input data and clock pulses to the different input of the circuit.

9.4 Observe the operation of the circuit and detect the output result CPLD.

10. Verify the operation of SAP-1.

10.1 Select appropriate components /Simulation software for SAP-1.

10.2 Build a SAP-1 or start simulation software

10.3 Enter a program in SAP-1/Simulation software

10.4 Observe the output of SAP-1/Simulation software

11. Verify the operation of SAP-2.

11.1 Select appropriate components /Simulation software for SAP-2.

11.2 Build a SAP-2 or start simulation software

11.3 Enter a program in SAP-2/Simulation software

11.4 Observe the output of SAP-1/Simulation software

REFERENCE BOOKS

1. Digital principles and application - A P Malvino
2. Digital Computer Electronics - A P Malvino
3. Digital System - Tocci
4. Modern Digital Electronics - R. P. Jain
5. Digital Fundamentals - FLOYD

66855 Electronic Servicing-II

T	P	C
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OBJECTIVES

Upon completion of these content student will be able to achieve and acquire knowledge, skills and attitude in the area of Electronic Servicing-2 special emphasis on:

- Safety precautions and electronics workshop safety regulations.
- Identify the tools , measuring and testing instruments used in servicing.
- Security system.
- Color TV, LCD & LED TV.
- Multimedia projector, Washing machine.
- Video Camera.
- Photo Copier.
- Telephone Set.
- Microcomputer.
- ECG & USG machine.

SHORT DESCRIPTION

Safety and precautions, Identify tools, tester, equipment**,** Security system, Color TV, LCD & LED TV, Multimedia projector, washing machine, Video Camera, Photo Copier, Digital Telephone Set, Mobile phone set, microcomputer, ECG and USG machine.

DETAIL DESCRIPTION

Practical:

1. Apply safety and precautions.

1.1. List the safety precautions.
1.2. List the workshop safety regulations.
1.3. Learn about Electrical & Electronics equipment safety policy.

2. Identify the tools, tester, equipment and instruments for servicing.

2.1. Collect different tools and instruments.
2.2. Categories the tools and instruments.
2.3. Draw the pictures of required tools & instruments and labeling the major features.
2.4. Operate the required tools and instruments.

3. Perform repairing and maintenance of a security system.

3.1. Select necessary tools, tester and instrument.
3.2. Examine the physical condition of the system.
3.3. Identify the symptoms.
3.4. Measure voltage or signals on specified test point.
3.5. Identify the faulty components.
3.6. Replace the faulty components.
3.7. Test the functioning.

4. Perform repairing and maintenance of a colour TV.

4.1. Select the proper tools, instruments, equipment and manuals.
4.2. Inspect the physical condition of the color TV.

4.3. Identify the symptoms and write the possible causes of the symptoms.
4.4. Unscrew and remove the cover of the color TV.
4.5. Locate the probable faulty sections.
4.6. Check or test the possible causes sequentially.
4.7. Identify the faulty section/components.
4.8. Replace the faulty components.
4.9. Test the functioning.

5. Perform repairing and maintenance of a LCD TV.

5.1. Select the proper tools, instruments, equipment and manuals.
5.2. Inspect the physical condition of the LCD TV.
5.3. Identify the symptoms and write the possible causes of the symptoms.
5.4. Unscrew and remove the cover of the LCD TV.
5.5. Locate the probable faulty sections.
5.6. Check or test the possible causes sequentially.
5.7. Identify the faulty section/components.
5.8. Replace the faulty components.
5.9. Test the functioning.

6. Perform repairing and maintenance of a LED TV.

6.1. Select the proper tools, instruments, equipment and manuals.
6.2. Inspect the physical condition of the LED TV.
6.3. Identify the symptoms and write the possible causes of the symptoms.
6.4. Unscrew and remove the cover of the LED TV.
6.5. Locate the probable faulty sections.
6.6. Check or test the possible causes sequentially.
6.7. Identify the faulty section/components.
6.8. Replace the faulty components.
6.9. Test the functioning.

