



BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM
SYLLABUS (PROBIDHAN-2016)

AUTOMOBILE TECHNOLOGY

TECHNOLOGY CODE: **662**

3rd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

AUTOMOBILE TECHNOLOGY (662)

3rd 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	66231	Automotive Engine System -2	2	3	3	40	60	25	25	150
2	66822	Electronic Engineering Fundamentals	2	3	3	40	60	25	25	150
3	66611	Computer Application	0	6	2	0	0	50	50	100
4	65931	Mathematics -3	3	3	4	60	90	50	0	200
5	65922	Physics -2	3	3	4	60	90	25	25	200
6	65722	Communicative English	1	3	2	20	30	50	0	100
Total			11	21	18	220	330	225	125	900

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of automobile engines and their systems with special emphasis on:

- Valves & valve train
- Valve timing
- Cooling systems
- Lubricating systems
- Intake systems
- Exhaust systems

SHORT DESCRIPTION

Valves and valve trains; Valve timing and valve timing diagrams; Cooling systems; Cooling system components; Servicing of cooling systems; Lubricating systems; Lubricating system components; Servicing of lubricating systems; Intake system; Intake system components; Exhaust system; Exhaust system components, combustion phenomena.

DETAIL DESCRIPTION**THEORY:****1. Understand the features of valves.**

- 1.1 Mention the purpose of engine valves.
- 1.2 Identify different types of engine valves.
- 1.3 Describe the construction of mushroom type IC engine valves of different types.
- 1.4 Draw poppet mushroom type engine valve and show the parts.

2. Understand the features of valve trains.

- 2.1 State the meaning of the valve train.
- 2.2 Describe the operation of camshaft in block with push rod valve train (Conventional type).
- 2.3 Describe the operation of tappets or rocker arm valve train for single overhead camshaft (SOHC) engine.
- 2.4 Describe the operation of the valve train with bucket tappet for double overhead camshaft (DOHC) engine.
- 2.5 Identify the various types of valve arrangement in IC engines (I-head, L-head, T-head, F-head, etc).
- 2.6 Mention the purpose of tappet clearance.
- 2.7 Describe the construction of hydraulic valve lifters.
- 2.8 Describe the operation of hydraulic valve lifters.
- 2.9 Mention the advantages of hydraulic valve lifter.

3. Understand the aspects of valve timing.

- 3.1 State the meaning of valve timing.
- 3.2 Outline the importance of valve timing.
- 3.3 Mention the mechanical and dynamic factors affecting the valve timing.
- 3.4 State the meaning of variable valve timing intelligent (VVTI).
- 3.5 Mention the advantages of VVTI.

4. Understand the aspects of valve timing diagrams.

- 4.1 State the meaning of the valve timing diagram.
- 4.2 Draw the valve timing diagram for the 4-stroke SI engines.
- 4.3 Explain the valve timing diagram for the 4-stroke SI engines.
- 4.4 Explain the relation between valve timing diagram of 4-stroke petrol engine and pressure volume diagram.
- 4.5 Draw the valve timing diagram of a typical 4-stroke CI engine.
- 4.6 Explain valve timing diagram for a typical 4-stroke CI engine.

5. Understand the aspects of engine cooling system.

- 5.1 Define the engine operating temperature.
- 5.2 Mention the necessity of engine cooling.

- 5.3 Mention the functions of engine cooling system.
- 5.4 Identify the different type of engine cooling systems.
- 5.5 List the advantages and disadvantages of different engine cooling systems.

6. Understand the future of various engine cooling systems.

- 6.1 Explain the direct air cooling system.
- 6.2 Mention the factors those affect the air cooling system.
- 6.3 Describe the construction & operation of pump assisted water /liquid cooling system.
- 6.4 Describe the construction & operation of thermo-syphon type water cooling system.
- 6.5 Describe the construction & operation of steam cooling (evaporative cooling) system.

7. Understand the features of water pump.

- 7.1 Mention the functions of water pump.
- 7.2 Describe the construction of water pumps.
- 7.3 Describe the operation of the water pump.
- 7.4 Mention the faults of water pump & their remedies.

8. Understand the features of cooling fan.

- 8.1 Mention the functions of cooling fan.
- 8.2 Describe the construction of cooling fan.
- 8.3 Describe the operation of cooling fan.
- 8.4 Describe the construction advantages of using electric motor cooling fan.
- 8.5 Describe the operation of electric motor cooling fan with circuit diagram.

9. Understand the features of the radiator.

- 9.1 Mention the functions of radiator.
- 9.2 Identify the types of radiator.
- 9.3 Describe the construction of radiators.
- 9.4 Describe the operation of radiators.
- 9.5 Mention the functions of coolant expansion tank.
- 9.6 Explain the necessity of the uses of antifreeze solution.
- 9.7 List the antifreeze solution used in automobile.

10. Understand the features of thermostat valve.

- 10.1 Mention the functions of thermostat valve.
- 10.2 Identify the types of thermostat valve.
- 10.3 Describe the construction of thermostat valve.
- 10.4 Describe the operation of thermostat valve.
- 10.5 Explain the bypass passage controlled by thermostat valve.
- 10.6 Explain the role of thermostat valve in case of fuel consumption.

11. Understand the features of radiator pressure cap.

- 11.1 Mention the functions of radiator pressure cap.
- 11.2 Explain the importance of radiator pressure cap.
- 11.3 Describe the construction of radiator pressure cap.
- 11.4 Describe the operation of radiator pressure cap.

12. Understand the servicing of cooling systems.

- 12.1 Identify the common faults of cooling system.
- 12.2 Outline the purpose of cooling system servicing.
- 12.3 List Describe the radiator servicing procedure.
- 12.4 Describe the process of cleaning water jackets.
- 12.5 List Describe the servicing procedure of water pump.
- 12.6 Mention the causes and remedies of engine overheating.
- 12.7 Mention the troubleshooting procedure of engine cooling system.
- 12.8 Identify the problems due to freezing of cooling water.

13. Understand the lubricating systems.

- 13.1 State the purpose of engine lubrication.

- 13.2 Name the different lubricating systems.
- 13.3 Describe the operation of the splash lubricating system.
- 13.4 Describe the operation of the pressure lubricating system.
- 13.5 Describe the operation of splash and pressure lubricating system with the sketch.
- 13.6 Describe the operation of petro-oil lubricating system.
- 13.7 Describe the operation of dry-sump lubricating system with the sketch.

14. Understand the features of the oil pump.

- 14.1 Mention the function of oil pump.
- 14.2 Identify the types of oil pump.
- 14.3 Describe the construction of rotor & gear type oil pumps.
- 14.4 Describe the operation of the rotor & gear type oil pumps.

15. Understand the features of the oil pressure relief valve.

- 15.1 Mention the function of oil pressure relief valve.
- 15.2 Describe the construction of the oil pressure relief valve.
- 15.3 Describe the operation of oil pressure relief valve.

16. Understand the features of oil filter.

- 16.1 Mention the function of oil filter.
- 16.2 Identify the types of oil filter.
- 16.3 Describe the construction of oil filters.
- 16.4 Describe the operation of oil filters.

