



BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

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

ARCHITECTURE & INTERIOR DESIGN
TECHNOLOGY CODE: 687

4th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

ARCHITECTURE AND INTERIOR DESIGN (687)

4th 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	68741	Interior Design-2	2	6	4	40	60	50	50	200
2	68742	CAD-1	1	6	3	20	30	50	50	150
3	68743	History of Architecture & Interior Design	2	0	2	40	60	0	0	100
4	66446	Fundamental Construction Process	2	3	3	40	60	25	25	150
5	68744	Perspective Drawing & Rendering	1	6	3	20	30	50	50	150
6	66447	Basic Estimating & Costing	3	3	4	60	90	25	25	200
7	65841	Business Organization & Communication	2	0	2	40	60	0	0	100
Total			13	24	21	260	390	200	200	1050

AIMS

- To be able to understand the Building construction rules.
- To be able to understand the planning process of kitchen.
- To be able to understand the planning process of Toilet.
- To be able to understand the planning process of staircase.

SHORT DESCRIPTION

site plan, plan, elevation, section, working drawing, Detail drawing, Presentation drawing, FAR, MGC, setback, garage & car parking ,Driveway, ramp, apron and turning radius, staircase, kitchen and kitchenate, kitchen store and pantry, working triangle, fixtures, fittings, lavatory, closets and shower, materials for floor, wall, cabinet and platform; bathroom, materials for latrine, toilet and public toilet floor and wall; slope ratio, components of a stair, trade and riser relationship, utility area.

Theory:**1. Understand Architectural Drawing.**

- 1.1 Define site plan.
- 1.2 Define plan, elevation, section of a residential building.
- 1.3 State working drawing (Architectural, Structural, Electrical, Plumbing Drawing).
- 1.4 Describe Detail drawing.
- 1.5 Describe Presentation drawing.

2. Understand the Building by - Laws and Building Approval.

- 2.1 Define Building - by - Laws and BNBC.
- 2.2 Define Rajuk Sheet/ Building approval Sheet.
- 2.3 Discuss different features of a Rajuk Sheet/building approval sheet.
- 2.4 Discuss different terms related to Building by-laws/ Rajuk Sheet (FAR, MGC, Set-Back)/building approval sheet.
- 2.5 Discuss Rajuk rule for Parking, Stair and other rules'2010.

3. Understand the Garage and Car parking.

- 3.1 Define garage & car parking.
- 3.2 State the function & location of garage & car parking.
- 3.3 Discuss the size of garage & car parking.
- 3.4 Describe the planning consideration of garage & car parking.
- 3.5 Describe Driveway, ramp, apron and turning radius.

4. Understand the kitchen.

- 4.1 Define kitchen.
- 4.2 Identify the location of kitchen.
- 4.3 Discuss about kitchen and kitchenate, kitchen store and pantry.
- 4.4 List different fixtures, fittings and appliances use in a kitchen.
- 4.5 Discuss about kitchen triangle/working triangle of kitchen.
- 4.6 Mention different types of kitchen, their advantages and disadvantages.

5. Understand the planning process of kitchen.

- 5.1 Mention different heights and widths of the cabinet/platform of kitchen.
- 5.2 Discuss removal process of smoke and other smell/adore from kitchen.
- 5.3 Discuss different suitable materials used for floor, wall, cabinet and platform of a kitchen.
- 5.4 Discuss different types of sink (SBST, SBDT, DBDT etc).
- 5.5 Discuss different types of burner (Gas, oven, range, microwave oven) and refrigerator.

6. Understand the Bathroom/Toilet.

- 6.1 Define Toilet.
- 6.2 Difference between bathroom, latrine, toilet and public toilet.
- 6.3 Identify the location of toilet.
- 6.4 List different fixtures, fittings use in a toilet.
- 6.5 Discuss different types of lavatory, closets and shower.

7. Understand the planning process of Bathroom/Toilet.

- 7.1 Discuss with detail measurements of bathtub and shower enclosure.
- 7.2 Explain the procedure of hot and cold water supply system in a toilet.
- 7.3 Explain different types of urinal used in toilet/public toilet.
- 7.4 Discuss removal process of adore from toilet.
- 7.5 Mention different types of measurements allocation for different purpose of a toilet.
- 7.6 Discuss different suitable materials used for floor, walls of a toilet.
- 7.7 Mention slope ratio of a toilet floor.

8. Understand the Staircase.

- 8.1 Define stair.
- 8.2 Distinguish between stair and stair case.
- 8.3 Discuss about pent house.
- 8.4 Mention different types of stair.
- 8.5 Mention and discuss in details the components of a stair (trade, riser, handrail, baluster, balustrade, nosing, Scotia block, open string, closed string, soffit, walking line, waist slab, landing, flight, newel post, sunlight, headroom)
- 8.6 Mention the formula of trade and riser relationship of a stair.
- 8.7 Identify the suitable location of a stair.