7. Perform repairing and maintenance of a Multimedia Projector.

7.1. Select the proper tools, instruments, equipment and manuals.
7.2. Inspect the physical condition of the Multimedia Projector.
7.3. Identify the symptoms and write the possible causes of the symptoms.
7.4. Unscrew and remove the cover of the Multimedia Projector.
7.5. Locate the probable faulty sections.
7.6. Check or test the possible causes sequentially.
7.7. Identify the faulty section/components.
7.8. Replace the faulty components.
7.9. Test the functioning.

8. Perform repairing and maintenance of a washing machine.

8.1. Select the proper tools, instruments, equipment and manuals.
8.2. Inspect the physical condition of the washing machine.
8.3. Identify the symptoms and write the possible causes of the symptoms.
8.4. Unscrew and remove the cover of the washing machine.
8.5. Locate the probable faulty sections.
8.6. Check or test the possible causes sequentially.
8.7. Identify the faulty section/components.

8.8. Replace the faulty components.
8.9. Test the functioning.

9. Perform repairing and maintenance of a Video Camera.

9.1. Select the proper tools, instruments, equipment and manuals.
9.2. Inspect the physical condition of the Video Camera.
9.3. Identify the symptoms and write the possible causes of the symptoms.
9.4. Unscrew and remove the cover of the Video Camera.
9.5. Locate the probable faulty sections.
9.6. Check or test the possible causes sequentially.
9.7. Identify the faulty section/components.
9.8. Replace the faulty components.
9.9. Test the functioning.

10. Perform repairing and maintenance of a Photo Copier.

10.1. Select the proper tools, instruments, equipment and manuals.
10.2. Inspect the physical condition of the Photo Copier.
10.3. Identify the symptoms and write the possible causes of the symptoms.
10.4. Unscrew and remove the cover of the Photo Copier.
10.5. Check the drum
10.6. Locate the probable faulty sections.
10.7. Check or test the possible causes sequentially.
10.8. Identify the faulty section/components.
10.9. Replace the faulty components.
10.10. Test the functioning.

11. Perform repairing and maintenance of a Digital Telephone set.

11.1. Select the proper tools, instruments, equipment and manuals.
11.2. Inspect the physical condition of the Digital Telephone set.
11.3. Identify the symptoms and write the possible causes of the symptoms.
11.4. Unscrew and remove the cover of the Digital Telephone set.
11.5. Locate the probable faulty sections.
11.6. Check or test the possible causes sequentially.
11.7. Identify the faulty section/components.
11.8. Replace the faulty components.
11.9. Test the functioning.

12. Perform repairing and maintenance of a Mobile phone set.

12.1. Select the proper tools, instruments, equipment and manuals.
12.2. Inspect the physical condition of the Mobile phone set.
12.3. Identify the symptoms and write the possible causes of the symptoms.
12.4. Unscrew and remove the cover of the Mobile phone set.
12.5. Locate the probable faulty sections.
12.6. Check or test the possible causes sequentially.
12.7. Identify the faulty section/components.
12.8. Replace the faulty components.
12.9. Test the functioning.

13. Perform repairing and maintenance of a microcomputer.

13.1. Select the proper tools, instruments, equipment and manuals.
13.2. Inspect the physical condition of the microcomputer.
13.3. Identify the symptoms and write the possible causes of the symptoms.
13.4. Unscrew and remove the cover of the microcomputer.
13.5. Locate the probable faulty sections.
13.6. Check or test the possible causes sequentially.
13.7. Identify the faulty section/components.
13.8. Replace the faulty components.
13.9. Test the functioning.

14. Perform repairing and maintenance of an ECG machine.

14.1. Select the proper tools, instruments, equipment and manuals.
14.2. Inspect the physical condition of the ECG machine.
14.3. Identify the symptoms and write the possible causes of the symptoms.
14.4. Unscrew and remove the cover of the ECG machine.
14.5. Locate the probable faulty sections.
14.6. Check or test the possible causes sequentially.
14.7. Identify the faulty section/components.
14.8. Replace the faulty components.
14.9. Test the functioning.

