DIPLOMA IN ENGINEERING
PROBIDHAN-2016

Computer Technology

1st Semester

Sl. No.	Subject Code	Name of the Subject	T	P	C	Marks				
						Theory		Practical		Total
						Cont. Assess	Final Exam	Cont. Assess	Final Exam	
1	66611	Computer Application	0	6	2	-	-	50	50	100
2	66612	Computer Lab. Practice (IT support-I)	0	6	2	-	-	50	50	100
3	66712	Electrical Engineering Fundamentals	3	3	4	60	90	25	25	200
5	65911	Mathematics-I	3	3	4	60	90	50	-	200
6	65912	Physics-I	3	3	4	60	90	25	25	200
	65712	English	2	0	2	40	60	-	-	100
7	65711	Bangla	3	3	4	60	90	50	-	200
Total			**14**	**24**	**22**	**280**	**420**	**250**	**150**	**1100**

BANGLADESH TECHNICAL EDUCATION BOARD

Agargoan, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016) **(খসড়া)**

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: 66

FIRST SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

Computer Technology

1st Semester

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1	66611	Computer Application	0	6	2	-	-	50	50	100
2	66612	Computer Lab Practice	0	6	2	-	-	50	50	100
3	66712	Electrical Engineering Fundamentals	3	3	4	60	90	25	25	200
5	65911	Mathematics-I	3	3	4	60	90	50	-	200
6	65912	Physics-I	3	3	4	60	90	25	25	200
	65712	English	2	0	2	40	60	-	-	100
7	65711	Bangla	3	3	4	60	90	50	-	200
Total			**14**	**24**	**22**	**280**	**420**	**250**	**150**	**1100**

. . . . .	*COMPUTER APPLICATION*	*T*	*P*	*C*
		0	**6**	**2**

OBJECTIVES

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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 P*rinter* 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

66612	***Computer Lab Practices***	***T***	***P***	***C***
		0	**6**	**2**

OBJECTIVES

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SHORT DESCRIPTION

DETAIL DESCRIPTION

1. **Assemble a PC**
   - **1.1 Prepare specification of the parts and components of a PC**
     - 1.1.1 Parts and components are listed
     - 1.1.2 Specification are prepared and written
     - 1.1.3 Costing of the PC parts and accessories are estimated
   - **1.2 Prepare hardware for assemble**
     - 1.2.1 Hardware, parts and components are collected as per specification and documented Or Required PC components are collected from store according to the manual or user guide or clients requirement
     - 1.2.2 ***PC*** equipment is Isolated from electrical source before assembling
     - 1.2.3 Electrostatic discharge precautions are observed
     - 1.2.4 Safe work practice observed and personal protective equipment (PPE) worn as required
     - 1.2.5 ***Tools and equipment*** are selected and collected as required
     - 1.2.6 Modification of check list is observed
   - **1.3 Install PSU and Assemble motherboard components into the casing**
     - 1.3.1 PC ***power supply unit (PSU)*** is installed in ***casing***
     - 1.3.2 ***Processor***, processor heat sink and cooling fan are installed to the motherboard
     - 1.3.3 RAM module are installed into the motherboard
     - 1.3.4 Motherboard is set to the casing
     - 1.3.5 Other ***peripherals*** are installed
     - 1.3.6 WiFi adapter is installed
     - 1.3.7 AGP,NIC and Sound card is installed as required
   - **1.4 Install storage devices and electrical connection to the PC**
     - 1.4.1 ***Hard disk,*** optical drive(CD/DVD R/W drive),are installed
     - 1.4.2 Power and ***data cables*** are properly connected
     - 1.4.3 Front panel power switch, front or back panel ***USB*** port,status LED's etc. are properly connected
     - 1.4.4 Motherboard is connected with power supply
   - **1.5 Assemble the system unit**
     - 1.5.1 All connections are checked
     - 1.5.2 Screwing is observed
     - 1.5.3 Installation is completed by setting and screwing the cover
   - **1.6 Connect *Input* and *output* units**
     - 1.6.1 Ensure power switch is switched off
     - 1.6.2 PC system unit is connected to the electrical power line
     - 1.6.3 Display unit (monitor) is connected to the electrical power line
   - **1.7 Modify the BIOS setting**
     - 1.7.1 Power switch is switched On
     - 1.7.2 Entered to the BIOS setting
     - 1.7.3 Date and Time is adjusted
     - 1.7.4 Correct processor and memory clock frequency is chosen

1.7.5 ***Hard disk*** and CD/DVD interface is selected correctly
1.7.6 Boot device sequence is modified as required
1.7.7 Change and modification are saved
1.7.8 Exit from the BIOS setting

1.8 Install operating system and required device driver

1.8.1 Operating system container is connected or entered to the drive of the PC
1.8.2 Installation is started
1.8.3 Hard disk partition is done correctly
1.8.4 ***Operating system*** is configured and installed
1.8.5 Required ***device driver*** is installed
1.8.6 System information is observed and cross checked with the requirements check list

1.9 Shut-down and clean work place

1.9.1 Operating system is shut down properly
1.9.2 Computer is switched off
1.9.3 Tools and equipment is cleaned and stored as per workplace standard
1.9.4 Waste materials are disposed as per workplace practice

2. Install and configure custom software in a personal computer

2.1 Follow Electrical and Electronic safety in work

2.1.1 ***PC*** equipment is isolated from electrical source when assembling
2.1.2 Electrostatic discharge precautions are observed
2.1.3 Safe work practice observed and personal protective equipment (PPE) worn as required for the work performed

2.2 Determine client requirements

2.2.1 User requirements for software and hardware are documented.
2.2.2 Analyze user requirements and list of PC components and their costs are determined
2.2.3 Components and budget are verified with the ***Client***
2.2.4 Approval of components and required budget from the client is confirmed
2.2.5 ***PC hardware and software components*** are collected and stored according to user manual or guidelines

2.3 Install hardware components

2.3.1 Ensure that computer power is switched off
2.3.2 Software container is inserted in appropriate to PC or drives
2.3.3 I/O slot or Hardware components are connected to the appropriate port(s)
2.3.4 PC and peripherals are connected with the AC power line if external power is required.
2.3.5 System automatically detected the hardware and device driver is installed
2.3.6 Vendor's given or from internet device driver is installed and configured
2.3.7 Correct functioning of hardware component is confirmed

2.4 Install software components

2.4.1 Identify if older version of the software component is exists
2.4.2 If older version is already installed, software component is ***upgraded***
2.4.3 ***Fresh installation*** of the software component is done
2.4.4 Documented the changes or modification of the system
2.4.5 Installed/updated software component is checked to work correctly

2.5 Determine user satisfaction and documentation

2.5.1 User requirements for software and hardware are verified
2.5.2 User satisfaction is recorded
2.5.3 Confirmation of completion of work is documented

3. Use peripherals(Printer, Scanner and Projector) with PC/ Laptop

3.1 Install Printer with PC

3.1.1 Safety measures are identified and taken
3.1.2 Printer is selected and placed in appropriate places
3.1.3 External connectors, setting and controls are identified and interpreted using user manual
3.1.4 Necessary connection of the cables are confirmed

3.1.5 Driver software are installed or printer is added
3.1.6 Installed printer is found or checked.

3.2 Print documents using the installed printer

3.2.1 Document is Opened
3.2.2 Appropriate printer is selected
3.2.3 Necessary configuration and settings are performed
3.2.4 Document is printed
3.2.5 Buffer is cleared for any irregularities
3.2.6 Power switch is turn safely

3.3 Replace the tonner of the printer

3.3.1 Appropriate tonner is selected
3.3.2 Cartage/Tonner/ Ribbon is prepared using user manual for installation to the printer
3.3.3 Old Cartage/Tonner/Ribbon is removed
3.3.4 New cartage/tonner /ink ribbon is Installed
3.3.5 Test print is performed to check the print /print quality

3.4 Install Scanner into the PC

3.4.1 Safety measures are identified and taken
3.4.2 Scanner is selected and placed in appropriate places
3.4.3 External connectors ,setting and controls are identified and interpreted using user manual
3.4.4 Necessary connection of the cables are confirmed
3.4.5 Driver software are installed or scanner is added to
3.4.6 Installed scanner is found or checked.

3.5 Scan picture/ documents using the installed scanner

3.5.1 Document / picture / drawing object is collected and selected
3.5.2 Document/picture is placed in scanner plate properly
3.5.3 Appropriate scanner is selected
3.5.4 Necessary configuration and settings are performed
3.5.5 Necessary file type is selected
3.5.6 Document / picture / drawing is scanned
3.5.7 Scanned document is saved in proper drive/ folders
3.5.8 Maintain proper action for any irregularities
3.5.9 Power switch is turn off safely

3.6 Install Multimedia Projector with PC/ Laptop

3.6.1 Safety measures are identified and taken
3.6.2 MMP is selected and external connectors, setting and controls are identified and interpreted using user manual
3.6.3 MMP is placed in appropriate places for proper projection
3.6.4 Necessary connection of the cables are confirmed
3.6.5 Turn on the projector and pc properly
3.6.6 Installed MMP is found or checked.
3.6.7 Necessary configuration and settings are performed
3.6.8 Ensure the connection for laptop
3.6.9 Use fn and appropriate function key if necessary for laptop connection

3.7 Use and maintain the projector

3.7.1 Document / picture / drawing object is opened
3.7.2 MMP controls and setting are adjusted
3.7.3 Projector screen is set.

