BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

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

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: **661**

3rd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

ARCHITECTURE TECHNOLOGY (661)

3rd SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total
						Theory		Practical		
						Cont. assess	Final exam	Cont. assess	Final exam	
1	66131	Architectural Design -2	1	6	3	20	30	50	50	150
2	66132	Computer Aided Drawing	0	6	2	0	0	50	50	100
3	66133	Architectural Graphics	1	3	2	20	30	25	25	100
4	66435	Fundamental Surveying	3	3	4	60	90	25	25	200
5	65722	Communicative English	1	3	2	20	30	50	0	100
6	65931	Mathematics-3	3	3	4	60	90	50	0	200
7	65922	Physics-2	3	3	4	60	90	25	25	200
		Total	12	27	21	240	360	275	175	1050

66131   **Architectural Design - 2**   **T   P   C**

                                                                              1   6   3

AIMS

- Able to understand the factors in planning and designing of residential building.
- To develop skills in orientation of different rooms of residential building.
- To provide knowledge and skills of working drawing of residential building

SHORT DESCRIPTION

Fundamentals of design, Basic area of residential building, Residential building planning, Area planning of house, Room arrangement , Floor plan ,

DETAIL DESCRIPTION

Theory :

1. Understand the fundamentals of Architectural design.
      1.1 State the terms of formal & informal design.
      1.2 List the principles of architectural design.
      1.3 List the elements of architectural design.
      1.4 Describe the principles of architectural design.
      1.5 Describe the elements of architectural design.
      1.6 State the style of house.

2. Understand the aspect of residential building planning .
      2.1 List the general requirement of a house.
      2.2 State the different components used in residential building.
      2.3 Describe the function of different components used in residential building.
      2.4 Describe the location of different components used in residential building.
      2.5 Mention the size of different components used in residential building.

3. Understand basic areas of residential building.
      3.1 List the basic areas of a house
      3.2 Describe basic areas of a house.
      3.3 State the living area of the house(Living and Dining).
      3.4 State the sleeping area of a house (Beds).
      3.5 State the service area of a house (Kitchen , Utility and Stair).
      3.6 Describe the toilet of of a residence.
      3.7 Explain the bubble diagram of a house.
      3.8 Explain traffic pattern of a house.

4. Understand the room arrangement of a house .
      4.1 State the location of different room of a house.
      4.2 Describe the function of different room of a house.
      4.3 Describe the functional relation of different room of a house.
      4.4 State the criteria depends on select the size of rooms of a house.
      4.5 State the meaning of the terms Foyer, Corridor, Passage, Verandah, Balcony, Terrace, Open Terrace, Porch, Portico, Head room, Louver, corbel, Offset, Projection wall, Pent house,, Drip course & Groove.

5. Understand the different types of house.
      5.1 List the different types of house.
      5.2 Describe different types of house.
      5.3 Describe Duplex & Split level house
      5.4 Describe difference between single and multistoried building.
      5.5 Describe advantage & disadvantage of single and multistoried building.
      5.6 State the design process of residential building.

6. Understand Architectural Drawing.

       6.1 Define plan, elevation, section of a residential building.

       6.2 State working drawing.

       6.3 Describe Detail drawing.

       6.4 Describe site plan.

7. Understand the planning of stair & Elevator.

       7.1 Define staircase.

       7.2 Mention the classification of staircase.

       7.3 Mention the space requirement for staircase.

       7.4 State the relation between tread & riser.

       7.5 Mention the planning consideration of staircase.

       7.6 Define Elevator & its function.

PRACTICAL :