15. Perform repairing and maintenance of a USG machine.

15.1. Select the proper tools, instruments, equipment and manuals.
15.2. Inspect the physical condition of the USG machine.
15.3. Identify the symptoms and write the possible causes of the symptoms.
15.4. Unscrew and remove the cover of the USG machine.
15.5. Locate the probable faulty sections.
15.6. Check or test the possible causes sequentially.
15.7. Identify the faulty section/components.
15.8. Replace the faulty components.
15.9. Test the functioning.

REFERENCE REPAIR & SERVICE MANUALS

1. How to be a successful Electronic Repair by Jestine Yong.
2. Electronic Repair guide,com
3. A shorted Repaired Model Universal Uni-2040.
4. Repairing Guides by Kent.
5. Sumsung TV & Mobile servicing guide.

69054 Environmental Studies

T	P	C
2	0	2

AIMS

- To be able to understand the basic concepts of environment and environmental pollution.
- To be able to understand the concepts of ecology and ecosystems
- To be able to understand the basic concepts of environmental degradation relating to industrial production.
- To be able to understand the major environmental issues and problems.
- To be able to understand legislative measures to protect environment.

SHORT DESCRIPTION

Basic concepts of environment; natural resources; biogeochemical cycling; ecology and ecosystem; air; water; soil; solid waste management; development and environment; global environmental challenges; legislative protection of environment.

DETAIL DESCRIPTION

1. Understand the multidisciplinary nature of environmental studies.

1.1. Define environment, nature, pollution, pollutant, contaminant.
1.2. Describe the scope of environmental studies.
1.3. Describe the importance of environmental studies.
1.4. Describe the formation and structure of the Earth.
1.5. Describe the earth's natural system.
1.6. Describe the changing attitudes to the natural world.
1.7. Mention the main components of environment.
1.8. Define natural and man-made environment.
1.9. Distinguish between natural and man-made environment.

2. Understand the natural resources.

2.1. Define natural resources.
2.2. Classify natural resources.
2.3. Describe forest resources.
2.4. Describe water resources.
2.5. Describe mineral resources.
2.6. Describe food resources.
2.7. Describe energy resources.
2.8. Describe land resources.
2.9. Describe environmental problem relating to resources use.
2.10. Describe the role of an individual in conservation of natural resources.

3. Understand the biogeochemical cycling.

3.1. Define biogeochemical cycle.
3.2. Describe hydrologic cycle.
3.3. Describe carbon cycle.
3.4. Describe nitrogen cycle.
3.5. Describe oxygen cycle.

3.6. Describe phosphorus cycle.
3.7. Describe sulfur cycle.
3.8. Describe nutrient cycle.

4. Understand the ecology and ecosystem.

4.1. Define ecology and ecosystem.
4.2. Structure and function of an ecosystem.
4.3. Describe the components of ecosystem.
4.4. Explain the stability of ecosystem.
4.5. Describe ecological factors.
4.6. Describe interdependency between abiotic and biotic component.
4.7. Describe the meaning of following terms: species, population, community, ecological succession, community periodicity, climax community, ecological niche, habitat, plankton, nekton, ecological indicator, evolution, adaptation, producers, consumers, decomposers, food chains, food webs, ecological pyramids, bio-concentration, bio-magnification, biodiversity, threatened species, endanger species, extinct species, exotic species, biodiversity conservation and biogeography.
4.8. Describe energy flow in the ecosystem.
4.9. Describe the ecosystem of pond, ocean, estuary, grassland, cropland, forest, desert and mangrove.

5. Understand the air as a component of environment.

5.1. Define air.
5.2. Describe the composition of the clean dry atmospheric air at ground level.
5.3. Describe the atmospheric structure.
5.4. Define air pollution.
5.5. Describe major air pollutants and their impacts.
5.6. Describe the sources of air pollutants.
5.7. Explain the formation of photochemical smog and its effects.
5.8. Describe the effects of air pollution on vegetation, animal, human health and materials and resources.
5.9. Define sound and noise.
5.10. Describe the classification of sound.
5.11. Describe the effects of noise.