3.7.4 Focus control is adjusted

3.7.5 Use projector

3.7.6 Turn off projection after a definite time to save life time of bulb.

3.7.7 Maintain proper action for any irregularities

3.7.8 Power switch is turn off safely

4. Connect a PC to an existing network

4.1 Follow workplace health and safety – OSH

4.1.1 Electrical isolation is maintained at the time of installation of the network equipment

4.1.2 Electrical hazard is avoided at all times

4.1.3 Safe work practice observed and personal protective equipment (PPE) worn as required for the work performed

4.2 Collect existing network specification

4.2.1 The person in the organization responsible for existing network is interviewed.

4.2.2 Existing network topology and network protocol is reviewed and documented

4.2.3 Existing network topology and IP is reviewed and documented

4.2.4 Network address plan is documented

4.3 Determine client network hardware and software components are required

4.3.1 Hardware and software components are determined

4.3.2 Cost of components is determined

4.3.3 Approval of components and confirmation of required budget is obtained from the client

4.4 Connect PC to the existing network

4.4.1 Network hardware and hardware driver software (if not automatically installed) is installed

4.4.2 Existing network transmission media is determined. E.g.; wireless, wired

4.4.3 Appropriate transmission media is connected with the existing network Infrastructure

4.5 Assign client machine address

4.5.1 Address is assigned to client machine (automatically or statically. e.g.; assign IP address, sub net mask statically in the case of TCP/IP protocol)

4.5.2 Conflict of network interface card is assessed

4.5.3 Domain name assigned if required.

4.5.4 Host name assigned if required.

4.5.5 Network interface card (NIC) is disabled and enabled

4.6 Test network connectivity

4.6.1 Test is done using simple network connectivity tools like ping, local loop-back and remote loop-back

4.6.2 If loop-back test fails, network interface card, connecting wire (continuity) is tested

ELECTRICAL ENGINEERING FUNDAMENTALS

T	P	C
3	3	4

OBJECTIVES

- To familiarize the basic electrical quantities & laws and to apply them in solving problems of electrical circuits.
- To acquaint with electro-magnetism, electro-magnetic induction.
- To develop skill in electrical wiring.
- To familiarize with DC generator, AC generator, AC motor, DC Motor & Transformers.
- To appreciate the safety measures to be taken for electrical wiring.

SHORT DESCRIPTION

Electric current, Voltage & Resistance; Conductors and insulators; Ohm's law; Kirchhoff's Law; Joule's law; Faraday's law; Basic electrical circuits; Power and energy; Electro-magnetic induction; House wiring; Controlling devices; Protective devices; Earthing; DC Motor, AC Motor, DC Generator; AC Generator; Transformer & Electricity Act/Rule.

DETAIL DESCRIPTION

Theory :

ELECTRIC CURRENT

1 Understand electricity and its nature.

1.1 State the meaning of electricity.
1.2 Describe the structure of atom.
1.3 Define current, voltage and resistance.
1.4 State the units of current, voltage and resistance.

CONDUCTOR, SEMICONDUCTOR & INSULATOR

2 Understand conductor semiconductor & insulator.

2.1 Define conductor, semiconductor and insulator.
2.2 Explain the conductor, semiconductor and insulator according to electron theory.
2.3 List at least 5 conductors, 5 semiconductor and 5 insulators.
2.4 Describe the factors upon which the resistance of a conductor depends.
2.5 State laws of resistance.
2.6 Prove the relation $R=\rho L/A$
2.7 Explain the meaning of resistivity and name the unit of resistivity.
2.8 Solve problems relating to laws of resistance.

OHM'S LAW

3 Understand Ohm's Law

3.1 State Ohm's law.
3.2 Deduce the relation between energy current, voltage and resistance.
3.3 Solve problems relating to Ohm's law.

Principles of Kirchhoff's Law

4 Understand Kirchhoff's Law

4.1 State Kirchhoff's current law.
4.2 Explain the Kirchhoff's current law.
4.3 Sate Kirchhoff's Voltage law.
4.4 Explain the Kirchhoff's Voltage law.
4.5 Solve problem by Kirchhoff's Law

BASIC ELECTRIC CIRCUITS

5 Understand electric circuit.

5.1 Define electric circuit.

5.2 Name the different types of electric circuits.
5.3 Define series circuit, parallel circuit and mixed circuit.
5.4 Describe the characteristic of series circuit and parallel circuit.
5.5 Calculate the equivalent resistance of series circuit, parallel circuit.
5.6 Solve problems relating to DC series circuit, parallel circuit and mixed circuit.
5.7 Define inductor, capacitor, inductive reactance & capacitive reactance.
5.8 Write the formula of inductive reactance, capacitive reactance & impedance.
5.9 Draw the AC circuit containing resistor, Inductor and Capacitor in Series and parallel circuit**.**
5.10 Problem on AC series & parallel circuit.

POWER AND ENERGY

6 Apply the concept of electrical power and energy.

6.1 Define electrical power and energy.
6.2 State the unit of electrical power and energy.
6.3 Show the relation between electrical power and energy.
6.4 Name the instruments for measuring of electrical power and energy.
6.5 Draw the connection diagram of wattmeter and energy meter in an electrical circuit.
6.6 Solve problems relating to electrical power and energy Calculation.

ELECTRO MAGNETIC INDUCTIONS

7 Understand the principles of Joule's law.

7.1 Explain Joule's law regarding the development of heat in electrical circuit.
7.2 Describe meaning of "J".
7.3 Solve problems relating to Joule’s law.

8 Understand the Faraday’s laws of Electro-magnetic Inductions

8.1 Define Electro-magnetic Inductions.
8.2 Explain Faraday’s laws of Electro-magnetic Induction.
8.3 Solve problems on Electro-magnetic Induction.

WIRES AND CABLES

9 Understand the uses of wires and cables.

9.1 Define electrical wires and cables.
9.2 Distinguish between wires and cables.
9.3 Describe the procedure of measuring the size of wires and cables by wire gauge.

HOUSE WIRING

10 Understand the different methods of house wiring.

10.1 State the meaning of wiring.
10.2 List the types of wiring.
10.3 State the types of wiring used in:
a) Residential building.
b) Workshop
c) Cinema hall/Auditorium
d) Temporary shed
10.4 List the name of fittings used in different types of electrical wiring.

CONTROLLING & PROTECTIVE DEVICES

11 Understand the controlling and protective devices & use of them.

11.1 Define controlling device.
11.2 Name the different types of controlling devices.
11.3 Define protective devices.
11.4 Name the different types of protective devices.
11.5 Name the different types of fuses used in house wiring.
11.6 Name the different types of circuit breaker used in house wiring.

EARTHING

12 Understand the necessity of earthing.

12.1 Define earthing
12.2 Explain necessity of earthing
12.3 Name different types of earthing

TRANSFORMER

13 Understand the principle of operation of transformer.

13.1 Define transformer.
13.2 Explain the working principle of transformer.
13.3 Write the equation relating to voltage, current & turns of primary & secondary winding of transformer.
13.4 Name the different losses of transformer.
13.5 Define transformation ratio (voltage, current and turns).
13.6 Solve problems on transformation ratio.

DC GENERATOR

14 Understand the principle of DC generator

14.1 Define DC Generator.
14.2 Classify DC Generator.
14.3 Explain the constructional features of DC Generator.
14.4 Explain the working principle of DC generator.
14.5 Name the different losses of DC Generator.

AC GENERATOR

15 Understand the principle of AC generator

15.1 Define AC Generator.
15.2 Explain the constructional features of AC Generator.
15.3 Explain the Working Principle of AC Generator.
15.4 Name the different losses of AC Generator.

DC MOTOR

16 Understand the principle of DC motor.

16.1 Define DC motor.
16.2 Classify DC Motor.
16.3 Name the different parts of DC motor.
16.4 Explain the working principle of DC Motor.
16.5 Name the different losses of DC Motor.
16.6 List the uses of different types of DC Motor.

AC MOTOR

17 Understand the principle of Induction motor.

17.1 Define Induction motor.
17.2 Classify Induction Motor.
17.3 Describe the principles of operation of capacitor motor.
17.4 List the uses of induction motor.

ELECTRICITY ACT

18 **Understand act/rule of Bangladesh and safety practices.**

18.1 Sate electricity act/rule of Bangladesh to be followed in electrical wiring.
18.2 Describe the importance of electricity act/rule.
18.3 Describe safety procedure against electricity hazard.
18.4 List the performance of safety practices for electrical equipment, machines and accessories.

Practical :

1 Identify and use electrical measuring instruments.

1.1 Identify Voltmeters, Ammeters, Clip-on meter, Frequency meter, Wattmeter, Energy meter and AVO meter.
1.2 Select & read the scale of given meters.
1.3 Connect correctly voltmeter, ammeter, wattmeter and energy meter to a given circuit..

2 Show skill in verification of Ohm's Law.

2.1 Sketch the circuit diagram for the verification of Ohm's Law.
2.2 List tools, equipment and material required for the experiment .
2.3 Prepare the circuit according to the circuit diagram using proper equipment.
2.4 Check all connections before the circuit is energized.
2.5 Verify the law by collecting relevant data.