17. Understand the aspects of crankcase ventilation.

- 17.1 State the purpose of crankcase ventilation.
- 17.2 Identify the types of crankcase ventilation.
- 17.3 Describe the operation of breather pipe crankcase ventilation.
- 17.4 Describe the operation of positive crankcase ventilation (PCV) with PCV valve.
- 17.5 Mention the causes of sludge formation and its remedies.

18. Understand the servicing of lubricating system.

- 18.1 Describe the servicing of lubricating system.
- 18.2 Describe the testing procedure of rotor & gear type oil pump.
- 18.3 List the common faults and remedies of lubricating system.
- 18.4 Mention the troubleshooting procedure of lubricating system.

19. Understand the air intake system of gasoline and diesel engines.

- 19.1 State the meaning of air intake system.
- 19.2 Draw the gasoline engine air intake system of conventional & EFI engine.
- 19.3 Mention the functions and construction of components of the gasoline engine air intake system.
- 19.4 Draw diesel engine air intake system conventional & EFI-Diesel engine.
- 19.5 Mention the functions and construction of components of the diesel engine air intake system.

20. Understand the features of air cleaner.

- 20.1 Mention the functions of air cleaner.
- 20.2 Identify different types of air cleaner.
- 20.3 Describe the construction & operation of dry type air cleaner.
- 20.4 Describe the construction & operation of the oil bath type air cleaner.
- 20.5 Mention the functions of thermostatically controlled air cleaner.
- 20.6 Describe the construction & operation of thermostatically controlled air cleaner.
- 20.7 Describe the servicing procedure of different types of air cleaner.

21. Understand the features of the exhaust system of the engine.

- 21.1 State the meaning of engine exhaust system.
- 21.2 Identify the different components of the exhaust system.
- 21.3 Mention the function of various components of exhaust system.
- 21.4 Draw the exhaust system of modern light vehicles.
- 21.5 Describe the construction of various components of the exhaust system.
- 21.6 Describe the operation of various components of the exhaust system.

22. Understand the features of the catalytic converter.

- 22.1 Mention the function of catalytic converter.
- 22.2 Mention the classification of catalytic converter.
- 22.3 Describe the construction of two way & three way catalytic converters.
- 22.4 Describe the operation of two way & three way catalytic converters.

23. Understand the features of diesel particulate filter (DPF).

- 23.1 Mention the function of diesel particulate filter (DPF).
- 23.2 Describe the construction of diesel particulate filter (DPF).
- 23.3 Describe the operation of diesel particulate filter (DPF).
- 23.4 Describe the cleaning method of diesel particulate filter (DPF).

24. Understand the features of resonator used in the exhaust system.

- 24.1 Mention the function of resonator.
- 24.2 Describe the construction of the resonator.
- 24.3 Describe the operation of the resonator.

25. Understand the combustion phenomenon of CI and SI engines.

- 25.1 Define combustion.
- 25.2 State the conditions necessary for combustion.
- 25.3 Explain the combustion phenomena in SI engine.
- 25.4 Describe the design features of different types of combustion chamber used in SI engine.
- 25.5 List the advantages and disadvantages of different combustion chambers.
- 25.6 Explain the abnormal combustion in SI engine.
- 25.7 Explain the combustion phenomena in CI engine.
- 25.8 Describe the design features of different types of combustion chamber used in CI engine.
- 25.9 List the merits and demerits of different types of combustion chamber used in CI engine.
- 25.10 Compare the induction swirl and compression swirl type combustion chamber.

PRACTICAL:

1. Study the valve trains arrangement of IC engines.

- 1.1 Identify the L-head (flat head) engine valve train and its components.
- 1.2 Identify the I-head (camshaft in block) engine valve train and its components.
- 1.3 Identify the single overhead camshaft IC engine valve train and its components.
- 1.4 Identify the double overhead camshaft IC engine valve train and its components.
- 1.5 Identify the V-type camshaft in block IC engine valve train and its components.

2. Study the camshaft in block with push rods, valve trains (I-head).

- 2.1 Disassemble the camshaft in block with push rods valve trains.
- 2.2 Identify different components of the camshaft in block with push rod valve mechanism.
- 2.3 Reassemble the valve train.
- 2.4 Perform the valve timing operation.
- 2.5 Adjust the valve clearance.

3. Study the overhead cam valve train.

- 3.1 Disassemble the overhead cam valve mechanism of an IC engine.
- 3.2 Identify different components of overhead cam valve mechanism.
- 3.3 Reassemble the overhead cam valve mechanism.
- 3.4 Perform the valve timing operation.
- 3.5 Adjust the valve clearance.

4. Study the cooling system of IC engines.

- 4.1 Identify the air cooling system and its components.
- 4.2 Identify the evaporative cooling system and its components.
- 4.3 Identify the thermo-siphone type water cooling system and its components.

4.4 Identify the pump assisted water cooling system and its components.

5. Service the pump assisted water cooling system.

5.1 Clean the cooling system (reverse flushing the radiator and engine water jackets).

5.2 Check the hoses and connections.

5.3 Bleed the cooling system.

5.4 Service the water pump.

5.5 Check the water pump drive belt for wear.

5.6 Test drive belt tension manually.

5.7 Adjust the drive belt tension, if necessary.

6. Check and test the cooling system.

6.1 Check cooling level.

6.2 Test workability of the thermostat.

6.3 Check the cooling system for leaks using the cooling system pressure tester.

6.4 Perform the pressure test of the radiator pressure cap using the cooling system pressure tester.

6.5 Test the workability (strength) of antifreeze solution.

6.6 Test and adjust pump drive belt tension using a belt tension gage.

7. Study the lubricating system of IC engines.

7.1 Identify the splash lubricating system and its components.

7.2 Identify the full pressure lubricating system and its components.

7.3 Identify the combination of splash and pressure lubricating system and its components.

7.4 Identify the petrol oil, lubricating system and its components.

7.5 Identify the dry sump lubricating system and its components.

8. Service the lubricating system of IC engine.

8.1 Perform the oil change operation of an IC engine.

8.2 Replace the oil filter of an IC engine.

8.3 Service the oil pan.

8.4 Service the oil pump and pressure relief valve.

8.5 Diagnose and rectify troubles of lubricating system.

9. Study the intake system of IC engines.

9.1 Disassemble the intake system of an IC engine.

9.2 Identify the components of the intake system.

9.3 Clean the air cleaner filtering element.

9.4 Check the oil contamination of an oil bath, air cleaner and change oil, if necessary.

9.5 Check the oil level of an oil bath, air cleaner and top up, if necessary.

9.6 Check intake manifold for wear, leakage and damage.

9.7 Reassemble the intake system.

10. Study the exhaust system of an IC engine.

10.1 Disassemble the exhaust system of an engine.

10.2 Identify the components of the exhaust system.

10.3 Clean the exhaust system components.

10.4 Inspect the exhaust system components for damage.

10.5 Reassemble the exhaust system components.

REFERENCE BOOKS

1. Automotive Mechanics – Crouse-Anglin
2. Auto Mechanics – Mitchel
3. Automobile Technology – N.K. Giri.
4. Automobile Engineering – R.B. Gupta.
5. Automobile Engineering – Dr. Kripal Singh.
6. The Automobile – Harban Singh Rayet.