6. Understand the water as a component of environment.

6.1. Define water.
6.2. Describe the characteristics of water.
6.3. Describe the sources of water.
6.4. Describe the uses of water.
6.5. Explain that the water is a universal solvent.
6.6. Define water pollution, biological oxygen demand (BOD), effluent treatment plant (ETP).
6.7. Describe the sources of water pollution.
6.8. Describe the effects of water pollution.

7. Understand the soil as a component of environment.

7.1. Define soil.
7.2. Describe the constituents of soil.
7.3. Define soil pollution.
7.4. Describe causes soil degradation.
7.5. Describe the sources of soil pollution.
7.6. Describe the effects of soil pollution.

8. Understand the concept of solid waste management.

8.1. Define solid waste, refuse, garbage, rubbish, trashes, demolition and construction waste, e-waste, agricultural waste, pathological waste, radioactive waste, hazardous waste, 3R, 4R.
8.2. List the sources of solid waste.
8.3. Mention the classification of solid waste.
8.4. Mention the methods of collection of solid waste.
8.5. Describe the recycling of solid wastes.
8.6. Describe resource recovery from solid waste.
8.7. Describe the potential method of disposal of solid waste.
8.8. Describe control measures of urban and industrial wastes.

9. Understand the development and environment.

9.1. Define environmental ethics and environmental stress.
9.2. Describe environmental stress.
9.3. Define sustainable development.
9.4. Define urbanization.
9.5. Describe the causes of urbanization.
9.6. Describe the effects of urbanization on environment.
9.7. Define industrialization.
9.8. Describe the causes of industrialization.
9.9. Describe the effects of industrialization on environment.

10. Understand the global environmental challenges.

10.1. Define greenhouse gas and greenhouse effects.
10.2. Make a list of greenhouse gases and their contribution on greenhouse effects.
10.3. Describe the causes and consequences of greenhouse effects.
10.4. Describe acid rain.
10.5. Describe importance of ozone layer.
10.6. Define ozone depleting substances (ODS).
10.7. Describe ozone layer depletion mechanism.
10.8. Describe hazardous waste.
10.9. Describe chemicals pesticides.
10.10. Describe radioactive pollution.
10.11. Describe natural disaster.

11. Understand the legislative protection of environment.

11.1. Define environmental impact assessment (EIA) and environmental auditing (EA).

11.2. Mention environmental act and legislations prescribed for air, noise, water, soil and wild life protection.

11.3. Describe environmental conservation act 1995 in Bangladesh.

11.4. Describe the environment conservation rule 1997 in Bangladesh.

11.5. Describe the environmental framework in Bangladesh.

11.6. Describe The Montreal Protocol and The Kyoto Protocol.

11.7. Describe role of an individual in prevention of pollution.

REFERENCES:

1. Fundamentals of Environmental Studies, Mahua Basu and S. Xavier, Cambridge.
2. Ecology and Environment, P.D. Sharma, Rastogi Publications.
3. Basics of Environmental Science, Michael Allaby, Routledge.
4. Environmental Science, Jonathan Turk and Amos Turk, Sauders golden sunburst series.

65851 Accounting Theory & Practice

T	P	C
2	3	3

AIMS

- To be able to understand the principles and practices of book keeping and accounting.
- To be able to understand the procedures of general accounting, financial accounting and their applications.
- To be able to understand the concept of income tax , VAT & Public works accounts.

Course Outlines

Concept of book keeping and accounting; Transactions; Entry systems; Accounts; Journal; Ledger; Cash book; Trial balance; Final accounts; Cost account & financial accounting; Income Tax; Public works accounts.

DESCRIPTION;

Theory

1. Concept of book keeping and accounting.

1.1 Define book keeping and accountancy.
1.2 State the objectives & of book keeping.
1.3 State the advantages of book keeping.
1.4 Differentiate between book keeping and accounting.
1.5 State the necessity and scope of book keeping and accounting.

2. Transactions Analysis.

2.1 Define transactions and business transaction.
2.2 Describe the characteristics of transaction.
2.3 Discuss the classification of transaction.