1. Perform the area planning.

       1.1 Draw a bubble diagram showing different areas of a house.

       1.2 Show the relationship of three basic area.

       1.3 Draw a traffic pattern

       1.4 Show the basic types of entrance.

       1.5 Sketch a line plan showing different rooms.

2. Prepare the drawing of various environmental consideration.

       2.1 Draw the winter and summer sun angle diagram.

       2.2 Draw the shading device to control summer and winter sun heat.

       2.3 Draw the plan showing position of the building.

       2.4 Draw the room plan showing air movement of the room.

3. Prepare the drawing of staircase.

       3.1 Draw the plan of a doglegged staircase in 1:50 scale.

       3.2 Draw a section of a doglegged staircase in 1:50 scale.

       3.3 Draw the plan of a three-quarter turn stair in 1:50 scale.

       3.4 Draw the section of a three-quarter turn stair in 1:50 scale.

4. Prepare the presentation drawing.

       4.1 Sketch a line plan of a multistoried two bed room residential building in a given area.

       4.2 Draw the plan of the building in 1:100 scale.

       4.3 Draw the 4-side elevations with rendering of the building in 1:100 scale..

       4.4 Draw the section of the building in 1:100 scale.

       4.5 Draw the roof plan of the building in 1:100 scale.

       4.6 Draw the lay-out plan of the building in 1:200 scale.

5. Prepare the working drawing of a residential building.

       5.1 Draw the floor plan of a house (working drawing) in 1:50 scale with detail dimensions.

       5.2 Draw the elevations in 1:50 scale.

       5.3 Draw a section in 1:50 scale detail dimensions.

       5.4 Draw detail drawing of building component in 1:10 scale.

6. Prepare the detail drawing of toilet & kitchen.

       6.1 Draw the detail toilet plan in 1:20 scale with different fixture layout.

       6.2 Draw the section of toilet in 1:20 scale.

       6.3 Draw the detail kitchen plan in 1:20 scale with different fixture layout.

       6.4 Draw the section of kitchen in 1:20 scale.

REFERENCE BOOKS

1. Architecture Drafting and Design

                Donald E.Hepler
                Paul I.Wallach

2. ডিজাইন রীতি ও স্থাপত্যিক ধারা

               আবু এইচ ইমামউদ্দিন

3. আর্কিটেকচারাল ড্রাফটিং - ১

T	**P**	**C**
0	**6**	**2**

66132   Computer Aided Drawing

AIMS:
Able to develop knowledge, skill and attitude in the field of Computer Aided Drafting (Auto CAD) with special emphasis on:

- Drawing environments and drawing aids.
- Different setup of drawing in Auto CAD.
- Drawing commands.
- Modification & editing of drawing.
- Develop skills in 3D using Auto CAD.
- Printing the drawing.

SHORT DESCRIPTION:
Drawing environments and drawing aids; Different set-up of drawing in Auto CAD; Drawing commands; Modification & edits of drawing; and Printing the drawing.

PRACTICAL

1.   Set up the drawing environments.
  1.1.   Start CAD software and identify the different areas of CAD graphic screen.
  1.2.   Use menu bar, command window and toolbar.
  1.3.   Perform the Cartesian co-ordinate system.
  1.4.   Save the drawing & exit from the file.

2.   Construct the geometrical shape or object.
  2.1.   Use the command to draw straight line.
  2.2.   Draw single and multiple points using point commands.
  2.3.   Draw angular line using line commands.
  2.4.   Perform snap command.
  2.5.   Erase the object using erase command.

3.   Construct the rectangle, circle, polygon, poly line etc.
  3.1.   Draw rectangle using rectangle commands.
  3.2.   Draw circles using different method of circle commands.
  3.3.   Draw polygon using different method of polygon commands.
  3.4.   Draw poly line using poly line commands.
  3.5.   Draw poly line and arc together using poly line commands.
  3.6.   Draw different thickness of poly line using poly line commands

4.   Construct the ellipse, arc, donut, offset, array etc.
  4.1.   Draw ellipse using center and axis method commands.
  4.2.   Draw arc using different commands of arc.
  4.3.   Draw donut using donut commands.
  4.4.   Perform offset command.
  4.5.   Perform rectangular and polar array command.

5.   Construct ray, chamfer, fillet, lengthen, hatch, stretch and scale etc.
  5.1.   Draw ray in a certain angular distance using ray command.
  5.2.   Use chamfer & fillet in a given rectangle.
  5.3.   Use different lengthen command in a given line.
  5.4.   Fill the drawing areas of an object using different pattern of hatch command.
  5.5.   Use stretch command to extend line and rectangle.
  5.6.   Use scale command to enlarge or reduce an object in a ratio.

6.   Edit and modify the object.
  6.1.   Select and delete the object in various methods.
  6.2.   Duplicate the object using copy.
  6.3.   Use trim command in a given drawing.
  6.4.   Use the extend command in a given drawing.
  6.5.   Use mirror command to create duplicate reverse copy.
  6.6.   Break the line using break command.
  6.7.   Rotate the object in different angle /direction using rotate command.