OBJECTIVES

- To provide understanding soldering technique and color code.
- To provide understanding and skill on the basic concept of semiconductor and to identify physically a range of semiconductor diodes.
- To develop comprehensive knowledge and skill on special diodes and devices.
- To develop the abilities to construct different rectifier circuits.
- To provide understanding of the basic concept and principle of transistor and to identify physically a range of transistor.
- To provide understanding and skill on oscillator.
- To provide the understanding skills on Multivibrator.

SHORT DESCRIPTION

Color code and soldering; Semiconductor; P-N junction diode; Special diodes and devices; Power supply; Transistor; Transistor amplifier; Oscillator, Multivibrator.

DETAIL DESCRIPTION**Theory:****1 Soldering and Color Code.**

- 1.1 Define soldering.
- 1.2 List the materials needed in soldering.
- 1.3 Mention the properties of a good soldered joint.
- 1.4 Multi layered Printed circuit board.
- 1.5 Mention the function of resistor, capacitor and inductor in electronic circuits.
- 1.6 Describe the procedure of determining the value of Capacitor, & Resistor using numeric and color code.

2 Semiconductor

- 2.1 Define Conductor, Semiconductor and Insulator.
- 2.2 Describe Semiconductor with atomic structure.
- 2.3 Explain the energy band diagram of Conductor, Semiconductor and Insulator.
- 2.4 Classify Semiconductor.
- 2.5 Describe the formation of P-type & N-Type Semiconductor material.
- 2.6 Explain the majority & minority charge carrier of P-type & N-Type Semiconductor.

3 P-N Junction Diode

- 3.1 Define PN junction diode
- 3.2 Describe the formation of depletion layer in PN junction.
- 3.3 Mention the behavior of PN junction under forward and reverse bias.
- 3.4 Explain the forward & reverse current voltage (IV) characteristics of PN junction diode.
- 3.5 Describe the operation of Zener diode.
- 3.6 Describe the application of Zener diode in voltage stabilization.
- 3.7 Describe the construction operation and application of (i) varactor diode (ii) LED (iii) LCD (viii) photo diode (ix) Solar cell.
- 3.8 Describe the construction operation and application of (i) DIAC (ii) TRIAC and (iii) SCR.

4 DC power supplies.

- 4.1 Define (i) dc power supply (ii) Regulated and Unregulated Power Supply.
- 4.2 Describe the block diagram of a typical regulated dc power supply.
- 4.3 Explain the operation of Half wave, Full wave and Bridge rectifier.
- 4.4 Mention ripple factor of Half wave, Full wave and Bridge rectifier.
- 4.5 Explain the operation of different types filter circuits with wave shape.

5 Bipolar Junction Transistor (BJT)

- 5.1 Define Transistor.
- 5.2 Describe the construction PNP and NPN Transistor.
- 5.3 State the biasing rules of BJT.
- 5.4 Explain the mechanism of current flow of PNP and NPN Transistor.
- 5.5 Draw the three basic transistor configuration circuits (CB, CC, CE).
- 5.6 Describe the characteristics of transistor in CB, CE, CC configuration.
- 5.7 Describe current amplification factor α , β and γ .
- 5.8 Establish the relation among α , β and γ .
- 5.9 Solve problem related to I_E , I_C , I_B , α , β and γ .

6 Transistor biasing and load line.

- 6.1 Mention the needs for biasing of transistor
- 6.2 State the conditions for proper biasing of transistor.
- 6.3 Describe the methods of drawing load line of transistor.
- 6.4 Explain the Effect of the location of operating point on the output signal.
- 6.5 Describe the various methods of transistor biasing.

7 Transistor Amplifier

- 7.1 Define (i) Amplifier (ii) Amplification and (iii) Gain
- 7.2 Mention the classification of Amplifier.
- 7.3 Describe the principle of operation of a single stage common emitter (CE) Amplifier.
- 7.4 Draw DC & AC equivalent circuits of the CE amplifier circuit.
- 7.5 Explain the operation of RC coupled and transformer coupled multistage amplifier.
- 7.6 Describe the operation of Push-Pull amplifier.

8 Field-Effect Transistor(FET).

- 8.1 Define field effect transistor(FET).
- 8.2 Mention the types of FET
- 8.3 Describe the construction and operation Junction Field Effect Transistor (JFET).
- 8.4 Explain characteristics of JFET .
- 8.5 Describe the parameters of JFET.
- 8.6 Establish the relationship among FET parameters.
- 8.7 Describe the DC biasing of JFET and its load line.
- 8.8 Describe the Construction and operation of DE and E-Only MOSFET.

9. Sinusoidal Oscillators.

- 9.1 Define feedback
- 9.2 Describe different types of feedback with block diagram.
- 9.3 Calculate the gain of amplifier with feedback (positive and negative).
- 9.4 Mention the advantages and disadvantages of negative feedback.
- 9.5 Explain the principle of operation of a oscillatory tank circuit.
- 9.6 Describe the essentials of feedback LC oscillators.
- 9.7 Explain the principle of operation of Hartly, Colpitt and Wein-bridge oscillators.
- 9.8 Explain the principle of operation phase shift & crystal oscillators.

10. Multivibrator circuits.

- 10.1 Define time base circuit.
- 10.2 Mention the methods of generating time base waveform.
- 10.3 Explain the generation of saw-tooth wave using charging and discharging of a capacitor.
- 10.4 Understand the features of multivibrator circuits.
- 10.5 State what is meant by multivibrator.
- 10.6 Explain the operation of astable, monostable and bistable multivibrator circuits with wave shapes.
- 10.7 Mention the principle of operation of Schmitt trigger circuit.

Practical : (Using Real component and Simulation Software)

1 Show skill in identifying the electronic components.

- 1.1 Observe the electronic components board and read the manuals.
- 1.2 Identify the different types of resistors with their values, tolerance and wattage.
- 1.3 Identify the different types of potentiometers with their values, & wattage.
- 1.4 Identify the different types of capacitors with their values, dc working voltages and types.
- 1.5 Identify the different types of diodes & rectifiers with the numbers and specifications.
- 1.6 Identify the different types of transistors and thyristors with their number and specifications.
- 1.7 Identify the different types of LED's, IC's and miniature relays with their number & specification.
- 1.8 Identify different types of transformer with their specification.
- 1.9 Identify different inductors with their values & current ratings.
- 1.10 Study the printed circuit boards.
- 1.11 Sketch the symbols of components used in electronic circuits.
- 1.12 Describe the basic function of each component.
- 1.13 Write a report on above activities.

2 Show skill for determining the values of different resistors and capacitors with the help of color code.

- 2.1 Select color code resistors & capacitors of different values.
- 2.2 Identify the colors and their numerical numbers.
- 2.3 Determine the value of resistors with tolerance.
- 2.4 Determine the value of capacitors and dc working voltage.
- 2.5 Write a report on above activities.

3 Show skill in performing soldering.

- 3.1 Select wires (single strand and multi strand) and cut wires to required length.
- 3.2 Select soldering iron, soldering tag and soldering lead.
- 3.3 Remove wire insulation to required length.
- 3.4 Clean and tin both iron and work piece.
- 3.5 Use a tinned iron in order to transfer adequate heat to the joint.
- 3.6 Joint two singles & multi stranded wires mechanically and solder.