3 Show skill in verification of Kirchhoff's Law**.**

3.1 Sketch the circuit diagram for the verification of Kirchhoff's Law.
3.2 List tools, equipment and material required for the experiment .
3.3 Prepare the circuit according to the circuit diagram using proper equipment.
3.4 Check all connections before the circuit is energized.
3.5 Verify the laws by collecting relevant data.

4 Verify the characteristics of series and parallel circuits.

4.1 Draw the working circuit diagram.
4.2 List tools, equipment and materials required for the experiment .
4.3 Prepare the circuit according to the circuit diagram using proper equipment.
4.4 Check all connections before the circuit is energized.
4.5 Record data and verify that in a series circuit total voltage and resistance is equal to the summation of individual voltage and resistance respectively but total current is equal to the individual current.
4.6 Record data and verify that for a parallel circuit supply voltage is equal to the branch voltage, supply current is equal to summation of branch currents.

5 Show skill in measuring the power of an electric circuit.

5.1 Sketch the necessary circuit diagram of an electrical circuit with electrical load, ammeter, voltmeter and wattmeter.
5.2 Prepare the circuit according to the circuit diagram using ammeter, voltmeter and wattmeter.
5.3 Record the power, measured by the wattmeter and verify the reading with that of calculated from ammeter and voltmeter.
5.4 Compare the measured data with that of calculated and rated power.

6 Show skill in measuring the energy consumed in an electrical circuit.

6.1 Sketch the necessary diagram of an electric circuit wattmeter, energy meter and electrical load.
6.2 Prepare the circuit according to the circuit diagram user wattmeter and energy meter.
6.3 Record the energy measured by the energy meter and verify with that of calculated from wattmeter for a fixed time.

7 Show skill in uses of hand tools, wires and cables.

7.1 List the hand tools used in electrical wiring.
7.2 Identify the hand tools used in electrical wiring.
7.3 Draw neat sketches of hand tools used in electrical wiring.
7.4 Identify different types of wires and cables.
7.5 Measure the diameter of the identified wire and cables using standard wire gauge.

8 Show skill in preparing wiring circuit of two lamps controlled from two points separately.

8.1 Sketch a working circuit of two lamps controlled from two points separately.
8.2 Make the wiring circuit using required materials and equipment a wiring board.
8.3 Test the connection of circuit by providing proper supply.

9 Show skill in preparing wiring circuit of one lamp controlled from two points.

9.1 Sketch a working diagram of one lamp controlled by two SPD tumbler Switches.
9.2 Complete the wiring circuit using required materials and equipment on wiring board.
9.3 Test the connection of circuit by providing proper supply.

10 Show skill in preparing wiring circuit of one bell with two indicating lamp controlled from two points.

10.1 Sketch a working diagram of one bell with two indicating lamps controlled by two push button switch.
13.2 Make the wiring circuit using required materials and equipment in wiring board.
13.3 Test the connection of circuit by providing proper supply.

11 Show skill in preparing wiring circuit of a fluorescent tube light.

11.1 Sketch a working diagram of a fluorescent tube light circuit.
11.2 Make the connection of a fluorescent tube light circuit using required materials and equipment.
11.3 Test the connection of the circuit by providing supply.

12 Find the transformation ratio of a transformer.

12.1 Develop a circuit to perform the experiment.
12.2 Select required equipment and materials.
12.3 Connect the components according to the circuit diagram.
12.4 Check the connections.
12.5 Record the primary (E_P) and secondary (E_S) voltages.
12.6 Calculate the transformation ratio using the relation

$$\frac{E_S}{E_P} = \frac{N_S}{N_P} = K$$

12.7 Note down the observations.

13 Dis-assemble and re-assemble the parts of a DC generator/ DC motor.

13.1 Select the necessary tools required for dis-assembling and re-assembling the parts of DC generator/ DC motor.
13.2 Identify at least ten main parts of the generator/motor.
13.3 Sketch at least ten main parts of the generator/motor.
13.4 Re-assemble the parts of the generator/motor.
13.5 Connect the generator/motor to the proper power source.
13.6 Start the generator/motor.

14 Start a 1-phase capacitor type motor/ceiling fan with regulator.

14.1 Select the equipment and tools required for the experiment.
14.2 Sketch a working diagram.
14.3 Identify the two sets of coils.
14.4 Connect the capacitor with the proper set of coil.
14.5 Connect power supply to the fan motor.
14.6 Test the rotation of the motor opposite direction by changing the capacitor connection.
14.7 Note down the observations.

REFERENCE BOOKS

1 A text book of Electrical Technology - B. L. Theraja
2 Basic Electricity - Charles W Ryan
3 Basic Electrical theory and Practice - E. B. Babler
4 Electrical Machine - Siskind

MATHEMATICS-1

T	P	C
3	3	4

OBJECTIVES

- To acquaint the students with the basic terminology of Algebra.
- To be able to understand the complex numbers which are being used in electrical engineering.
- To be able to understand the binomial expansion.
- To be able to use the knowledge of trigonometry in solving problems of engineering importance.

SHORT DESCRIPTION

Algebra : AP & GP, Polynomials & polynomial equations, Complex number, Permutation & Combination, Binomial theorem for positive integral index and negative & fractional index.

Trigonometry: Ratio of associated angles, Compound angles, Transformation formulae, multiple angles and Sub-multiple angles.

DETAIL DESCRIPTION

ALGEBRA **:**

1 Understand the concept of AP & GP.

1.1 Define AP and common difference.
1.2 Find last term and sum of n terms, given first term and common difference.
1.3 Define GP and common ratio.
1.4 Find the sum of n terms given first and common ratio.

2 Apply the concept of polynomial in solving the problems.

2.1 Define polynomials and polynomial equation.
2.2 Explain the roots and co-efficient of polynomial equations.
2.3 Find the relation between roots and co-efficient of the polynomial equations.
2.4 Determine the roots and their nature of quadratic polynomial equations.
2.5 Form the equation when the roots of the quadratic polynomial equations are given.
2.6 Find the condition of the common roots of quadratic polynomial equations.
2.7 Solve the problems related to the above.

3 Understand the concept of complex numbers.

3.1 Define complex numbers.
3.2 Perform algebraic operation (addition, subtraction, multiplication, division, square root) with complex number of the form a + ib.
3.3 Find the cube roots of unity.
3.4 Apply the properties of cube root of unity in solving problems.

4 Apply the concept of permutation.

4.1 Explain permutation.
4.2 Find the number of permutation of n things taken r at a time when,
i) things are all different.
ii) things are not all different.
4.3 Solve problems of the related to permutation :
i) be arranged so that the vowels may never be separated. From 10 man and 6 women a committee of 7 is to be formed. In how many ways can this be done so as to include at least two women in the committee.

5 Apply the concept of Combination.

5.1 Explain combination.
5.2 Find the number of combination of n different things taken r at a time.
5.3 Explain ${}^{n}C_{r}$, ${}^{n}C_{n}$, ${}^{n}C_{0}$
5.4 Find the number of combination of n things taken r at a time in which p particular things
i) Always occur ii) never occur.
5.5 Establish i) ${}^{n}C_{r} = {}^{n}C_{n-r}$
ii) ${}^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$
5.6 Solve problems related to combination.

6 Apply partial fraction to break the numerator and denominator.

6.1 Define proper and improper fractions.
6.2 Resolve in to partial fraction of the followings types :
a) Denominator having a non-repeated linear factor.

b) Denominator having a repeated linear factor.
c) Denominator having a quadratic factors.
d) Denominator having a combination of repeated, non-repeated and quadratic factors.

7 Apply the concept of binomial theorem.

7.1 State binomial expression.
7.2 Express the binomial theorem for positive index.
7.3 Find the general term, middle term, equidistant term and term independent of x.
7.4 Use binomial theorem to find the value of
i) $(0.9998)^2$, correct to six places of decimal.
ii) $(1+\sqrt{2})^5 - (1-\sqrt{2})^5$

8 Apply the concept of binomial theorem for negative index.

8.1 Express the binomial theorem for negative and fractional index.
8.2 Solve problems of the following types:
Expand (i) $(1 - nx)^{-\frac{1}{n}}$ (ii) $\frac{1}{\sqrt{4.08}}$

TRIGONOMETRY :

9 Apply the concept of associated angles.

9.1 Define associated angles.
9.2 Find the sign of trigonometrical function in different quadrants.
9.3 Calculate trigonometrical ratios of associated angle.
9.4 Solve the problems using above.

10 Apply the principle of trigonometrical ratios of compound angles.

10.1 Define compound angles.
10.2 Establish the following relation geometrically for acute angles.
i) $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$.
ii) $\cos(A \pm B) = \cos A \cos B \pm \sin A \sin B$.
10.3 Deduce formula for $\tan(A \pm B)$, $\cot(A \pm B)$.
10.4 Apply the identities to work out the problems:
i) find the value of $\sin 75^0$, $\tan 75^0$.
ii) show that $\frac{\sin 75° + \sin 15°}{\sin 75° - \sin 15°} = \sqrt{3}$
iii) if $\alpha + \beta = \theta$, $\tan\alpha + \tan\beta = b$, $\cot\alpha + \cot\beta = a$, show that $(a - b) = ab \cot\theta$.