7.   Set-up the units, limits, layer.
   7.1.   Set-up the units using units command.
   7.2.   Set-up the drawing limits using limits command.
   7.3.   Select the layer control option.
   7.4.   Create the name of a layer and make it current.
   7.5.   Use freeze, lock option of the layer.
   7.6.   Set the color, line type & line weight for different layer.

8.   Set-up the dimension style and dimensioning.
   8.1.   Set-up the dimension style using dimension style manager.
   8.2.   Set-up the dimension style using modify dimension style.
   8.3.   Set-up the units, dimension lines and arrows, text, leader & annotations etc.
   8.4.   Put dimension in the object using linear, angular, radius, diameter, ordinate, align, center mark, continuous, base line dimension commands.
   8.5.   Edit dimension.

9.   Set-up the Text style.
   9.1.   Set-up the text style using text style commands.
   9.2.   Set-up the text height & font using text style commands.
   9.3.   Select the text justification using text style command.
   9.4.   Write text by using dtext and mtext commands.
   9.5.   Edit the text in a given drawing..

10.   Prepare a drawing in different layer using CAD.
   10.1.   Draw a given floor plan of a building using various commands.
   10.2.   Draw an elevation of the building using various commands.
   10.3.   Draw the section of the building using various commands.
   10.4.   Put dimension & write the text or annotation on the floor plan & section.
   10.5.   Create a folder & Save the drawing.

11.   Prepare the 3D objects using CAD.
   11.1.   Create simple 3D object in auto CAD.
   11.2.   Draw isometric view.
   11.3.   Create 3D surface by using 3D poly, Edge surf, Rule surf, Tab surf & Mesh.
   11.4.   Edit / draw 3D object using polar co-ordinate system.
   11.5.   Edit 3D object using different editing command i. e. align, 3D rotate, 3Darray 3D, mirror 3D, move, chamfer, fillet, trim etc.

12.   Modify/Edit the 3D objects using CAD.
   12.1.   Create 3D surface/object by using extrude.
   12.2.   Edit 3d object using union command
   12.3.   Draw 3d object using revolves command.
   12.4.   Edit / draw 3D object using intersect command.
           Edit 3D object using subtracts command.

13.   Set the Layout and plot the drawing.
   13.1.   Create layout for plot/print using paper space and model space.
   13.2.   Set up the scale & assign pen (if necessary) for plot/print.
   13.3.   Select the paper & plotter for plotting/printing.
   13.4.   Plot/Print the drawing.
   13.5.   Set various drawing in different scale in a paper through layout.
   13.6.   Save the drawing in PDF format.

REFERENCE BOOKS :
1.   Mastering Auto CAD   -   Engr. Symuel Mallik

2.   Auto CAD 2D & 3D   -   Engr. Md. Shah Alam

66133   **ARCHITECTURAL GRAPHICS**   **T   P   C**
                                                                1   3   2

AIMS:
To be able to develop knowledge, skill and attitude in the field of the graphical representation of architectural design & drafting with special emphasis on:

- Free hand sketching
- Composition
- Colour design & rendering
- Perspective view (one point & two point)

SHORT DESCRIPTION:
Free hand sketching, composition, Design element, View, Isomatric View, Oblique view, Orthographic view, Colour design, Rendering, Surface development, One point perspective, Two point perspective.

THEORY:
1. **Understand Free Hand Sketching:**
   1.1   Define Free Hand Sketching
   1.2   Describe the necessity of free Hand Sketching
   1.3   Discuss the free hand sketch materials used in free hand Sketching.
   1.4   Describe the Principle & Technique of Free Hand Sketch.
   1.5   Explain the scaling techniques of Free Hand Sketch.
   1.6   Describe the use of different types of pencil in sketching.
2. **Understand Free Hand Sketch (Human Figure):**
   2.1.   State the necessity of Free Hand Sketch of Human Figure.
   2.2.   Describe the principle & technique of draw Human Figure.
   2.3.   Explain the Architecture Data in different situation for adults and children.
   2.4.   Explain the space required by human bodies in different working conditions & positions.
3. **Understand Free hand sketches(trees, bushes & natures):**
   3.1.   List the different types of Trees uses in Architectural Drawing.
   3.2.   Describe the different data of Trees uses in Architectural Drawing.
   3.3.   Describe the draw of Trees by pencil and charcoal.
   3.4.   Describe the draw of Bushes by pencil and charcoal.
4. **Understanding Free Hand Sketching of different Objects:**
   4.1.   State the necessity of free hand sketch of objects in Architectural Design.
   4.2.   Describe the principal and technique of free hand sketch of objects.
   4.3.   Describe between free and hand and dimensional sketches.
5. **Understand the necessity & importance of composition:**
   5.1.   Define composition.
   5.2.   State the list of composition.
   5.3.   Distinguish between different forms and composition.
   5.4.   Describe composition in different medium.
6. **Understand the necessity of colour in Architectural Design.**
   6.1   State the colour.
   6.2   Discuss the necessity of colour use in Architectural Design.
   6.3   List the different types of colour.
   6.4   Describe value weight and warmth of colour.
   6.5   State pigment, tone and shapes in colour.
   6.6   Describe the language of colour.