4 Show skill in soldering & de-soldering of electronic components and wires to the other components and circuit boards.

- 4.1 Select electronic components, wires and PCB.
- 4.2 Determine the rating of the soldering iron suitable for the work piece.
- 4.3 Clean and tin both iron & work piece.
- 4.4 Feed new soldering materials to the tinned and heated joint, in order to produce a correctly soldering.
- 4.5 Check the quality of soldering.
- 4.6 Clean and tin iron and de-solder the joint and components.
- 4.7 Use solder suckers and solder braid for de-soldering.
- 4.8 Write a report on the Job.

5 Show skill in checking the semi-conductor diode.

- 5.1 Collect a range of semi-conductor diodes and manufactures literature.
- 5.2 Select the digital multi-meter and set the selector switch to ohm range.
- 5.3 Determine the specification of semi-conductor diode.
- 5.4 Compare the determined specification with that of manufactures literature.
- 5.5 Measure forward & reverse resistances of the diode.
- 5.6 Identify p and n side of the diode.
- 5.7 Determine the condition of the diode.

6 Show skill in sketching forward and reverse characteristics curves of a semiconductor diode.

- 6.1 Select meter, power supply, components and materials.
- 6.2 Complete circuit according to circuit diagram for forward bias.
- 6.3 Check all connections.
- 6.4 Measure forward bias and corresponding forward current.
- 6.5 Record results in tabular form.
- 6.6 Connect circuit according to circuit diagram of reverse bias.
- 6.7 Measure reverse bias and corresponding reverse current.
- 6.8 Record results in tabular form.
- 6.9 Sketch the curves from data.

7 Show skill in sketching waves of half wave rectifier circuit.

- 7.1 Select meter, component, oscilloscope and materials.
- 7.2 Complete circuit of a half wave rectifier according to circuit diagram.
- 7.3 Check the circuit before operation.
- 7.4 Measure the input and output voltage and observe wave shapes in the oscilloscope.
- 7.5 Sketch the output voltage wave shape.

8 Show skill in sketching waves of full wave center tapped rectifier circuit.

- 8.1 Select meter, component, oscilloscope and materials.
- 8.2 Complete a full wave rectifier circuit according to circuit diagram.
- 8.3 Check the circuit supply & polarity of supply.
- 8.4 Measure the input & output voltages and observe wave shapes in the oscilloscope.
- 8.5 Sketch the output voltage wave shape.
- 8.6 Compare the result with half-wave rectifier circuit.

9 Show skill in constructing full wave bridge rectifier.

- 9.1 Select meter, component, oscilloscope and materials.
- 9.2 Build the circuit according to the circuit diagram.
- 9.3 Check the circuit.
- 9.4 Measure the input and output voltage.
- 9.5 Observe wave shape.
- 9.6 Compare the result with other rectifiers.

10 Show skill in identifying the terminals of bipolar junction transistor.

- 10.1 Select pnp & npn bipolar junction transistors.
- 10.2 Take AVO meter and manufacturer's literature of transistor.
- 10.3 Identify transistor legs.
- 10.4 Measure base-emitter, base-collector, forward and reverse resistance.
- 10.5 Determine the specifications with help of manufacturer's literatures.
- 10.6 Identify pnp & npn transistor.

11 Show skill in determining input and output characteristics of a transistor in common emitter connection.

- 11.1 Select component, AVO meters, circuit board and required materials.
- 11.2 Construct the circuit.
- 11.3 Adjust the biasing voltage to appropriate point.
- 11.4 Record input and output voltage and current.
- 11.5 Plot the curve with recorded data.

12 Show skill in measuring operating points (VCE and IC) for Transistor circuit.

- 12.1 Select a fixed bias transistor circuit materials.
- 12.2 Select required equipment.
- 12.3 Prepare the circuit.

12.4 Check the connections

12.5 Adjust the circuit.

13. Demonstrate the operation of a Hartly, Colpitt and R-C oscillator.

13.1 Draw the circuit diagram.

13.2 Select tools, equipment and materials.

13.3 Connect the circuit diagram.

13.4 Check and energize the circuit.

13.5 Observe the output for different frequencies

14. Study the operation of a transistor astable, monostable & bi-stable multivibrator circuit.

Select an experiment circuit.

14.1 Select the required tools and materials.

14.1 Build up the circuit as per diagram.

14.1 Switch on the power supply.

14.1 Switch on the trigger signal.

14.1 Observe the wave shapes at each collector & base of the transistor

REFERENCE BOOKS :

1. A Text Book of Applied Electronics - R.S. SEDHA
2. Principles of Electronics - V. K. Mehta

OBJECTIVES**SHORT DESCRIPTION****DETAIL DESCRIPTION****1. Operate a personal Computer****1.1 Start up a Computer**

- 1.1.1 *Peripherals* are checked and connected with system unit
- 1.1.2 Power cords / adapter are connected properly with computer and power outlets socket
- 1.1.3 Computer is switched on gently.
- 1.1.4 PC *desktop / GUI settings* are arranged and customized as per requirement.

1.2 Operate Computer

- 1.2.1 Files and folders are created.
- 1.2.2 Files and folders are *manipulated* as per requirement.
- 1.2.3 Properties of files and folders are viewed and searched.
- 1.2.4 Control panel settings are practiced.
- 1.2.5 *Memory devices* are formatted as per requirement.

1.3 Shutdown computer

- 1.3.1 unsaved file and folders are closed
- 1.3.2 Open software is closed and hardware devices are switched off.
- 1.3.3 Computer is switched off gently.
- 1.3.4 Power at the respective power outlets is switched off.

2. Type text and documents in English and Bangla.**2.1 Install the Typing Tutor software**

- 2.1.1 Required *Hardware* and *software* are ready to use.
- 2.1.2 Typing tutor software are collected and selected
- 2.1.3 English Typing tutor software is installed.
- 2.1.4 Specialized Bangla Typing tutor software is installed.

2.2 Practice text typing in English and Bangla

- 2.2.1 Typing tutor software is started.
- 2.2.2 English Home key drilling are practiced systematically
- 2.2.3 Intermediate level typing speed(25 cps) are achieved.
- 2.2.4 Specialized Bangla Typing tutor / software are installed.
- 2.2.5 Bangla Home key typing are practiced systematically
- 2.2.6 Text documents are typed repeatedly for increasing typing speed.

2.3 Type documents

- 2.3.1 *Word processor* is started.
- 2.3.2 Text document are typed.
- 2.3.3 Intermediate level typing speed (30 cps) in English and (20 cps) in Bangla are achieved.

3. Operate Word Processing Application**3.1 Create documents:**

- 3.1.1 Word-processing application are opened.
- 3.1.2 *Documents* are created.
- 3.1.3 Data are added according to information requirements.
- 3.1.4 Document templates Used as required.