11 Apply sum and product formula of trigonometrical ratios.

11.1 Express sum or difference of two sines and cosines as a product and vice-versa
11.2 Solve problems of the followings types:
i) show that, $\sin 55° + \cos 55° = \sqrt{2}\cos 10°$
ii) prove that, $\cos 80° \cos 60° \cos 40° \cos 20° = \frac{1}{16}$

12 Apply the concept of ratios of multiple angles.

12.1 State the identities for sin 2A, cos 2A and tan 2A.
12.2 Deduce formula for sin 3A, cos 3A and tan 3A.
12.3 Solve the problems of the followings types.
i) express $\cos 5\theta$ in terms of $\cos\theta$.
ii) if $\tan\alpha = 2\tan\beta$, show that, $\tan(\alpha + \beta) = \frac{3\sin 2\alpha}{1 + 3\cos 2\alpha}$

13 Apply the concept of ratios of sub-multiple angles.

13.1 Find mathematically the identities for $\sin\alpha$, $\cos\alpha$ and $\tan\alpha$ in terms of $\frac{\alpha}{2}$ and $\frac{\alpha}{3}$

13.2 Solve the problems of the type :
find the value of cos 3°, cos 6°, cos 9°, cos 18°, cos 36° etc.

Reference:

SL No	Athour	Title	Publication
01	S. P Deshpande	Mathematics for Polytechnic Students	Pune Vidyarthi Graha Prakashan
02	H. K. Das	Mathematics for Polytechnic Students(Volume I)	S.Chand Prakashan
03	Ashim Kumar Saha	Higher Mathematics	Akshar patra Prakashani
04	S.U Ahamed & M A Jabbar	Higher Mathematics	Alpha Prakashani

PHYSICS-I

T	P	C
3	3	4

OBJECTIVES

- To develop the students a background of basic science i.e. Physics required for understanding technological subjects.
- To develop a working knowledge of common engineering and industrial materials and to enable to determine through experiments the properties of such materials.
- To develop through experiments an understanding of fundamental scientific concept.
- To develop a basic knowledge and concept of physical properties of common engineering and industrial materials.

SHORT DESCRIPTION

Measurement, Units; Vector and Scalar quantities; Motion and Equations of motion; Force and Newton's Laws of motion; Gravity and Gravitation; Simple Harmonic motion; Hydrostatics; Surface tension and viscosity; Pressure, Sound; wave and sound Concepts and nature of sound, Velocity of sound, Ultrasonic.

DETAIL DESCRIPTION

THEORY :

1. PHYSICAL WORLD AND MEASUREMENT

1.1. Nature of Physical World.
1.2. Scope and Excitement of Physics.
1.3. Few Terms about Physics.
1.4. Physics and other world of Technological Knowledge.
1.5. Principle of Measurement.
1.6. Fundamental and Derived Quantities and Units.
1.7. Dimensions of Units.
1.8. Errors in Measurement.

2. SCALAR AND VECTOR QUANTITIES

2.1 Define vector and scalar quantities with examples.
2.2 Show the various representations of the vector quantities; and representation of a vector by unit vector.
2.3 Find and explain the resultant of two vectors in different directions.
2.4 Resolve a vector into horizontal & vertical component.
2.5 Explain the dot and cross product of two vectors.
2.6 Define laws of triangle of vector.

3. MOTION AND EQUATIONS OF MOTION

3.1 Define rest and motion
3.2 Classify and explain of motion.
3.3 Define and explain displacement, speed, velocity, acceleration and retardation.
3.4 Deduce the relationship between displacement, velocity, acceleration and retardation from these definitions.
3.5 Motion of a Projectile.
3.6 Equation of motion of a freely moving body thrown obliquely vertically upward or motion of a projectile.
3.7 Define angular velocity and linear velocity with their units.
3.8 Deduce the relation between angular velocity and linear velocity.
3.9 Define centripetal and centrifugal force with examples.

3.10 Prove that centrifugal force = $\frac{mv^2}{r}$

3.11 State and explain the laws of falling bodies and mention the equation of motion of a body when it is projected vertically upwards or downwards.

4. NEWTON'S LAWS OF MOTION FORCE AND FRICTION

4.1 Define force.
4.2 State Newton's laws of motion.
4.3 Define different units of force and their correlation and also mention the dimension of force.
4.4 Prove P=mf, from Newton's 2nd law of motion.
4.5 Find out the resultant of parallel forces.
4.6 Define inertia and momentum
4.7 State and prove the principles of conservation of momentum.
4.8 Define friction and describe the different kinds of friction.
4.9 Define the co-efficient of static friction.
4.10 Show that the co-efficient of static friction is equal to the tangent of angle of repose
4.11 State the merits and demerits of friction.

5. GRAVITY AND GRAVITATION

5.1 Define and explain the Kepler's Law.
5.2 Define gravity and gravitation.
5.3 Define and determine the gravitational constant (G) and also mention its units and dimension.
5.4 Define acceleration due to gravity 'g' and also mention its units and dimension.
5.5 Discuss the variation of 'g' at different places.
5.6 Define mass and weight with their units and dimension.
5.7 Distinguish between mass and weight.
5.8 Define and explain gravitational potential and escape velocity

6. SIMPLE HARMONIC MOTION (SHM)

6.1 Define Periodic and simple harmonic motion (SHM).
6.2 State the characteristics of SHM.
6.3 Describe a simple pendulum and a second pendulum.
6.4 Define effective length, amplitude, phase, complete oscillation, period of oscillation, frequency.
6.5 State and explain the laws of simple pendulum.
6.6 Motion of simple pendulum and it's time period.

7. WORK, POWER AND ENERGY

7.1 Define work, power and energy.
7.2 State the units and dimensions of work, power and energy.
7.3 State and prove the principle of the conservation of energy.
7.4 Define potential energy (PE) and kinetic energy (KE).
7.5 Derive the equation of potential and kinetic energy.
7.6 Recognize that the useful work can be found from:

$$\text{Efficiency} = \frac{\text{output work}}{\text{input work}} \times 100.$$

8. ELASTICITY

8.1 Name some of the general and special properties of matter.
8.2 Define Elasticity and Elastic limit.
8.3 Define perfectly elastic body and perfectly rigid body.
8.4 Define stress and strain with their units and dimensions.
8.5 State and explain the Hook's law.
8.6 Describe various kinds of modulus of elasticity.
8.7 Mention the units and dimensions of modulus of elasticity.
8.8 Define and explain Poisson's ratio.

9. HYDROSTATICS

9.1 Define pressure as force per unit area and state that it is measured in N/m^2 or Pascal.
9.2 State characteristics of liquid pressure.
9.3 Establish the pressure at a point in a fluid depend upon the density of the fluid, the depth in the fluid and acceleration due to gravity.
9.4 Surface tension and surface energy, Angle of contact.
9.5 Capillarity and theory of capillarity.
9.6 Viscosity and co-efficient of viscosity.
9.8 Necessity of viscosity.

10. WAVE AND SOUND

10.1 Wave and wave motion.
10.2 Transverse wave and longitudinal wave.
10.3 Some definitions relating waves.
10.4 Progressive wave and stationary waves.
10.5 Equation of progressive wave.
10.6 Sound and production of sound.
10.7 Sound is a longitudinal traveling wave.
10.8 Interference of sound: Constructive and Destructive interference.
10.9 Define beats and Mechanism of formation of beats.

11. SOUND AND VELOCITY OF SOUND

11.1 Identify that sound is produced by vibration and travels through a medium as a longitudinal wave.
11.2 Recognize that sound can be produced of different pitches (frequencies) & that the human ear has an audible frequency range covering approximately 20 Hz to 20 KHz.
11.3 State the approximate frequency range for
a. infrasonic sound, b. Ultrasonic (supersonic) sound.
11.4 Explain how sound is absorbed, reflected & refracted by different types of surface.
11.5 Describe the practical uses of echo sounding devices.
11.6 Define velocity of sound.
11.7 State the velocity of sound at NTP in still air.
11.8 Compare the effects of pressure, temperature & humidity on the velocity of sound in air.

PRACTICAL

1. Determine accurate diameter/side of an object using vernier calipers.
2. Measure the area of cross section of a wire by micrometer screw gage.
3. Measure the thickness of a glass plate by speedometer.
4. Verify the law of parallelogram of forces by a force board.
5. Draw $L\text{-}T^2$ graph and determine the value of "g" by using a simple pendulum.
6. Determine the coefficient of static friction.
7. Determine Young's modulus of a steel wire by Searle's apparatus.
8. Determine gravity of a solid heavier than and insoluble in water by hydrostatic balance.
9. Determine specific gravity of a liquid by specific gravity bottle.
10. Determine velocity of sound by resonance air column method.