7. **Understand the concept of rendering and presentation:**
   7.1   Define rendering.
   7.2   Describe the necessity of rendering.
   7.3   Describe the importance of rendering.
   7.4   State the technique of rendering.
   7.5   State the general approach and materials required for rendering.

8. **Understand the general feature of perspective drawing.**
    8.1   Define perspective drawing.
    8.2   Discuss the necessity and importance of perspective drawing.
    8.3   List the types of perspective drawing.
    8.4   Mention the principle of perspective drawing.
    8.5   Describe the methods of perspective drawing.

9. **Understand the principle of One point and Two point perspective:**
    9.1   Mention the meaning of One point or parallel perspective.
    9.2   Describe the methods of One point perspective.
    9.3   Mention the meaning of Two point perspective or angular perspective.
    9.4   Describe the methods of Two point perspective.
    9.5   Mention the meaning of the distortion in perspective.
    9.6   Describe the distortion from station point.

PRACTICAL:
1. **Prepare Free Hand Sketches:**
    1.1   Draw horizontal, vertical line.
    1.2   Draw inclined and curve line.
    1.3   Draw contour, expressive, regulating and drawing lines.
    1.4   Draw free hand circular figure.

2. **Prepare Free Hand Sketch(Human Figure):**
    2.1.   Draw human figure in different working position.
    2.2.   Draw human figure with anthropometric Data.
    2.3.   Sketch three dimensional objects like still life and Abstract forms.

3. **Prepare Free Hand Sketches (Trees, bushes, natures & objects):**
    3.1   Draw different types of Trees with height.
    3.2   Draw different types of Bushes.
    3.3   Draw different type of natural symbols.
    3.4   Draw the view of simple object in different position.
    3.5   Draw different types of household object.
    3.6   Draw different complex object having circular and hidden.

4. **Perform composition and Design element in Architectural Drawing:**
    4.1   Make composition using straight and curve lines.
    4.2   Make composition with geometrical forms.
    4.3   Make composition with dots and circle.
    4.4   Draw different element of Design.
    4.5   Make composition with design element.

5. **Prepare composition applying colour concept:**
    5.1   Make composition with primary colours of different grades.
    5.2   Make composition with secondary colors of different grades.
    5.3   Make composition with tertiary colours of different grades.
    5.4   Prepare a colour wheel and colour charts.
    5.5   Prepare a coluor scheme of a building.

6. **Prepare Render & presentation:**
    6.1   Draw two dimensional object and make rendering with pencil.
    6.2   Make different composition with colour.
    6.3   Prepare render of human figure indifferent positions.

7. **Perform the construction of the perspective view:**
    7.1   Draw the different step of One point perspective.
    7.2   Draw the One point perspective view of an object using different step.
    7.3   Draw the different step of Two point perspective.

7.4   Draw the Two point perspective view of an object using different step.

7.5   Draw the shape of object by changing vanishing point in One point perspective.

7.6   Draw the shape of object by changing vanishing point in Two point perspective.

REFERENCE BOOKS:

1.   Prathomic Engineering Drawing – Hemonta Kumar Bhattacharia.
2.   Rendering with pen and ink- Robert W.Gill.
3.   Order in space- keth Critchlow.
4.   Architectural Rendering-Albert. O. Halse.
5.   Graphics – 2_Sonnaymot Rezaul Karim
6.   Professional Architectural Graphics-C. Leslie Martin.
7.   Basic Perspective.
8.   Creative Perspective.