3.1.5 Formatting tools are used when creating the document.

3.1.6 Documents are saved to directory.

3.2 Customize basic settings to meet page layout conventions:

3.2.1 Adjust page layout to meet information requirements

3.2.2 Open and view different toolbars

3.2.3 Change **font format** to suit the purpose of the document

3.2.4 Change alignment and line spacing according to document information requirements

3.2.5 Modify margins to suit the purpose of the document

3.2.6 Open and switch between several documents

3.3 Format documents

3.3.1 Use formatting features and styles as required.

3.3.2 Highlight and copy text from another area in the document or from another active document

3.3.3 Insert headers and footers to incorporate necessary data

3.3.4 Save document in another **file format**

3.3.5 Save and close document to **a storage device**.

3.4 Create tables:

3.4.1 Insert standard table into document

3.4.2 Change cells to meet information requirements

3.4.3 Insert and delete columns and rows as necessary

3.4.4 Use formatting tools according to style requirements

3.5 Add images:

3.5.1 Insert appropriate **images** into document and customize as necessary

3.5.2 Position and resize images to meet document formatting needs

3.6 Print information and Shutdown computer:

3.6.1 *Printer* is connected with computer and power outlet properly.

3.6.2 Power is switched on at both the power outlet and printer.

3.6.3 Printer is installed and added.

3.6.4 Correct printer settings are selected and document is printed.

3.6.5 Print from the printer spool is viewed or cancelled and

3.6.6 Unsaved data is saved as per requirements.

3.6.7 Open software is closed and computer hardware devices are shut downed.

3.6.8 Power at the respective power outlets is switched off.

4. Operate Spreadsheet application

4.1 Create spreadsheets

4.1.1 Open spreadsheet application,

4.1.2 create spreadsheet files and enter numbers, text and symbols into cells according to information requirements

4.1.3 Enter **simple formulas and functions** using cell referencing where required

4.1.4 Correct formulas when error messages occur

4.1.5 Use a range of common tools during spreadsheet development

4.1.6 Edit columns and rows within the spreadsheet

4.1.7 Use the auto-fill function to increment data where required

4.1.8 Save spreadsheet to directory or folder

4.2 Customize basic settings:

4.2.1 Adjust page layout to meet user requirements or special needs

4.2.2 Open and view different toolbars

4.2.3 Change font settings so that they are appropriate for the purpose of the document

4.2.4 Change **alignment** options and line spacing according to spreadsheet **formatting features**

4.2.5 **Format** cell to display different styles as required

4.2.6 Modify margin sizes to suit the purpose of the spreadsheets

4.2.7 View multiple spreadsheets concurrently

4.3 Format spreadsheet:

4.3.1 Use formatting features as required

- 4.3.2 Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet
- 4.3.3 Use **formatting tools** as required within the spreadsheet
- 4.3.4 Align information in a selected cell as required
- 4.3.5 Insert headers and footers using formatting features
- 4.3.6 Save spreadsheet in another format
- 4.3.7 Save and close spreadsheet to **storage device**

4.4 Incorporate object and chart in spreadsheet:

- 4.4.1 Import an object into an active spreadsheet
- 4.4.2 Manipulate imported **object** by using formatting features
- 4.4.3 Create a chart using selected data in the spreadsheet
- 4.4.4 Display selected data in a different chart
- 4.4.5 Modify chart using formatting features

4.5 Create worksheets and charts

- 4.5.1 Worksheets are created as per requirement
- 4.5.2 Data are *entered*
- 4.5.3 **Functions** are used for calculating and editing logical operation
- 4.5.4 **Sheets** are formatted as per requirement.
- 4.5.5 **Charts** are created.
- 4.5.6 Charts/ Sheets are previewed.

4.6 Print spreadsheet:

- 4.6.1 Preview spreadsheet in print preview mode
- 4.6.2 Select basic printer options
- 4.6.3 Print spreadsheet or selected part of spreadsheet
- 4.6.4 Submit the spreadsheet to **appropriate person** for approval or feedback

5. Operate Presentation Package:

5.1 Create presentations:

- 5.1.1 Open a presentation package application and create a simple design for a presentation according to organizational requirements
- 5.1.2 Open a blank presentation and add text and graphics
- 5.1.3 Apply existing styles within a presentation
- 5.1.4 Use presentation template and slides to create a presentation
- 5.1.5 Use various **illustrations** and **effects** in presentation
- 5.1.6 Save presentation to correct directory

5.2 Customize basic settings:

- 5.2.1 Adjust display to meet user requirements
- 5.2.2 Open and view different **toolbars** to view options
- 5.2.3 Ensure **font settings** are appropriate for the purpose of the presentation
- 5.2.4 View multiple slides at once

5.3 Format presentation:

- 5.3.1 Use and incorporate organizational charts, bulleted lists and modify as required
- 5.3.2 Add **objects** and manipulate to meet presentation purposes
- 5.3.3 Import **objects** and modify for presentation purposes
- 5.3.4 Modify slide layout, including text and colors to meet presentation requirements
- 5.3.5 Use **formatting tools** as required within the presentation
- 5.3.6 Duplicate slides within and/or across a presentation
- 5.3.7 Reorder the sequence of slides and/or delete slides for presentation purposes
- 5.3.8 Save presentation in another **format**
- 5.3.9 Save and close presentation to disk

5.4 Add slide show effects:

- 5.4.1 Incorporate preset animation and multimedia effects into presentation as required to enhance the presentation
- 5.4.2 Add slide transition effects to presentation to ensure smooth progression though the presentation

- 5.4.3 Test presentation for overall impact
- 5.4.4 Use onscreen navigation tools to start and stop slide show or move between different slides as required

5.5 Print presentation and notes:

- 5.5.1 Select appropriate print format for presentation
- 5.5.2 Select preferred slide orientation
- 5.5.3 Add notes and slide numbers
- 5.5.4 Preview slides and spell check before presentation
- 5.5.5 Print the selected slides and submit presentation to appropriate person for feedback

6. Access Information using Internet and electronic mail

6.1 Access resources from internet

- 6.1.1 Appropriate internet **browsers** are selected and installed
- 6.1.2 Internet browser is opened and web address / URL is written/selected in /from address bar to access **information**.
- 6.1.3 **Search engines** are used to access information
- 6.1.4 Video / Information are Shared /downloaded / uploaded from / to web site/**social media**.
- 6.1.5 **Web based resources** are used.
- 6.1.6 Netiquette' (or web etiquette) principles are searched and followed

6.2 Use and manage Electronic mail

- 6.2.1 **Email services** are identified and selected to create a new email address
- 6.2.2 Email account is created
- 6.2.3 Document is prepared, attached and sent to different types of recipient.
- 6.2.4 Email is read, forwarded, replied and deleted as per requirement.
- 6.2.5 Custom email folders are created and **manipulated**
- 6.2.6 Email message is printed

AIMS

- To enable to calculate the areas of regular polygons, hexagons, octagon, hydraulic mean depth (HMD) of a channel, area occupied by water of circular culvert. Excavation work.
- To provide the ability to calculate volume of regular solids like pyramid frustum of pyramid, prismoid, wedge and area of curved surfaces.
- To enable to use the knowledge of gradient of a straight line in finding speed, acceleration etc.
- To enable to use the knowledge of conic in finding the girder of a railway bridge, cable of a suspension bridge and maximum height of an arch.
- To make understand the basic concept and techniques of composition and resolution of vectors and computing the resultant of vectors.