REFERENCE BOOKS:

1. Higher Secondary Physics - First Part - Dr. Shahjahan Tapan
2. A Text Book of Properties of of matter - N Subrahmanyam and Brij Lal
3. A Text Book of Sound - N Subrahmanyam and Brij Lal
4. Higher Secondary Physics- First Part - Prof. Golam Hossain Pramanik
5. Higher Secondary Physics- First Part - Ishak Nurfungnabi

ENGLISH **T P C**
Subject Code **2 0 2**

Full Marks: 100

Continuous Assessment : 40 Marks

Theory (Final Exam) : 60 Marks

Objectives:

After the completion of the course, learners will be able to develop-

- Reading, Listening with understanding
- The fluency of speech
- Grammatical accuracy with emphasis on spelling & punctuation
- Creative writing

Seen comprehension :(Marks-20)

Unit	Lesson	Title
People Or Institutions Making History (Unit one)	1	Nelson Mandela, from Apartheid Fighter To President
	2	The Unforgettable History
Food Adulteration(Unit Three)	1	Food Adulteration Reaches Height
	2	Eating Habit and Hazards
Human Relationship(Unit Four)	2	Love and Friendship
Environment and Nature (Unit Eight)	1	Water ,Water Everywhere
	5	Kuakata: Daughter Of The Sea
Greatest Scientific Achievement (Unit Thirteen)	1	Some Of The Greatest Scientific Achievements Of The Last 50 Years
	2	Science and Technology Against an Age- old Disease
Art and Music (Unit Fourteen)	1	What is Beauty?
	3	Crafts In Our Time
Tours and Travels (Unit Fifteen)	1	Travelling to A village in Bangladesh
	4	The Wonders of Vilayet

N.B: The Unit mentioned refers to the Text Book (1st Paper) English for Today for class 11 – 12 by National Curriculum & Text Book Board, Dhaka.

Grammar (Marks-20)

1. (a) Uses of Articles.
(b) Uses of Tense *(Right forms of verbs with indicators)
(c) Classify verbs: (Regular and Irregular verbs, Auxiliary, Principal, finite, non-finite verbs,)

2. Sentence:
(a) Changing Sentences: (Assertive, Interrogative, Optative, Imperative, Exclamatory Simple, Complex and Compound), Comparison Of Adjectives/Adverbs

(b) Question making: WH, Yes/No, Tag question

3. Enrich vocabulary: synonyms, Antonyms; suffix and prefix.

4. Voice, Narration

5. Sentence Analysis :

Study of part of Speech,(Type of verbs-Regular and Irregular verbs, Auxiliary and Principal verb)
Study Of Phrases and Clauses (Noun/ Adjective/ verb/ participle /adverbial/ prepositional phrases and Principal /Sub ordinate //co ordinate clauses)

Free Writing (Marks -20)

1. Write dialogues: (with teacher, principal, shopkeeper, hotel manager, station maste, newcomer, buyers, doctor, friend, colleagues etc).
2. Report writing on different events/ occasions/ accidents.
3. Writing situational personal and official letters.
4. Writing job application with CV /Appointment letter / joining letter
5. Write a guided paragraph with questions.

BANGLA

T	P	C
৩	৩	৪

উদ্দেশ্য :

১.মাতৃভাষা হিসেবে বাংলা ভাষার প্রকৃতি ও বৈশিষ্ট্য সম্পর্কে ধারণা লাভ। ভাষার ব্যবহারে প্রায়োগিক যোগ্যতা অর্জন।
২.বাংলা সাহিত্য পঠন-পাঠনের মাধ্যমে জাতীয় চেতনা, দেশপ্রেম, মুক্তিযুদ্ধের চেতনা, শুদ্ধাচার, নীতি ও মূল্যবোধের উন্মেষ ঘটানো।

সংক্ষিপ্ত বিবরণী :

মাতৃভাষা ও সৃজনশীলতা : বাংলা ভাষা রীতির বিচিত্রতা, বানান রীতি, পত্র রচনা এবং কবিতা, প্রবন্ধ, নাটক, উপন্যাস ও ছোট গল্প।

বিশদ বিবরণী:

১.বাংলা ভাষার প্রয়োগঃ

ক)বাংলা ভাষা :
ভাষার সংজ্ঞা, বাংলা ভাষা রীতি - সাধু, চলিত, আঞ্চলিক বা উপভাষা (সংজ্ঞা, বৈশিষ্ট্য, পার্থক্য ও উদাহরণ)

খ) বাংলা বানান রীতি ও শব্দ প্রয়োগ:
১.বাংলা একডেমির প্রমিত বানান রীতি, ণ-ত্ব ও ষ-ত্ব বিধি
২. শব্দ ও শব্দের শ্রেণি বিভাগ (সংজ্ঞা, শব্দের গঠন, উৎস বা উৎপত্তি ও অর্থগত)
৩.বাক্য প্রকরণ ও গঠন রীতি (সংজ্ঞা, বাক্য গঠন এবং প্রকার)

গ) পত্র রচনা :
আবেদন পত্র (চাকুরি, ছুটি), চাকুরিতে যোগদান পত্র, মানপত্র, স্মারকলিপি,
সংবাদপত্রে প্রকাশের জন্য পত্র

২. বাংলা সাহিত্যঃ

ক. কবিতা :
১.বঙ্গভাষা –মাইকেল মধুসূদন দত্ত
২. সোনার তরী – রবীন্দ্র নাথ ঠাকুর
৩. উমর ফারুক –কাজী নজরুল ইসলাম
৪. বাংলার মুখ আমি– জীবনানন্দ দাশ
৫. আসাদের শার্ট – শামসুর রাহমান
৬. স্বাধীনতা শব্দটি কি করে আমাদের হলো? – নির্মলেন্দু গুণ

খ. প্রবন্ধ :
১. অর্ধাঙ্গী –রোকেয়া সাখাওয়াত হোসেন
২.বইকেনা – সৈয়দ মুজতবা আলী

গ. একাঙ্কিকা (নাটিকা):
১.মানুষ –মুনীর চৌধুরী

ঘ. উপন্যাসঃ
১.লালসালু – সৈয়দ ওয়ালী উল্লাহ

ঙ.ছোট গল্পঃ
১. হৈমন্তী – রবীন্দ্র নাথ ঠাকুর
২. একুশের গল্প – জহির রায়হান
৩. পাতালেহাসপাতালে – হাসান আজিজুল হক

ব্যবহারিক

১.নির্ধারিত বক্তৃতা :

বাংলাদেশ ও বাঙালি সংস্কৃতি, বিভিন্ন জাতীয় দিবস (একুশে ফেব্রুয়ারি ও আন্তর্জাতিক মাতৃভাষা দিবস, স্বাধীনতা দিবস, বিজয় দিবস, জাতীয় শোক দিবস, মুজিব নগর দিবস, মহান মে দিবস)
প্রাতিষ্ঠানিক বক্তৃতা- নবাগত শিক্ষক/ছাত্রছাত্রীদের বরণ, গুরুত্বপূর্ণ ব্যক্তিবর্গের আগমন উপলক্ষে বক্তৃতা ।

২. উপস্থিত বক্তৃতা :

বিষয়বস্তু উন্মুক্ত

৩. আবৃত্তি :

১. মানুষ	- কাজী নজরুল ইসলাম
২. আকাশ নীলা	- জীবনানন্দ দাশ
৩. পল্লী জননী	- জসীম উদ্‌দীন
৪. ছাড়পত্র	- সুকান্ত ভট্টাচার্য
৫. তোমাকে পাওয়ার জন্য হে স্বাধীনতা	- শামসুর রাহমান
৬. নিষিদ্ধ সম্পাদকীয়	– হেলাল হাফিজ

৪. বিতর্ক (নমুনা)

সংস্কৃতিই আধুনিক মানুষের ধর্ম
তথ্য প্রযুক্তির অবাধ ব্যবহারই যুব সমাজেরঅবক্ষয়ের মূল কারণ
গতানুগতিক শিক্ষা নয় কর্মমুখি শিক্ষাই অর্থনৈতিক মুক্তির চাবিকাঠি
চালকের অসাবধনতাই সড়ক দুর্ঘটনার প্রধান কারণ
মুক্তিযুদ্ধের চেতনাই অসাম্প্রদায়িক বাংলাদেশ প্রতিষ্ঠার মূলমন্ত্র
প্রযুক্তির বিকাশই প্রকৃতি বিনাশের একমাত্র কারণ

৫. প্রতিবেদন প্রণয়ন ও উপস্থাপন:
স্থানীয় বিভিন্ন সমস্যা ও অনুসন্ধানী যে কোন বিষয় ।

BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

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

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: **666**

2nd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

2nd 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	66621	Database Application	0	6	2	0	0	50	50	100
2	66623	Graphics Design -1	0	6	2	0	0	50	50	100
3	65812	Physical education & Life skill development	0	3	1	0	0	25	25	50
4	66822	Electronic Engineering Fundamentals	2	3	3	40	60	25	25	150
5	65921	Mathematics -2	3	3	4	60	90	50	0	200
6	65922	Physics -2	3	3	4	60	90	25	25	200
7	65722	Communicative English	1	3	2	20	30	50	0	100
Total			**9**	**27**	**18**	**180**	**270**	**275**	**175**	**900**

66621 DATABASE APPLICATION T P C
0 6 2

1. Design Database Table

1.1. Follow OSH practices

1.1.1. Safe work practices are observed according to IT workplace guideline.
1.1.2. OSH hazards and incidents are reported to appropriate personnel according to Workplace procedures.
1.1.3. Safe workplace environment are assured.