9. Understand the design process of different utility area.

- 9.1 Discuss the different types of utility area (such as reading room, servant room, prayer room, lobby, laundry, terrace etc)
- 9.2 Discuss the different types of furniture and fixture use in utility area.
- 9.3 Discuss the furniture and fixture arrangement of utility area.
- 9.4 Discuss different types of materials and colour use in utility area.
- 9.5 Discuss the lighting and ventilation of utility area.

PRACTICAL :

Prepare a Rajuk sheet/ Building Approval sheet.

- 1.1. Draw all necessary drawings for Rajuk sheet/ Building Approval sheet. Residence building as per required scale.
- 1.2. Calculate all necessary measurements.
- 1.3. Write the title box with all necessary information.

2. Understand parking lots and garages.

- 2.1 Describe the factors to determine a drive way and turning radius.
- 2.2 Describe straight and curve driveway and its formulae.
- 2.3 Describe curved device ways and determine its factors.
- 2.4 Describe double drive ways, drive way exit.
- 2.5 Describe the vehicle length & width.
- 2.6 Discuss the slope of ramp, ramp break over angle, angle of departure and angle of approach.

3. Prepare a set of drawing of Kitchen.

- 3.1 Draw a plan of kitchen in 1:20 scale showing all fixtures.
- 3.2 Draw a longitudinal section of the kitchen in 1:20 scale..
- 3.3 Draw a traverse (cross) section
- 3.4 Draw a working triangle of the kitchen.
- 3.5 Draw a sectional elevation of the kitchen showing cabinet and platform in 1:20 scale.
- 3.6 Draw a sectional elevation of the kitchen showing kitchen hood in 1:20 scale.
- 3.7 Draw the water supply and water disposal system of the kitchen.

4. Prepare a set of drawing of toilet.

- 4.1 Draw a plan of toilet in 1:20 scale showing all fixtures.
- 4.2 Draw a longitudinal section of the toilet in 1:20 scale.
- 4.3 Draw a traverse (cross) section of the toilet in 1:20 scale.
- 4.4 Draw the water supply and water disposal system of the toilet.
- 4.5 Draw a public toilet plan showing all fixtures.

5. Prepare a set of drawing of stair.

- 5.1 Draw a necessary plans of an open well stair in 1:20 scale.
- 5.2 Draw a longitudinal (long) section of the stair in 1:20 scale.
- 5.3 Draw necessary detail drawing to showing the fixing arrangement of nosing to the steps in 1:10 scale.
- 5.4 Draw necessary detail drawing to showing the fixing arrangement of railing to the balusters in 1:10 scale.
- 5.5 Draw necessary detail drawing to showing the fixing arrangement of railing to the steps in 1:10 scale.

REFERENCE BOOKS

1. Architecture Drafting and Design- By **Donald E.Hepler & Paul I.Wallach**
2. আর্কিটেকচারাল ড্রাফটিং - ১ - মোঃ রফিকুল ইসলাম
3. Time Saver Standard Building Type - By Joseph De Chirra.
4. Time Saver Standard for Interior Design and Space Planning
- By Joseph De chira, Julius panero & Martin zelnik
5. ওয়ার্কিং ড্রয়িং-১ - সৈয়দ মাজহারুল হক

AIMS:

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

- Drawing environments and drawing aids.
- Different setup of drawing in Auto CAD.
- Drawing commands.
- Modification & edits of drawing.
- Printing the drawing elements.

SHORT DESCRIPTION:

Drawing environments and drawing aids; Different setup of drawing in Auto CAD; Drawing commands; Modification & edits of drawing; & Printing the drawing elements.

Theory**1. Understand the drawing environments and drawing aids.**

- 1.1. Define AutoCAD software and identify the different areas of CAD graphic screen.
- 1.2. Explain menu bar, command prompt area, toolbar and drawing tools.
- 1.3. Explain the drawing tools, different menus and dialog boxes of CAD software.
- 1.4. State how to save the file & exit from the file.

2. Understand the units, limits & layer.

- 2.1. State the units using units command.
- 2.2. State the drawing limits using limits command.
- 2.3. Explain the layer control option.
- 2.4. List the name of a layer and make it current.
- 2.5. State freeze, lock option of the layer.
- 2.6. Explain the color, line type & line weight for different layer.

3. Understand the dimension style and dimensioning.

- 3.1. Define set up of dimension style using dimension style manager.
- 3.2. State the dimension style using modifies dimension style.
- 3.3. State the units, dimension lines and arrows, text, leader & annotations etc.
- 3.4. Define dimension in the object using linear, angular, radius, diameter, and ordinate, align, center mark, continuous, base line commands.
- 3.5. Define edit dimension.