3. Entry system of Accounting.

3.1 State the aspects of transactions.
3.2 Define single & double entry system ..
3.3 Discuss the principles of double entry system.
3.4 Distinguish between single entry and double entry system of book keeping.
3.5 Justify whether double entry system is an improvement over the single entry system.

4. Classification of accounts.

4.1 Define accounts.
4.2 State the objectives of accounts.
4.3 Illustrate different type of accounts with example.
4.4 Define “Golden rules of Book keeping”.
4.5 State the rules for “Debit” and “Credit” in each class of accounts.
4.6 Define accounting cycle.

5. Journal.

5.1 Define Journal.
5.2 State the functions of Journal.
5.3 Mention the various names of Journal.
5.4 Interpret the form of Journal.

6. Ledger.

6.1 Define ledger.
6.2 Interpret the form of ledger.
6.3 State the functions of ledger.
6.4 Distinguish between Journal and Ledger.
6.5 Explain why ledger is called the king of all books of accounts.
6.6 Explain the following terms: Balance, Balancing; Debit balance; credit balance.

7. Cash book & Its Classification.

7.1 Define cash book.
7.2 Classification of cash book.
7.3 Explain cash book as both Journal and Ledger.
7.4 Define discount.
7.5 Explain the different types of discount.

8. Trial balance.

8.1 Define trial balance.
8.2 State the object of a trial balance.
8.3 Discuss the methods of preparation of a trial balance.
8.4 Explain the limitations of a trial balance.
8.5 Prepare trial balance from given ledger balance. (practical)

9. Final accounts.

9.1 State the components of final account.
9.2 Distinguish between trial balance and balance sheet.
9.3 Select the items to be posted in the trading account, profit & loss account and the balance sheet.
9.4 State the adjustment to be made from the given information below or above the trial balance.
9.5 Explain the following terms: revenue expenditure; capital expenditure; depreciation; annuity method demnishing balance method, machine hour method

10. Cost and financial accounting.

10.1 Define financial accounting.
10.2 State the objectives of financial accounting.
10.3 Define cost accounting.
10.4 State the elements of direct cost and indirect cost.
10.5 Discuss the capital budgeting
10.6 Explain the following terms:
a. Fixed cost b. Variable cost c. Factory cost d. Overhead cost e. Process cost
f. Direct cost g. Operating cost h. Standard cost

11. Income Tax

11.1 Define Income Tax.
11.2 State the objects of Income Tax.
11.3 Classification of assesses.
11.4 Taxable income of assesses.
11.5 Tax rebate.
11.6 Explain the following terms: Income tax year; assessment year, NBR.

12. Public works accounts.

12.1 State the important aspects of public works accounts.

12.2 Describe the main features of public works accounts.

12.3 Define Value Added Tex (VAT)

12.4 State the merits and demerits of VAT.

12.5 Explain the following terms : Revenue ; Grant ; Bill; Voucher.

PRACTICAL

1. Identify the transaction from given statements stating reasons.
2. Determine Debtor (Dr) and Creditor (Cr.) from given transactions applying golden rules.
3. Journalize from given transactions.
4. Prepare ledger from given transactions.
5. Prepare double column cash book from given transactions showing balances.
6. Prepare triple column cash book from given transaction and find out the balances.
7. Prepare analytical and imprest system of cash book.
8. Prepare trial balance from the given ledger balance.
9. Prepare trading account, profit & loss account and balance sheet from the given trial balance & other information.
10. Prepare cost sheet showing prime cost, factory cost, cost of production, total cost and selling price.

REFERENCE BOOKS

1. Book-keeping & Accounting - Prof. Gazi Abdus Salam
2. Principles of Accounting - Hafiz uddin
3. Cost Accounting - Prof. Asimuddin Mondol
৪. হিসাবরক্ষণ ও হিসাববিজ্ঞান - পরেশ মন্ডল
৫. উচ্চ মাধ্যমিক হিসাববিজ্ঞান - হক ও হোসাইন
৬. আয়কর - ড. মনজুর মোরশেদ