1.2. Plan database table design

1.2.1. Pencil, pen, eraser and paper are collected to design the database as per client's requirement.
1.2.2. Object of the database are identified as per client's specification.
1.2.3. Entities, attributes and relationship are determined
1.2.4. Attribute name, data type and description /validation are defined in tabular form.

1.3. Incorporate basic design principles

1.3.1. Database application is selected as per requirement
1.3.2. Database application is opened
1.3.3. Database objects are selected as per plan requirement
1.3.4. Design tools are selected as per requirement
1.3.5. Design tools are used
1.3.6. Database objects are used.

1.4. Develop a table with fields and attributes

1.4.1. Field name are created according to the design plan
1.4.2. Data types of a fields are selected
1.4.3. Field's properties are set
1.4.4. Field descriptions are written as requirement
1.4.5. Primary key is determined and set
1.4.6. Index is established
1.4.7. Additional attribute is set as required
1.4.8. Table structure, field name and field properties are edited
1.4.9. Table structure is saved

1.5. Create a relationship between the tables

1.5.1. Common field in each table with same data type is ensured
1.5.2. Primary key and foreign key are assigned
1.5.3. Closing of all table are observed
1.5.4. Manipulation of relationship are performed
1.5.5. Database Tables are saved.

1.6. Shut down the computer and clean workplace

1.6.1. Database is closed
1.6.2. Computer is shut down according to Standard Operating Procedure(SOP)
1.6.3. Clean the workplace as per company rules

2. Create forms

2.1. Follow OSH practices

2.1.1. Safe work practices are observed according to IT workplace guideline.
2.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
2.1.3. Safe workplace environment are assured.

2.2. Create form using wizard

2.2.1. Form object is selected from the object list
2.2.2. Create menu is selected from the ribbon
2.2.3. More forms tool is selected from the ribbon
2.2.4. Table is selected from the form wizard dialog box
2.2.5. Fields are selected from the available fields list
2.2.6. The procedure is finished by clicking the finish button Form is saved

2.3. Insert command buttons on the form using wizard

2.3.1. Previously created form is opened in design view
2.3.2. Design tab is selected from menu bar
2.3.3. Use control wizard is activated from the design ribbon
2.3.4. Command Button tool is drag & dropped in the form from the design ribbon
2.3.5. Appropriate category is selected from the category list
2.3.6. Appropriate action is selected from the action list
2.3.7. Button insertion is finished by clicking the finish button of the wizard

2.4. Create form manually

2.4.1. Form object is selected from the object list
2.4.2. Create menu is selected from the ribbon
2.4.3. Form design tool is selected from the ribbon
2.4.4. Add existing fields tool is selected under design ribbon
2.4.5. Table is selected from the available table list
2.4.6. Fields are drag & dropped in the form from the available fields list
2.4.7. Form is viewed in form view
2.4.8. Form is saved

2.5. Insert command buttons manually

2.5.1. Previously created form is opened in design view
2.5.2. Design tab is selected from menu bar
2.5.3. Command Button tool is drag & dropped in the form from the design ribbon
2.5.4. Property sheet is viewed by double clicking the button
2.5.5. Macros are Built by clicking the appropriate event under the event tab
2.5.6. Records and command buttons are Navigated
2.5.7. Form is saved

2.6. Manipulate the records using command buttons

2.6.1. Database is opened properly
2.6.2. Previously created form is opened in form view
2.6.3. Records are added by clicking Add new record button
2.6.4. Records are deleted by clicking Delete record button
2.6.5. Records are modified

3. Retrieve database information

3.1. Follow OSH practices

3.1.1. Safe work practices are observed according to IT workplace guideline.
3.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
3.1.3. Safe workplace environment are assured.

3.2. Create simple query and retrieve required information

3.2.1. Existing database and location are accessed
3.2.2. Query is created by Query Wizard
3.2.3. Field are selected from existing table
3.2.4. Data are sorted using simple query
3.2.5. Parameter is used

3.2.6. Criteria is used for query
3.2.7. Query is run and saved

3.3. Create append query

3.3.1. Existing database and location are accessed as required
3.3.2. Query object is selected
3.3.3. Design view is opened of the query
3.3.4. Table(s) are added in the query
3.3.5. Fields are selected as per requirement
3.3.6. Append are performed as per required table.
3.3.7. Query is run and saved

3.4. Create delete query

3.4.1. Existing database and location are accessed as required
3.4.2. Query object is selected
3.4.3. Design view is opened of the query
3.4.4. Table(s) are added in the query
3.4.5. Fields are selected as per requirement
3.4.6. Deletion is performed as per requirement.
3.4.7. Query is run and saved

3.5. Perform Filter Operations

3.5.1. Filter are applied to table and forms
3.5.2. Filter are removed from table and forms

3.6. Sort Records

3.6.1. Data sorted in a table, form and query output in ascending/descending numerical /alphabetical order as required.
3.6.2. Report Based on table and query are created and saved as required

3.7. Shut down the computer and clean workplace

3.7.1. Database is closed
3.7.2. Computer is shut down according to Standard Operating Procedure(SOP)
3.7.3. Clean the workplace as per company rules

4. Generate database Reports

4.1. Follow OSH practices

4.1.1.Safe work practices are observed according to IT workplace guideline.
4.1.2.OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
4.1.3. Safe workplace environment are assured.

4.2. Create reports

4.2.1. Reports format are planed and determined
4.2.2. Report based on a table and query are created and saved as required.
4.2.3. The arrangement of data fields and headings within a report layout are changed as required.
4.2.4. Data under a specific heading (field) in a report are grouped in ascending/descending order as required.
4.2.5. Specific fields in a grouped report are presented by sum, minimum, maximum, average, count at appropriate break points.

4.3. Modify reports to include or exclude additional requirements

4.3.1. Text in headers, footers in a report are added or modified as necessary.
4.3.2. Report is deleted correctly.
4.3.3. Report is saved and closed correctly.

4.4. Sort Records

4.4.1. Data sorted in a table, form and query output in ascending/ descending numerical /alphabetical order as required.
4.4.2. Report Based on table and query are created and saved as required

4.5. Distribute and print reports in a suitable format

4.5.1. Table, forms, reports are previewed to ensure that errors are detected and corrected.
4.5.2. Report orientation, paper size changed as required
4.5.3. The results of query printed as required
4.5.4. Specific pages in a report or a complete report printed as required

4.6. Export data in various Formats

4.6.1. Report is exported as PDF or XPS.
4.6.2. Report is exported as word Document.
4.6.3. Report is exported as HTML Document.

5. Test and use database

5.1. Follow OSH practices

5.1.1. Safe work practices are observed according to IT workplace guideline.
5.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
5.1.3. Safe workplace environment are assured.

5.2. Plan to test the correctness of the database

5.2.1. Possible errors are listed
5.2.2. Testing sequence is planed

5.3. Verify the feature of the database

5.3.1. Database is opened
5.3.2. Tables, forms and reports are opened
5.3.3. Features of the tables, forms and report are shown
5.3.4. Format of the text are modified if required
5.3.5. Alignment of the tables, forms and reports are changed as per client's requirements.

5.4. Navigate the buttons and forms

5.4.1. Forms are opened
5.4.2. Buttons of the forms are identified
5.4.3. Functions of the buttons are tested to verify the usability for every events.

5.5. Perform data entry operation

5.5.1. Forms are identified for data entry
5.5.2. Data is organized
5.5.3. Forms are opened for data entry
5.5.4. Data is entered in the concern field
5.5.5. Error is detected if any and corrected by modification if required.
5.5.6. All forms are filled up and checked for malfunctions
5.5.7. Malfunctions are corrected if required.

5.6. View and print reports

5.6.1. Table, forms, reports are previewed to ensure that errors are detected and corrected.
5.6.2. Report orientation, paper size changed as required
5.6.3. The results of query are printed as required
5.6.4. Specific pages in a report or a complete report is printed as required

66623 GRAPHICS DESIGN-1 **T P C**
0 6 2

Separate and compose Images

1.1. Follow OSH practices
- 1.1.1. Safe work practices are observed according to workplace procedures
- 1.1.2. OSH hazards and incidents are reported to appropriate personnel.

1.2. Identify image source
- 1.2.1. Appropriate Image separation software is identified.
- 1.2.2. Image sources are identified
- 1.2.3. Image separation tools are identified.
- 1.2.4. Images are successfully Imported from appropriate source

1.3. Identify image standards
- 1.3.1. Image properties are identified
- 1.3.2. Image resolution are identified and demonstrated.
- 1.3.3. Image format are identified and selected.

1.4. Separate Images using magic wand tools
- 1.4.1. Magic wand tool is selected
- 1.4.2. Image is selected
- 1.4.3. Image is separated

1.5. Separate Images using lasso tools
- 1.5.1. Lasso tool is selected
- 1.5.2. Image is selected
- 1.5.3. Image is separated

1.6. Separate Images using pen tools
- 1.6.1. pen tool is selected
- 1.6.2. Image is selected
- 1.6.3. Image is separated

1.7. Create layer and compose
- 1.7.1. New document is created
- 1.7.2. Images are pasted for edit
- 1.7.3. Layers are created and selected.
- 1.7.4. Images are edited and arranged.