66435	FUNDAMENTAL SURVEYING	T	P	C
		3	3	4

AIMS

To provide the students with an opportunity to acquire knowledge and skills to:

· Survey work with chain, compass and total station.

· Conduct cadastral survey.

· Conduct leveling and contouring

· Calculation of the area by using different instrument.

SHORT DESCRIPTION

Concept of Surveying; Chain surveying; Compass surveying; Cadastral surveying; Leveling and Contouring; Surveying with total station; GPS .

DETAIL DESCRIPTION

Theory:

1 Understand the concept of surveying
1.1 Define surveying.
1.2 State the purpose of surveying.
1.3 Discuss the classification of surveying based on shape of the earth, nature of field, objective of surveying and instrument employed.
1.4 Explain field work.
1.5 Explain office work.
1.6 Identify survey instruments with their care and adjustment.
1.7 Differentiate between plane survey and geodetic survey.

2 Understand the basic principle of chain surveying.

2.1 Define the meaning of chain surveying.
2.2 Explain chain line, base line, tie line, check line and station points ill-conditioned and well conditioned triangle.
2.3 List the equipment and accessories used in chain surveying.
2.4 Mention the use of arrows, ranging rod, offset rod & optical square.
2.5 Explain the construction and use of optical square.
2.6 Define direct and indirect ranging.
2.7 Describe the procedure of indirect ranging (reciprocal ranging) on sloping ground.
2.8 Describe the procedure of measuring linear distances with the help of chain and tape.
2.9 Define double line field book.
2.10 Describe the procedure of booking in a double line field book.

3 Understand the preparation of a chain survey map
3.1 List the instruments and materials required for plotting a survey map.
3.2 Identify suitable scale for plotting a map.
3.3 Describes the procedure of plotting a survey map from field book.
3.4 Identify conventional symbols used in plotting maps.

4 Understand the basic terms used in compass surveying
4.1 List the instrument and accessories required for compass survey.
4.2 Define the terms: meridian, true meridian, magnetic meridian, bearing, true bearing, magnetic bearing, magnetic declination, dip of the needle, deflected angle, exterior angle, interior angle.
4.3 Define fore bearing and back bearing.

4.4 Find back bearing from fore bearing and fore bearing from back bearing.

4.5 Convert whole circle bearing to reduced bearing and reduced bearing to whole circle bearing.

4.6 Describe between prismatic compass.

4.7 Define local attraction.

4.8 Identify local attraction and correct the observed bearings.

5 Understand the basic concept of cadastral survey.

5.1 Define cadastral survey.

5.2 Identify scale used in cadastral survey.

5.3 List the equipment and accessories used in cadastral survey.

5.4 Define the terms:- Quadrilaterals, intersections, shikmi, chanda, check line, field, khaka.

5.5 Describe the procedure of cadastral survey.

5.6 Explain the procedure of preparing a cadastral survey map.

6 Understand the concept of leveling and bench mark .

6.1 Describe the purpose of leveling.

6.2 Explain the following terms in leveling :
   a) Level surface; b) Level line; c) Horizontal surface; d) Horizontal line; e) Vertical plane;
   f) Vertical line; g) Datum surface; h) Datum; i) Reduced level; j) Formation level

6.3 State the meaning of bench mark.

6.4 Compare GTS, permanent, arbitrary and temporary bench mark.

6.5 Identify different types of level.

6.6 Explain the following terms related to leveling:
   a) Line of collimation; b) Axis of telescope; c) Axis of bubble tube; d) Vertical axis;
   e) Height of instrument; f) Plane of collimation; g) Focusing; h) Parallax

6.7 Identify different types of leveling staff.

7 Understand the temporary and permanent adjustment of leveling Instrument.

7.1 Mention different kinds of adjustments of level.

7.2 Mention different steps of temporary adjustment.

7.3 Identify the fundamental lines of leveling instrument.

7.4 Mention the procedure of adjustments

8 Understand the various aspects of leveling.

8.1 Explain the meaning of following terms as used in leveling:
   a) Back sight, foresight and intermediate sight reading; b) Change point; c) Station.