- **SHORT DESCRIPTION**

Menstruation : Area of rectangles, squares, triangles, quadrilaterals, parallelograms, rhombus, trapezium, circle, sector, segment; Volume of rectangular solids, prism, parallelepiped, pyramids, cones, spheres, frustum of pyramid and cone; Area of curved surface of prism, Cylinder cone, pyramid and frustum of cone.

Co-ordinate Geometry: Co-ordinates of a point, locus and its equation, straight lines, circles and conic.

Vector: Addition and subtraction, dot and cross product.

DETAIL DESCRIPTION

MENSURATION:

1 Apply the concept of area of triangle.

1.1 Find the area of triangle in the form,

i) $A = \frac{\sqrt{3}}{4} a^2$, a = length of a side of equilateral triangle.

ii) $A = \frac{c}{4} \sqrt{4a^2 - c^2}$, where a = length of equal sides, c = third side.

iii) $A = \sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c = length of the sides of a triangle and 2s is the perimeter of the triangle.

1.2 Use formula in 1.1 to solve problems.

2 Apply the concept of finding areas of quadrilateral & Parallelogram & finding areas of rhombus & trapezium.

2.1 Define quadrilateral & Parallelogram.

2.2 Find the areas of quadrilateral when off sets are given.

2.3 Find the areas of a parallelogram.

2.4 Solve problems using above formulae.

2.5 Define rhombus & trapezium.

2.6 Find the areas of rhombus when the diagonals are given.

2.7 Find the areas of trapezium in terms of its parallel sides and the perpendicular distance between them.

2.8 Solve problems related to rhombus & trapezium.

3 Apply the concept of finding areas of regular polygon.

3.1 Define a regular polygon.

3.2 Find the area of a regular polygon of n sides, when

i) The length of one side and the radius of inscribed circle are given.

ii) The length of one side and the radius of circumscribed circle are given.

3.3 Find the area of a regular.

a) Hexagon

- b) Octagon when length of side is given.
- 3.4 Solve problems of the following types:
A hexagonal polygon 6 m length of each side has a 20 cm width road surrounded the polygon.
Find the area of the road.

4 Understand areas of circle, sector and segment.

- 4.1 Define circle, circumference, sector and segment.
4.2 Find the circumference and area of a circle when its radius is given.
4.3 Find the area of sector and segment of a circle.
4.4 Solve problems related to the above formulae.

5 Apply the concept of volume of a rectangular solid.

- 5.1 Define rectangular solid and a cube.
5.2 Find geometrically the volume of a rectangular solid when its length, breadth and height are given.
5.3 Find the volume and diagonal of a cube when side is given.
5.4 Solve problems with the help of 6.2 & 6.3.

6 Apply the concept of surface area, volume of a prism, parallelepiped and cylinder.

- 6.1 Define a prism, parallelepiped and a cylinder.
6.2 Explain the formulae for areas of curved surfaces of prism, parallelepiped and cylinder.
6.3 Explain the formulae for volume of prism, parallelepiped and cylinder when base and height are given.
6.4 Solve problems related to 7.2, 7.3.

7 Apply the concept of the surface area, volume of pyramid, cone and sphere.

- 7.1 Define pyramid, cone and sphere.
7.2 Explain the formula for areas of curved surfaces of pyramid, cone and sphere.
7.3 Explain the formula for volumes of pyramid, cone and sphere.
7.4 Solve problems related to 8.2, 8.3.

CO-ORDINATE GEOMETRY

8 Apply the concept of co-ordinates to find lengths and areas.

- 8.1 Explain the co-ordinates of a point.
8.2 State different types of co-ordinates of a point.
8.3 Find the distance between two points (x_1, y_1) and (x_2, y_2) .
8.4 Find the co-ordinates of a point which divides the straight line joining two points in certain ratio.
8.5 Find the area of a triangle whose vertices are given.
8.6 Solve problems related to co-ordinates of points and distance formula.

9 Apply the concept of locus & the equation of straight lines in calculating various Parameter.

- 9.1 Define locus of a point.
9.2 Find the locus of a point.
9.3 Solve problems for finding locus of a point under certain conditions.
9.4 Describe the Equation $x=a$ and $y=b$ and slope of a straight line.
9.5 Find the slope of a straight line passing through two point (x_1, y_1) and (x_2, y_2) .
9.6 Find the equation of straight lines:
(i) Point slope form.
(ii) Slope Intercept form.
(iii) Two points form.
(iv) Intercept form.
(v) Perpendicular form.
9.7 Find the point of intersection of two given straight lines.
9.8 Find the angle between two given straight lines.
9.9 Find the condition of parallelism and perpendicularity of two given straight lines.
9.10 Find the distances of a point from a line.

10 Apply the equations of circle, tangent and normal in solving problems.

- 10.1 Define circle, center and radius.
 10.2 Find the equation of a circle in the form:
 (i) $x^2 + y^2 = a^2$
 (ii) $(x - h)^2 + (y - k)^2 = a^2$
 (iii) $x^2 + y^2 + 2gx + 2fy + c = 0$
 10.3 Find the equation of a circle described on the line joining (x_1, y_1) and (x_2, y_2) .
 10.4 Define tangent and normal.
 10.5 Find the condition that a straight line may touch a circle.
 10.6 Find the equations of tangent and normal to a circle at any point.
 10.7 Solve the problems related to equations of circle, tangent and normal.

11 Understand conic or conic sections.

- 11.1 Define conic, focus, Directorx and Eccentricity.
 11.2 Find the equations of parabola, ellipse and hyperbola.
 11.3 Solve problems related to parabola, ellipse and hyperbola.

VECTOR :**12 Apply the theorems of vector algebra.**

- 12.1 Define scalar and vector.
 12.2 Explain null vector, free vector, like vector, equal vector, collinear vector, unit vector, position vector, addition and subtraction of vectors, linear combination, direction cosines and direction ratios, dependent and independent vectors, scalar fields and vector field.
 12.3 Prove the laws of vector algebra.
 12.4 Resolve a vector in space along three mutually perpendicular directions
 12.5 Solve problems involving addition and subtraction of vectors.

13 Apply the concept of dot product and cross product of vectors.

- 13.1 Define dot product and cross product of vectors.
 13.2 Interpret dot product and cross product of vector geometrically.
 13.3 Deduce the condition of parallelism and perpendicularity of two vectors.
 13.4 Prove the distributive law of dot product and cross product of vector.
 13.5 Explain the scalar triple product and vector triple product.
 13.6 Solve problems involving dot product and cross product.

Reference

SL No	Athour	Title	Publication
01	G. V. Kumbhojkar	Companion to basic Maths	Phadke Prakashan
02	Murary R Spigel	Vector & Tensor Analysis	Schaum's Outline Series
03	Md. Abu Yousuf	Vector & Tensor Analysis	Mamun Brothers
04	Rahman & Bhattacharjee	Co-ordinate Geometry & Vector Analysis	H.L. Bhattacharjee
05	Md. Nurul Islam	Higher Mathematics	Akkhar Patra Prakashani

OBJECTIVES

- To develop a foundation in scientific principles and processes for the understanding and application of technology.
- To develop an understanding of fundamental scientific concepts through investigation and experimentation.
- To provide a common base for further studies in technology and science.
- To develop the basic knowledge of modern physics.