1.8. Evaluate own work
- 1.8.1. Constructive criticism from others is applied to improve own work.
- 1.8.2. Own work is evaluated against planned Strategy for own practice.
- 1.8.3. Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

Create basic designs using illustration software

3.8. Follow OSH practices
- 3.8.1. Safe work practices are observed according to workplace procedures
- 3.8.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.

3.9. Create basic designs
- 3.9.1. Required designs are specified.
- 3.9.2. Appropriate shape and size are identified
- 3.9.3. Content area is defined
- 3.9.4. Contents are inserted and composed
- 3.9.5. Shapes are modified as per requirements.
- 3.9.6. Typographical design is applied as per requirements.
- 3.9.7. Font attributes are applied per requirements.
- 3.9.8. Design and colour are applied per requirements.
- 3.9.9. Design is saved in appropriate file format

3.10. Create Outline and transfer.
- 3.10.1. Design is reviewed and finalized
- 3.10.2. Outline is created and grouped
- 3.10.3. Final design is saved in appropriate file format
- 3.10.4. Final design is transferred to the recipients

3.11. Develop conceptual skills and ideas
- 3.11.1. Working with others to develop basic design ideas is demonstrated.
- 3.11.2. Ability to gain experience in a range of genres and interpretation of basic design guidelines is demonstrated.
- 3.11.3. Ability to gain experience in a range of genres and interpretation of basic design guidelines is demonstrated.
- 3.11.4. A range of opportunities to develop own practice and keep informed about current design practice are identified and used for basic design guidelines.

3.12. Evaluate own work
- 3.12.1. Constructive criticism from others is applied to improve own work.
- 3.12.2. Own work is evaluated against planned strategy for own practice.
- 3.12.3. Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

Manipulate image using image processing Software

3.1. Follow OSH practices
- 3.1.1. Safe work practices are observed according to workplace procedures
- 3.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures

3.2. Retouch Image
- 3.2.1. Appropriate retouch tools are identified
- 3.2.2. Tools are calibrated as required
- 3.2.3. Layers are created and preserved
- 3.2.4. Different retouch tools are used as per requirement
- 3.2.5. Images are corrected and saved in appropriate file format

3.3. Colour Correction
- 3.3.1. Different colour correction methods are identified
- 3.3.2. Appropriate image mode is selected
- 3.3.3. Various colour correction methods are used
- 3.3.4. Compare image enhancement with the original one

3.3.5. Save in appropriate file format
3.3.6. Transfer the image to recipient

3.4. Apply Effect
3.4.1. Identify appropriate effect options
3.4.2. Proper image mode is selected
3.4.3. Different Effects are applied to images as per requirements
3.4.4. Compare and adjust effects
3.4.5. Save in appropriate file format
3.4.6. Transfer the image to recipient

3.5. Evaluate own work
3.5.1. Constructive criticism from others is applied to improve own work
3.5.2. Own work is evaluated against planned strategy for own practice
3.5.3. Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

Create professional designs using Illustration software.

3.13. Follow OSH practices
3.13.1. Safe work practices are observed according to workplace procedures
3.13.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.

3.14. Prepare design
3.14.1. Required Professional Design works are selected.
3.14.2. Appropriate Tools, Palette and arrange them as needed are identified.
3.14.3. Ruler/unit/Grids/Guides/Smart Guides as per requirement are set
3.14.4. Key Drawing / Design Layout are prepared
3.14.5. Various Marks.
3.14.6. Layer lock is applied

3.15. Create Design
3.15.1. Insert Contents are inserted.
3.15.2. Colour/Design/Pattern is applied.
3.15.3. Pathfinder to create complex Objects are used
3.15.4. Font Attributes as per requirement Applied
3.15.5. Zoom In-Out and Panning are used
3.15.6. Design for further use is Saved

3.16. Review and Finalize
3.16.1. Artwork and Preview is used
3.16.2. Layer Hide-Unhide option is used
3.16.3. Outline and Group Created
3.16.4. Appropriate File Format Saved
3.16.5. The image to recipient Transferred

65812 PHYSICAL EDUCATION AND LIFE SKILL DEVELOPMENT T P C
0 3 1

OBJECTIVES

- To enhance body fitness.
- To make aware of First Aid Procedure.
- To acquaint with the Common games and sports.
- To develop Life Skill.

SHORT DESCRIPTION

Warm up; Yoga; Muscle developing with equipment; Meditation, First aid; sports science, Games & sports; Life skill development.

DETAIL DESCRIPTION

1. National Anthem and Assembly

1.1 Line and File.
1.2 Make assembly.
1.3 Recitation of national anthem.
1.4 National anthem in music.

2. Warm up

2.1 **General Warm-up :**
Spot running (Slow, Medium & Fast), Neck rotation, Hand rotation, Side twisting, Toe touching, Hip rotation, Ankle twisting, Sit up and Upper body bending (Front & Back).

2.2 **Squad Drill :**
Line, File, Attention, Stand at easy, Stand easy, Left turn, Right turn, About turn, Mark time, Quick march, Right wheel, Left wheel, Open order march & Closed order march.

2.3 **Specific warm up :**
Legs raising one by one, Leg raising in slanting position, Knee bending and nose touching, Heels raising, Toes touching (standing and laying position), Hand stretch breathing (Tadasana, Horizontal, Vertical).

2.4 Mass Physical Exercise
Hand raising, Side twisting, Front & back bending, Front curl, Straight arm curl two hand, Hands raising overhead and Push up.

3. Yoga

3.1 Dhyanasan : Shabasan, Padmasan, Gomukhasan, Sharbangasan, shashangasan Shirshasan
3.2 Shasthyasan : Halasan, Matshasan, Paban Muktasan, Ustrasan.
3.3 Prana and Pranayama: Nadisuddhi Pranayma, cooling pranayamas (sitali pranayama, Sitkari Pramayama, sadanta pranayama), Ujjayi pranayama,

4. Muscle Developing with equipment

4.1 Damball : Front curl, Hand sidewise stretching, Arms raising overhead.
4.2 Barball : Front press, Leg press, Rowing motion with leverage bar.
4.3 Rope climbing : Straight way climbing, Leg raising climbing.
4.4 Horizontal bar : Chinning the bar with front grip, Chinning the bar with wide back grip.
4.5 Jogging Machine : Slow, Medium, and Fast running.
4.6 A. B king pro (Rowing Machine): Sit up.
4.7 Sit up bench: Sit up.

5 **Meditation**

5.1 Define meditation.
5.2 Classification of Meditation.

5.3 Nadanusandhana (A-Kara chanting, U-Kara chanting, M-Kara chanting, AUM-kara chanting.
5.4 OM-Meditation.
5.5 Cyclic Meditation (Starting Prayer, Instant Relaxation Technique, Centring, Standing Asanas, Sitting Asanas, Quick Relaxation Technique).

6. **First Aid**
6.1 Define First Aid.
6.2 What do you mean by First Aider.
6.3 Discuss the responsibilities of a First Aider.
6.4 Different types of equipment of First Aid.
6.5 Muscle Cramp-Ice application (Remedy).
6.7 Dislocation-Ice application (Remedy).

7. Rules and Technique of games and sports
7.1 Kabadi.
7.2 Football.
7.3 Cricket.
7.4 Badminton.
7.5 Athletics.
7.6 Swimming.

8. Sports Science
8.1 Definition of Exercise physiology.
8.2 Function of muscles.
8.3 Concept of work, energy and power.
8.4 Effect of exercise on heart and circulatory system.
8.5 Motor components for physical fitness.
8.6 Definition of sports Biomechanics.
8.7 Definition of sports psychology.
8.8 Meaning of nutrition, Diet and Balanced diet.
8.9 Meaning of the terms –Test, measurement and Evaluation.

9. Show skill on conversation on day to day life
9.1 Today's Market price.
9.2 Festivals(religious festivals, National festivals).
9.3 Celebration of National days.
9.4 Aim in life.
9.5 Visited historical places/sites.

10. Human relation
10.1 Family relation.
10.2 Relation with nighbour.
10.3 Humanitarian Service.
10.4 Service for handicapped (intelligent, physical, social etc).
10.5 Service for orphan / Patient.

11 Vote of appreciation
11.1 About dress .
11.2 For good work.
11.3 For good result.
11.4 For good news.

12. Stress Management
12.1 Habit to be a man of humor.
12.2 Always brain should be cool.
12.3 Positive thinking.
12.4 Factors that determine our attitude.
12.5 The benefits of a positive attitude.
12.6 Steps to building a positive attitude.

13 Time Management

13.1 Determine essential time for a task.
13.2 Determine delay and unexpected time.
13.3 Determine time for daily activities .
13.4 Plan for daily activities.

14 Interview Technique

14.1 Mental preparation to face an interview.
14.2 Selection of dress for interview.
14.3 Introducing himself/herself to the interviewer .
14.4 Coping interview.

15 Team work

15.1 Organized a team.
15.2 Selection of team leader.
15.3 Distribution the task to the members.
15.4 Accepting opinion of team members.
15.5 Completion of task as a team.

16 Social work

16.1 Tree plantation.
16.2 Community service.
16.2.1 Rover Scout.
16.2.2 Sanitation.
16.2.3 Pure drinking water.
16.2.4 Social Culture.