4. Understand the Text style.

- 4.1. Define the text style using text style commands.
- 4.2. Mention the text height & font using text style commands.
- 4.3. Explain the text justification using text style command.
- 4.4. State how to write text by using dtext and multiple text commands.
- 4.5. Define edit the text in a given drawing.
- 4.6. State how to insert text in CAD from other software (i.e. MS Word, Excel etc).

5. Understand the geometrical shape or object.

- 5.1. State the command to draw Line using Cartesian and Polar co-ordinate system.
- 5.2. Define single and multiple points using point commands.
- 5.3. Define straight and angular line using line commands.
- 5.4. State Connect lines, arcs etc. using snap command.
- 5.5. Define Erase the object using different erase commands.

6. Understand the rectangle, circle, polygon, poly line etc.

- 6.1. Define rectangle using rectangle commands.
- 6.2. Discuss circles using different method of circle commands.
- 6.3. Discuss polygon using different method of polygon commands.
- 6.4. Define poly line using poly line commands.
- 6.5. Define poly line and arc together using poly line commands.
- 6.6. State different thickness of poly line using poly line commands.

7. Understand the ellipse, arc, donut, offset, array etc.

- 7.1. Define ellipse using center and axis method commands.
- 7.2. Define arc using different commands of arc.
- 7.3. Define donut using donut commands.
- 7.4. Describe lines in certain distance using offset commands.
- 7.5. Duplicate an object in a fixed number & fixed distance using the rectangle array commands.
- 7.6. Describe duplicate an object in a fixed number & rotating distance using the polar array commands.

8. Understand ray, chamfer, fillet, lengthen, hatch, stretch and scale etc.

- 8.1. Define ray in a certain angular distance using ray command.
- 8.2. Describe chamfer & fillet in a given figure.
- 8.3. Describe different lengthen command in a given line.
- 8.4. Explain the drawing areas of an object using different pattern of hatch command.
- 8.5. State stretch command to extend an area.
- 8.6. Define scale command to enlarge or reduce an object in a ratio.

9. Understand Edit and modify the object.

- 9.1. Define select and delete the object in various methods.
- 9.2. Explain duplicate the object using copy.
- 9.3. State trim command in a given drawing.
- 9.4. State the extend command in a given drawing.
- 9.5. Define mirror command to create duplicate reverse copy.
- 9.6. State Break the line using break command.
- 9.7. State Rotate the object in different angle /direction using rotate command.

10. Understand the Layout and plot the drawing.

- 10.1 Define layout for plot.
- 10.2 Define the scale & assign pen (if necessary) for plot.
- 10.3 State the paper & plotter for plotting.
- 10.4 Define the environment for plotting.
- 10.5 State how to plot the drawing.

PRACTICAL

1. Set up the drawing environments and drawing aids.

- 1.1 Start CAD software and identify the different areas of CAD graphic screen.
- 1.2 Use menu bar, command prompt area, toolbar and drawing tools.
- 1.3 Use the drawing aids, different menus and dialog boxes of CAD package.
- 1.4 Save the drawing & exit from the file.

2. Set-up the units, limits, layer.

- 2.1 Fix-up the units using units command.
- 2.2 Fix-up the drawing limits using limits command.
- 2.3 Create the name of a layer and make it current.
- 2.4 Use freeze, lock option of the layer.
- 2.5 Set the color, line type & line weight for different layer.

3. Set-up the dimension style and dimensioning.

- 3.1 Set-up the dimension style using dimension style manager.
- 3.2 Fix-up the units, dimension lines and arrows, text, leader & annotations etc.
- 3.3 Put dimension in the object using linear, angular, radius, diameter, ordinate, align, center mark, continuous, base line commands.
- 3.4 Edit dimension.

4. Set-up the Text style.

- 4.1 Set the text style using text style commands.
- 4.2 Fix-up the text height & font using text style commands.
- 4.3 Write text by using d ext and multiple text commands.
- 4.4 Insert text in CAD from other software (i.e. MS Word, Excel etc).

5. Construct the geometrical shape or object.

- 5.1 Draw straight and angular line using line commands.
- 5.2 Draw single and multiple points using point commands.
- 5.3 Connect lines, arcs etc. using snap command.
- 5.4 Erase the object using different erase commands.

6. Construct the rectangle, circle, polygon, poly line etc.

- 6.1 Draw rectangle using rectangle commands.
- 6.2 Draw circles using different method of circle commands.
- 6.3 Draw polygon using different method of polygon commands.
- 6.4 Draw poly line using poly line commands.
- 6.5 Draw poly line and arc together using poly line commands.

7. Construct the ellipse, arc, donut, offset, array etc.

- 7.1 Draw ellipse using center and axis method commands.
- 7.2 Draw arc using different commands of arc.
- 7.3 Draw donut using donut commands.
- 7.4 Duplicate an object in a fixed number & fixed distance using the rectangle array commands.
- 7.5 Duplicate an object in a fixed number & rotating distance using the polar array commands.