SHORT DESCRIPTION

Thermometry and Heat Capacity; Expansion of materials (effect of heat); Heat transfer; Humidity; Nature of heat and Thermodynamics; Photometry; Reflection of light; Refraction of light; Electron , photon and Radio activity; Theory of Relativity.

DETAIL DESCRIPTION**THEORY****1. THERMOMETRY AND HEAT CAPACITY**

- 1.1 Define heat and temperature.
- 1.2 Mention the units of measurement of heat and temperature.
- 1.3 Distinguish between heat and temperature.
- 1.4 Identify the range of the Celsius scale determined by the boiling point and melting point of water
- 1.5 State the construction and graduation of a mercury thermometer.
- 1.6 Define specific heat capacity, thermal capacity and water equivalent with their units.
- 1.7 Prove the total heat gained by an object is equal to the sum of the heat lost by all the surrounding objects.
- 1.8 Explain the principle of calorimetry.
- 1.9 Define various kinds of specific latent heat.
- 1.10 Determine the latent heat of fusion of ice and latent heat of vaporization of water.
- 1.11 Determine the specific heat of a solid by calorimeter.

2. EFFECT OF HEAT ON DIMENSION OF MATERIALS

- 2.1 Show that different materials change in size at different amounts with the same heat source.
- 2.2 Explain the meaning of differential expansion in bimetallic strip, thermostats, compensated pendulum etc.
- 2.3 Explain the methods of overcoming problems caused by the expansion of materials in buildings, machinery, railway lines and bridges.
- 2.4 Mention the units co-efficient of linear, superficial and cubical expansion of solids.
- 2.5 Define the co-efficient of linear, superficial and cubical expansion of solids.

- 2.6 Relation between the co-efficient of linear, superficial and cubical expansion of solids.
- 2.7 Define real and apparent expansion of liquid.
- 2.8 Relation between the real and apparent expansion of liquid.

3. HEAT TRANSFER

- 3.1 Identify the phenomena of heat transferring from hot bodies to cold bodies.
- 3.2 Explain the methods of heat transfer by conduction, convection and radiation with examples of each type of transfer.
- 3.3 Define thermal conductivity (K) and Co-efficient of thermal conductivity.
- 3.4 Find the unit and dimension of Co-efficient of thermal conductivity.
- 3.5 List the factors which determine the quantity of heat (Q) flowing through a material.
- 3.6 Show that the quantity of heat flowing through a material can be found from

$$Q = \frac{KA(\theta_H - \theta_C)t}{d}$$

- 3.7 State Stefan-Boltzman Law and wien's law.
- 3.8 State Newton's law of cooling.
- 3.9 Explain Green house effect.

4. HUMIDITY

- 4.1 Define Standard Temperature and Pressure.
- 4.2 Define Humidity, Absolute Humidity, Relative Humidity and Dewpoint.
- 4.3 Relation between vapour pressure and air pressure.
- 4.4 Determine Humidity by wet and dry bulb hygrometer.
- 4.5 Explain few phenomena related to hygrometry.

5. NATURE OF HEAT AND THERMODYNAMICS

- 5.1 Describe the caloric theory and kinetic theory of heat.
- 5.2 Explain the mechanical equivalent of heat.
- 5.3 State and Explain the first law of thermodynamics .
- 5.4 Explain Isothermal and adiabatic change.
- 5.5 Explain Specific heat of a gas, Molar specific heat or molar heat capacity.
- 5.6 Relate between pressure and volume of a gas in adiabatic Change i, e; $PV^\gamma = \text{const.}$
- 5.7 State and Explain Reversible process and irreversible process.
- 5.8 State & explain 2nd law of thermodynamics
- 5.9 Entropy: Definition, unit and significant.
- 5.10 Explain Change of entropy in a reversible and irreversible process.
- 5.11 Give an example of increase of entropy in irreversible process.

6. PHOTOMETRY

- 6.1 Define light, medium (transparent, translucent, opaque), luminous & non-luminous bodies, parallel, convergent & divergent of rays.
- 6.2 Show the travel of light in straight line.
- 6.3 Define photometry, luminous intensity, luminous flux, brightness and illuminating power.
- 6.4 Mention relation between luminous intensity & illuminating power.
- 6.5 Explain inverse square law of light.
- 6.6 Describe the practical uses of light waves in engineering.

7. REFLECTION OF LIGHT

- 7.1 Define mirror (plane & spherical), image (real & virtual) and magnification of images.
- 7.2 Describe the reflection of light.
- 7.3 State the laws of reflection of light.
- 7.4 Express the verification of laws of reflection.
- 7.5 Define pole, principal axis, center of curvature, radius of curvature, principal focus in case of concave & convex mirrors.
- 7.6 Find the relation between focal length & radius of curvature of a concave & convex mirror.
- 7.7 Express the general equation of concave and convex mirror.

8. REFRACTION OF LIGHT

- 8.1 Define refraction of light Give examples of refraction of light
- 8.2 State the laws of refraction and Express the verification of laws of refraction
- 8.3 Define absolute and relative refractive index and Relate absolute and relative refractive index
- 8.4 Explain the meaning of total internal reflection and critical angle and Relate total internal reflection and critical angle.
- 8.5 Give examples of total internal reflection.
- 8.6 Describe refraction of light through a prism.
- 8.7 Express the deduction of the relation between refractive index, minimum deviation and angle of the prism.
- 8.8 Define lens and mention the kinds of lens.
- 8.9 Identify and List uses of lens.
- 8.10 Express the deduction of the general equation of lens (Concave & convex).

9. ELECTRON, PHOTON AND RADIO-ACTIVITY

- 9.1 Describe Electrical conductivity of gases.
- 9.2 Describe Discharge tube.
- 9.3 Cathode ray : Definition and its properties
- 9.4 X-ray : Definition, properties & uses
- 9.5 Discuss Photo electric effect .
- 9.6 Derive Einstein's photo electric equation
- 9.7 Define and explain radio-activity.
- 9.8 Describe radio-active decay law.
- 9.9 Define half-life and mean-life of radio-active atoms.
- 9.10 Define nuclear fission and fusion.

10. THEORY OF RELATIVITY

- 10.1 Define Space, time and Mass.
- 10.2 Define rest mass.
- 10.3 Express the theory of relativity.
- 10.4 Explain special theory of relativity and its fundamental postulate.
- 10.5 Mention different Kinds of theory of relativity.
- 10.6 The Relativity of Length - Length contraction.
- 10.7 The Relativity of Time – Time dilation.
- 10.8 Deduce Einstein's mass -energy relation

PRACTICAL

1. Compare the operation of common thermometers.
2. Determine the coefficient of linear expansion of a solid by Pullinger's apparatus.
3. Measure the specific heat capacity of various substances.(Brass, steel).
4. Determine the latent heat of fusion of ice.
5. Determine the water equivalent by calorimeter.
6. Compare the luminous intensity of two different light sources.
7. Verify the laws of reflection.
8. Find out the focal length of a concave mirror.
9. Determine the refractive index of a glass Slab.
10. Determine the angle of Minimum deviation and refractive index of a glass prism by using I-D graph.