8.2 Mention the procedure of holding a leveling staff.

8.3 Mention the procedure of leveling work.

8.4 Mention the necessity of level book or field book.

8.5 Identify different kinds of level book or field book.

8.6 Describe the term reduction of leveling.

8.7 Mention the procedure of booking of staff reading into level book.

8.8 Solve problems on reduction of leveling.

8.9 Solve problems on calculation of missing data of old level book.

9 Understand the aspects of contouring.

9.1 Explain the terms contour, contouring, horizontal equivalent and vertical interval.

9.2 Mention the characteristics of contour.

9.3 List the uses of contour.

9.4 Mention the different methods of contouring (direct method and indirect method).

9.5 State the procedure of different methods of contouring.

9.6 Mention the procedure of drawing contour map.

9.7 Draw contour maps.

10 Understand the digital theodolite.

10.1 Define digital theodolite.

10.3 Describe the components of digital theodolite and its function.

10.5 Describe the procedure of setting digital theodolite.
10.6 Describe the procedure of taking horizontal angle with digital theodolite.
10.7 Describe the procedure of taking vertical angle with digital theodolite.

11 Understand the principle of operation and uses of total station.
11.1. Explain the function of the total station.
11.2. State focusing and target point of total station.
11.3. Describe the procedural steps of setting total station.
11.5. Mention the procedure centering and leveling.

12. Understand the operation panel.
12.1. Describe the basic key operation.
12.2. Describe soft key operation.
12.6. Explain configuration mode, measurement mode and memory mode.
12.7. Describe the process of selecting different options.
12.8. Define horizontal angel.
12.9. Explain the procedure of horizontal angel between two points with total
        station.
12.10. Describe the procedure of EDM setting in the total station.
12.11. Describe the procedure of measuring horizontal distance and slop
         distance with total station.
12.12. Describe the procedure of measuring vertical distance with total station.

13 Understand the principles of operation and uses of GPS receiver.

13.1 Explain the meaning of global positioning system (GPS).
13.2 Describe the working principles of GPS receiver.
13.3 Mention different features of GPS receiver.
13.4 Describe operational process of the instruments related to GPS.
13.5 Describe the procedure of finding co-ordinates (latitude & longitude) of a station using
      GPS receiver.
13.6 List the works performed by GPS receiver.
13.7 Explain software used in GPS receiver.
13.8 Mention different types of software used in GPS receiver.
13.9 Mention the applications of different soft wares.
13.10 Describe the preparation of a map using mapping software and data received with
      GPS receiver.

Practical:

1. Measure length of line by chain and tape.
2. Set perpendiculars with the help of chain and tape.
3. Set perpendiculars with the help of optical square.
4. Measure magnetic bearing by prismatic and surveyors compass.
5. Locate the boundary line of a property with the help of chain, tape and which is already
   plotted on the mouza map.
6. Perform temporary adjustments of level.
7. Conduct fly leveling to establish a bench mark.
8. Conduct reciprocal leveling.
9. Conduct contouring by direct method over a low lying/elevated area, prepare contour map
   and calculate the quantity of earth work in filling/cutting.
10. Determine the height and distance of a tower using digital theodolite.
11. Determine height and distance of tower using total station.
12. Determine the co-ordinates of a station (within the institute) using GPS receiver.

REFERENCE BOOKS

1 Surveying and Leveling- T. P. Kanatker
2 Surveying- Aziz & Shahjahan
3 Surveying- B. C. Punmia

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.

<div align="center">

Practical Part:

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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.

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Course Content

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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.Ieltse xam.Com

Lab-Facilitator, 30 Students In A Group:

Physical Facility	Size (In Ft)	Area (In Sq Ft)
Class Room Cum Laboratory	$1\,5 \times 20$	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.)

AIMS

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

- **SHORT DESCRIPTION**

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

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

    Vector: Addition and subtraction, dot and cross product.

DETAIL DESCRIPTION

MENSURATION:

1   **Apply the concept of area of triangle.**
    1.1   Find the area of triangle in the form,

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

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

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

    1.2   Use formula in 1.1 to solve problems.

2   **Apply the concept of finding areas of quadrilateral & Parallelogram & finding areas of rhombus & trapezium.**
    2.1   Define quadrilateral & Parallelogram.
    2.2   Find the areas of quadrilateral when off sets are given.
    2.3   Find the areas of a parallelogram.
    2.4   Solve problems using above formulae.
    2.5   Define rhombus & trapezium.
    2.6   Find the areas of rhombus when the diagonals are given.
    2.7   Find the areas of trapezium in terms of its parallel sides and the perpendicular distance between them.
    2.8   Solve problems related to rhombus & trapezium.