Reference Book

Modern Yoga _Kany Lal Shah
Rules of games and sports_ Kazi Abdul Alim
Yoga _ Sobita Mallick
Iron Man_ Nilmoni Dass

66822	Electronics Engineering Fundamental	T	P	C
		2	3	3

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 toidentify 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 coupledandtransformer 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 andWein-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 mutivibrator 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 p 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 form 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 manufacture'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

65921 MATHEMATICS -2

T	P	C
3	3	4

OBJECTIVES

- To enable in solving the simultaneous equations with the help of determinant and matrix.
- To make understand the exponential series.
- To provide ability to apply the knowledge of differential calculus in solving problem like slope, gradient of a curve, velocity, acceleration, rate of flow of liquid etc.
- To enable to apply the process of integration in solving practical problems like calculation of area of a regular figure in two dimensions and volume of regular solids of different shapes.

SHORT DESCRIPTION

Algebra : Determinants, Matrix, Exponential Series.

Trigonometry : Inverse circular functions, Properties of triangle and solution of triangles.

Differential Calculus : Function and limit of a function, differentiation with the help of limit, differentiation of functions, geometrical interpretation of $\frac{dy}{dx}$, successive differentiation and Leibnitz theorem, partial differentiation.

Integral Calculus : Fundamental integrals, integration by substitutions, integration by parts, integration by partial fraction, definite integrals.

DETAIL DESCRIPTION

ALGEBRA :

1 Apply determinants to solve simultaneous equations.

1.1 Expand a third order determinant.
1.2 Define minor and co-factors.
1.3 State the properties of determinants.
1.4 Solve the problems of determinants.
1.5 Apply Cramer's rule to solve the linear equation.

2 Apply the concept of matrix.

2.1 Define matrix, null matrix, unit matrix, square matrix. column matrix, row matrix, inverse matrix, transpose matrix, adjoin matrix, rank of a matrix, singular matrix.
2.2 Explain equality, addition and multiplication of matrix.
2.3 Find the rank of a matrix.
2.4 solve the problems of the following types:
  i) Solve the given set of linear equations with the help of matrix.
  ii) Find the transpose and adjoin matrix of a given matrix.

3 Understand exponential series.

3.1 Define e.
3.2 Prove that e is finite and lies between 2 and 3.
3.3 Prove that $e^x = 1 + \frac{x}{\lfloor 1} + \frac{x^2}{\lfloor 2} + \frac{x^3}{\lfloor 3} + \frac{x^4}{\lfloor 4}$ ..... to ∞
3.4 Solve problems of the followings types :

i) $1 + \frac{1}{\lfloor 2} + \frac{1}{\lfloor 4} + \frac{1}{\lfloor 6}$ + ... to ∞

ii) $\frac{1}{\lfloor 2} + \frac{1+2}{\lfloor 3} + \frac{1+2+3}{\lfloor 4} + \frac{1+2+3+4}{\lfloor 5}$ + ... to ∞

TRIGONOMETRY

4 Apply the concept of inverse circular function.

4.1 Explain the term inverse circular function and principal value of a trigonometrical ratio.

4.2 Deduce mathematically the fundamental relations of different circular functions.

4.3 Convert a given inverse circular function in terms of other functions.

4.4 Prove mathematically

i) $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \dfrac{x+y}{1-xy}$.

ii) $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \dfrac{x+y+z-xyz}{1-xy-yz-zx}$

iii) $\sin^{-1} x + \sin^{-1} y = \sin^{-1} \left(x\sqrt{1-y^2} + y\sqrt{1-x^2}\right)$

iv) $2\tan^{-1} x = \sin^{-1} \dfrac{2x}{1+x^2} = \cos^{-1} \dfrac{1-x^2}{1+x^2} = \tan^{-1} \dfrac{2x}{1-x^2}$

4.5 Solve problems of the following types.

a) $2\tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{4} = \frac{\pi}{4}$

b) $\cos \tan^{-1} \cot \sin^{-1} x = x$.

c) Prove that the area of the segment cut from a circle of radius r by a chord at a distance d from the centre is given by

$K = r^2 \cos^{-1} \dfrac{d}{r} - d\sqrt{r^2 - d^2}$

5 Apply the principle of properties of triangles.

5.1 Prove the followings identities :

i) $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C} = 2R$.

ii) $a^2 = b^2 + c^2 - 2bc \cos A$

iii) $a = b \cos C - c \cos B$.

v) $\Delta = \dfrac{1}{2} bc \sin A$.

5.2 Establish the followings.

a) $\tan \dfrac{A}{2} = \sqrt{\dfrac{(s-b)(s-c)}{s(s-a)}}$

b) $\tan \dfrac{B-C}{2} = \dfrac{b-c}{b+c} \cot \dfrac{A}{2}$

c) $\Delta = \dfrac{abc}{4R}$

5.3 Solve the problems of the following types:

i) Prove $\cos (B - C) + \cos A = \dfrac{bc}{2R}$

ii) An object experiences two forces F_1 and F_2 of magnitude 9 and 13 Newtons with an angle 100^0 between their directions. Find the magnitude of the resultant R.

DIFFERENTIAL CALCULUS

6 Understand the concept of functions.

6.1 Define constant, variable, function, domain, range

6.2 Solve problems related to functions.

7 Understand the concept of limits.

7.1 Define limit and continuity of a function.

7.2 Distinguish between $\lim_{x \to a}$ f(x) and f(a).

7.3 Establish (i) $\lim_{x \to 0} \frac{\sin x}{x} = 1$

(ii) $\lim_{x \to 0} \frac{\tan x}{x} = 1$

8 Understand differential co-efficient and differentiation.

8.1 Define differential co-efficient in the form of

$$\frac{dy}{dx} = \lim_{h \to 0} \frac{f(x + h) - f(x)}{h}$$

8.2 Find the differential co-efficient of algebraic and trigonometrical functions from first principle.

9 Apply the concept of differentiation.

9.1 State the formulae for differentiation:

(i) sum or difference

(ii) product

(iii) quotient

(iv) function of function

(v) logarithmic function

9.2 Find the differential co-efficient using the sum or difference formula, product formula and quotient formula.

9.3 Find the differential co-efficient function of function and logarithmic function.

10 Apply the concept of geometrical meaning of $\frac{dy}{dx}$

10.1 Interpret $\frac{dy}{dx}$ geometrically.

10.2 Explain $\frac{dy}{dx}$ under different conditions

10.3 Solve the problems of the type:
A circular plate of metal expands by heat so that its radius increases at the rate of 0.01 cm per second. At what rate is the area increasing when the radius is 700 cm ?

11 Use Leibnitz's theorem to solve the problems of successive differentiation.

11.1 Find 2nd, 3rd and 4th derivatives of a function and hence find n-th derivatives.

11.2 Express Leibnitz's theorem

11.3 Solve the problems of successive differentiation and Leibnitz's theorem.

12 Understand partial differentiation.

12.1 Define partial derivatives.

12.2 State formula for total differential.

12.3 State formulae for partial differentiation of implicit function and homogenous function.

12.4 State Euler's theorem on homogeneous function.

12.5 Solve the problems of partial derivatives.

INTEGRAL CALCULUS

13 Apply fundamental indefinite integrals in solving problems.

13.1 Explain the concept of integration and constant of integration.

13.2 State fundamental and standard integrals.

13.3 Write down formulae for:

(i) Integration of algebraic sum.

(ii) Integration of the product of a constant and a function.

13.4 Integrate by method of substitution, integrate by parts and by partial fractions.

13.5 Solve problems of indefinite integration.

14 Apply the concept of definite integrals.

14.1 Explain definite integration.

14.2 Interpret geometrically the meaning of $\int_a^b f(x)\,dx$

14.3 Solve problems of the following types:

(i) $\int_0^{\pi/2} \cos^2 x \, dx.$ (ii) $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{-x^2}} dx$

P* =Practical continuous assessment

Reference

SL No	Athour	Title	Publication
01	S. P Deshpande	Mathematics for Polytechnic Students	Pune Vidyarthi Graha Prakashan
02	H. K. Das	Mathematics for Polytechnic Students(Volume I)	S.Chand Prakashan
03	Shri Shantinarayan	Engg.Maths Vol I & II	S.Chand & Comp
04	Dr. B M Ekramul Haque	Higher Mathematics	Akshar Patra Prakashani
05	Md. Abu Yousuf	Differential & Integral Calculus	Mamun Brothers

65922 PHYSICS-2

T	P	C
3	3	4

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^{γ}=const.
5.7 State and Explain Reversible process and irreversible process.
5.8 State & explain 2^{nd} 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 co-efficient 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.Odgensbasicvocabulary.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.

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.Britishcoucil.Org/Education/Blog/Podcast/News/Weather,Www.Englishteststore.Com.Www.Ieltsexam.Com

Lab-Facilitator, 30 Students In A Group:

Physical Facility	Size (In Ft)	Area (In Sq Ft)
Class Room Cum Laboratory	1 5 × 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.Marium-Websters.Com,Www.Compellingconversation.Com, Www.Esl.Guide@About.Com, Www.Bbc.Com/News, Www.Speaking24.Com, Www.Itutor.Com, Www.Ieltsexam.Com, Www.Englishteststore.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.)