REFERENCE BOOKS:

1. Higher Secondary Physics – Second Part - by Dr. Shahjahan Tapan
2. A Text Book of Heat and Thermodynamics - by N Subrahmanyam and Brij Lal
3. A Text Book of Optics - by N Subrahmanyam and Brij Lal
4. Higher Secondary Physics -Second Part - by Prof. Golam Hossain Pramanik
5. Higher Secondary Physics -Second Part - by Ishak Nurfungnabi
6. Thermodynamics - by K K Ramalingam

65722

COMMUNICATIVE ENGLISH

T	P	C
1	3	2

Full Marks: 100 (Practical-50.Theoretical-50)

Introduction

This Course Will Provide A Unique Foundation In The Basic Level For Developing Listening, Speaking, Reading And Writing Skills Into Some Of More Specialized And Advanced Capabilities Of Basic Operation In Communication.

Theory Part

Total Mark: : 50
Continuous Assessment : 20
Final Exam : 30

Objectives:

After The Completion of the Module, Learners Will Be Able To Develop-

- # Creative Writing Ability
- # Transferring Information, Ideas And Knowledge
- #Communicative Competence Effectively In The Workplace Situation.

1.Comprehension For Reading Task (Mark:10)

(Text May Be Taken From Contemporary Journals, Editorial of News Papers Or From Online Resources)

Test Items:

1. MCQ (Guessing Meaning from Context)
2. Rearranging
3. Gap-Filling (With Clues or Without Clues)
4. Answering Questions
5. Summarizing

2. Composition (Mark: 20)

The Following Are The Topic Title Introduced For Writing Task:

1. Introduce Formal/Informal Greeting &Farewell
2. Describe The Idea Of Communication & Presentation Skills
3. Write Paragraph On The Basis Of Comparison and Contrast
4. Narrate Process, Stories And Interpreted Charts, Graphs.
5. Write Letters to the Print and Electronic Media
6. Write Letters of Advice, Complaints, Inquiry, Order and Cancellation
6. Prepare Seven Days Weather Report.
7. Make An Attractive Poster For The People Giving Advice To Protect The Environment.
8. Prepare A Series Of Questions About Personal Information, Place Of Interest, Foods, Hobby And Employment Opportunity.

9. Write Dialogue On The Following Situations
 - # About Exchanging Views With A Person And Introducing One Narrating Daily Activities
 - # Meeting At The Train Station & Asking Question About The Departure And Arrival Of The Train To The Station Manager
 - # Meeting at The Airport And Asking The Flight Schedule
 - # Getting To The Hotel And Asking For A Reservation
 - # Social Language for Telephonic Conversation
 - # Talking About the Weather, Trips & Sight Seeing
 - # Asking Permission and Making Request.
 - # Talking About Office and Office Manner
 - # Talking About Etiquette and Manner

10. Prepare Job Application With A Complete CV For Job Suitable For You.

Practical Part:

Objectives:

- 1. Communicate The Areas That Learners Encounter In Real Life Situation.**
- 2. Reinforce The Basic Language Skills Of Listening And Speaking.**
- 3. Integrate ICT As Tools In Learning Language.**

Course Content

Unit	Lesson	Title
1. Use Of Dictionary	Define Dictionary	1.1 Know How To Use A Dictionary 1.2 Learn At Least 10 Words In A Day With Correct Pronunciation (Follow The Link : www.Marriunm-Englishdictionary.Com)
2. Basic Vocabulary Practice	Basic Words For Communication By ODGENS	2.1 Use 10 Most Common Formulas (Structure) To Write Correct Sentence. (Follow The Link: www.Odgenbasicvocabulary.Com www.Grammarly.Com)
3. Listening Skill Practice	Listen To The Audio Video Presentation On Current Real Life Situation	3.1 Practice Audio Video Conferencing Activities. 3.2. Communicate With The English Speaking People Online (Link: www.Speaking24.Com)
4. Speaking Skill Practice (Self Interpretation)	Introduce Yourself With The Vocabulary Prescribed By ODGENS	4.1 Browse Vocabulary Related Phrases To Introduce You. (Link : www.Youtube.Com/Let Me Introduce Myself)
5. Listening Skill Practice	Listen To The Weather Reports, Sports Commentary In The English TV Channels.	5.1 Prepare Seven Days Weather Report For The Place You Are Staying. 5.2. Make Some Attractive Poster To Protect The Environment.
6. Speaking Skill Practice	Identify Formal And Informal Social Language	6. 1 Practice Conversation Emphasizing On Greetings & Farewell (Link- www.Esl.Guide@About.Com) 6.2 Take Part In Audio Video Conferencing Activities 6.3 Ask Questions About Personal Information, Place Of Interest, Food, Hobby, Employment Opportunity With Foreign Friends Using Social Media.
7. Writing Skill Practice	Develop Paragraph	7.1 Develop Paragraph On The Basis Of Comparison, Contrast And Analysis. Check Plagiarism Wordiness By The Correction Software (Www.Grammarly.Com) 7.2. Write E-Mail, Send And Reply E-Mail

8. Listening Skill Practice	Watch Short Films, Documentary And Listen To The English Music(With Lyric) To Practice In A Group	8.1 Listen To Hard Talk, Interview 8.2. Prepare A Series Of Questions To Interview A Celebrity 8.3. Down Load Documentary From www.Youtube.Com/Education
9. Presentation	Define Presentation	9.1 Edutain/Entertain Yourself Preparing A

		Documentary In A Group With The Activities Done During The Period Of Class Hours In The Lab For Communicative English.
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Evaluation:

Students Can Be Evaluated Individually Or In A Group On The Basis Of Performance Done In The Lab. Furthermore, They May Be Given Online Test Using Authenticated Websites Like www.britishcouncil.org/education/blog/podcast/news/weather, www.english-teststore.com, www.ielts-exam.com

Lab-Facilitator, 30 Students In A Group:

Physical Facility	Size (In Ft)	Area (In Sq Ft)
Class Room Cum Laboratory	15 × 20	300
Library	15 × 20	300
Wash Room	4 × 7	28

Lists Of Equipments And Resources For 30 Learners:

Personal Computers With Accessories	15
Projector Multimedia	01
Printer	01
Scanner	01
Modem	01
Essential Software	01 Set
Internet Connection For Each Computer	Broad Band/Dial Up
Camera (Digital)	01
Video Conferencing Equipments	01 Set
TV Card	01
Satellite Cable Connection	01
Head Phone	15
Related Books And Journals	01
First Aid Box	01

Reference:

www.britishcouncil.org, www.marion-websters.com, www.compellingconversation.com, www.esl-guide@about.com, www.bbc.com/news, www.speaking24.com, www.itutor.com, www.eltsexam.com, www.english-teststore.com, www.ginger.com, www.grammarly.com

(Note: This Course May Be Introduced After Fourth Semester Coz It Needs Some Maturity Of The Students To Adopt With The Course Materials And The Contents. These Themes Are Suggestive Not Prescriptive.)