3   **Apply the concept of finding areas of regular polygon.**
    3.1   Define a regular polygon.
    3.2   Find the area of a regular polygon of n sides, when
        i)   The length of one side and the radius of inscribed circle are given.
        ii)   The length of one side and the radius of circumscribed circle are given.
    3.3   Find the area of a regular.

a) Hexagon

b) Octagon when length of side is given.

3.4 Solve problems of the followings types:

A hexagonal polygon 6 m length of each side has a 20 cm width road surrounded the polygon. Find the area of the road.

4 Understand areas of circle, sector and segment.

 4.1 Define circle, circumference, sector and segment.

 4.2 Find the circumference and area of a circle when its radius is given.

 4.3 Find the area of sector and segment of a circle.

 4.4 Solve problems related to the above formulae.

5 Apply the concept of volume of a rectangular solid.

 5.1 Define rectangular solid and a cube.

 5.2 Find geometrically the volume of a rectangular solid when its length, breadth and height are given.

 5.3 Find the volume and diagonal of a cube when side is given.

 5.4 Solve problems with the help of 6.2 & 6.3.

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

 6.1 Define a prism, parallelepiped and a cylinder.

 6.2 Explain the formulae for areas of curved surfaces of prism, parallelepiped and cylinder.

 6.3 Explain the formulae for volume of prism, parallelepiped and cylinder when base and height are given.

 6.4 Solve problems related to 7.2, 7.3.

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

 7.1 Define pyramid, cone and sphere.

 7.2 Explain the formula for areas of curved surfaces of pyramid, cone and sphere.

 7.3 Explain the formula for volumes of pyramid, cone and sphere.

 7.4 Solve problems related to 8.2, 8.3.

CO-ORDINATE GEOMETRY

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

 8.1 Explain the co-ordinates of a point.

 8.2 State different types of co-ordinates of a point.

 8.3 Find the distance between two points (x_1, y_1) and (x_2, y_2).

 8.4 Find the co-ordinates of a point which divides the straight line joining two points in certain ratio.

 8.5 Find the area of a triangle whose vertices are given.

 8.6 Solve problems related to co-ordinates of points and distance formula.

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

 9.1 Define locus of a point.

 9.2 Find the locus of a point.

 9.3 Solve problems for finding locus of a point under certain conditions.

 9.4 Describe the Equation x=a and y=b and slope of a straight line.

 9.5 Find the slope of a straight line passing through two point $(x_1, y_1,)$ and (x_2, y_2).

 9.6 Find the equation of straight lines:

  (i) Point slope form.

  (ii) Slope Intercept form.

  (iii) Two points form.

  (iv) Intercept form.

  (v) Perpendicular form.

 9.7 Find the point of intersection of two given straight lines.

 9.8 Find the angle between two given straight lines.

 9.9 Find the condition of parallelism and perpendicularity of two given straight lines.

 9.10 Find the distances of a point from a line.

10 Apply the equations of circle, tangent and normal in solving problems.
  10.1   Define circle, center and radius.
  10.2   Find the equation of a circle in the form:
          (i) $x^2 + y^2 = a^2$
          (ii) $(x - h)^2 + (y - k)^2 = a^2$

          (iii) $x^2 + y^2 + 2gx + 2fy + c = 0$

  10.3   Find the equation of a circle described on the line joining (x_1, y_1) and (x_2, y_2).
  10.4   Define tangent and normal.
  10.5   Find the condition that a straight line may touch a circle.
  10.6   Find the equations of tangent and normal to a circle at any point.
  10.7   Solve the problems related to equations of circle, tangent and normal.

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

VECTOR :

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

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

Reference

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

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;$PV\gamma$=const.
5.7   State and Explain Reversible process and irreversible process.
5.8   State & explain 2nd law of thermodynamics
5.9   Entropy: Definition, unit and significant.
5.10   Explain Change of entropy in a reversible and irreversible process.
5.11   Give an example of increase of entropy in irreversible process.

6. PHOTOMETRY

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

7. REFLECTION OF LIGHT

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

8. REFRACTION OF LIGHT

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

9. ELECTRON, PHOTON AND RADIO-ACTIVITY

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

10. THEORY OF RELATIVITY

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

PRACTICAL

1. Compare the operation of common thermometers.
2. Determine the 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