8. Construct ray, chamfer, fillet, lengthen, hatch, stretch and scale etc.

- 8.1 Use chamfer & fillet in a given figure.
- 8.2 Use different lengthen command in a given line.

- 8.3 Fill the drawing areas of an object using different pattern of hatch command.
- 8.4 Use stretch command to extend an area.
- 8.5 Use scale command to enlarge or reduce an object in a ratio.

9. Edit and modify the object.

- 9.1 Select and delete the object in various methods.
- 9.2 Duplicate the object using copy.
- 9.3 Use trim command in a given drawing.
- 9.4 Use the extend command in a given drawing.
- 9.5 Use mirror command to create duplicate reverse copy.
- 9.6 Break the line using break command.
- 9.7 Rotate the object in different angle /direction using rotate command.

10. Prepare a drawing in different layer using Auto 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.

11. Set the Layout and plot the drawing.

- 11.1 Create layout for plot.
- 11.2 Set up the scale & assign pen (if necessary) for plot.
- 11.3 Select the paper & plotter for plotting.
- 11.4 Plot the drawing.

REFERENCE BOOKS:

- 1. Mastering Auto CAD - Engr. Symuel Mallik
- 2. Auto CAD 2D & 3D - Engr. Md. Shah Alam
- 3. Autodesk-

AIMS:

- To be able to understand the Architectural characteristics of Egyptian, west Asiatic, Hellenic period of Greek Architecture, Roman Civilization.
- To be able to develop the knowledge of beginning of Islamic architecture during the Mughal period and be able to know the development of Islamic & indo Islamic architecture in East Bengal.
- To be able to understand Architecture & the decorative arts of the 20th century.
- Master Architects and their works.
- Modern Architects in Bangladesh and their works.

SHORT DESCRIPTION

Style of decorative arts, Egyptian, west Asiatic, Hellenic period of Greek Architecture, Roman Civilization, Development of Islamic architecture during Mughal period, architecture in East Bengal;

Theory:**1. Understand the Architectural characteristics of Egyptian Architecture.**

- 1.1 Describe the historical influence of Egyptian architecture.
- 1.2 Describe the evaluation of pyramid.
- 1.3 Describe the architectural features of great pyramid of Cheops.
- 1.4 Explain the architectural characteristics of the temples of amun at karnak
- 1.5 Explain the architectural characteristics of the temples of Queen Hatshepsut.

2. Understand the Architectural characteristics of West Asiatic Architecture.

- 2.1 Describe the architectural characteristics west Asiatic civilization.
- 2.2 Identify the material and building technology adopted by the west Asiatic architecture
- 2.3 Explain the architectural characteristics of the planning of the city of khorsabad city
- 2.4 Explain the architectural features of the planning of the palace of Persepolis
- 2.5 Explain the architectural characteristics of the city of Babylon

3. Interpret Architectural characteristics of Hellenic period of Greek Architecture.

- 3.1 Describe the historical influence of the Greek architecture.
- 3.2 Explain the architectural features of the Greek order.
- 3.3 Compare Doric & Corinthian order.
- 3.4 Explain the planning features of the acropolis at Athens.
- 3.5 Explain the architectural features of Parthenon.
- 3.6 Describe the comparative analysis of Greek architecture.

4. Understand the Architectural characteristics of Roman Civilization.

- 4.1 Describe the historical influence of the Roman civilization.
- 4.2 Describe the architectural characteristics of the Basilica of Constantine.
- 4.3 Explain the architectural characteristics of Roman Coliseum.
- 4.4 Explain the architectural characteristics of Roman house.

5. Understand the development of the Islamic Architecture during the Mughal period.

- 5.1 Describe the historical influence in the development of Mughal Style.
- 5.2 Describe the development in the planning of Fathepur Sikri.
- 5.3 Explain the architectural development in the planning of Red Fort.
- 5.3 Explain the architectural development in the planning of Agra Fort.
- 5.4 Identify the architectural features of the Delhi-jame Masjid.
- 5.5 Describe the Architecture feature of Humayan's Tomb.
- 5.6 Describe the Architecture feature of the Tajmahal.

6. Understand the development of Islamic Architecture in Bengal.

- 6.1 Describe the historical influence on the Islamic Architectural style of Bengal.
- 6.2 Explain the Architectural features of the Sat Gambuj Masjid ,Khulna.
- 6.3 Explain the Architectural features of the Atia Masjid ,Tangail.
- 6.4 Explain the Architectural features of the Lal-bag Fort.
- 6.5 Explain the Architectural features of the Ashan Monjil.
- 6.6 Explain the Architectural features of the Karjan Hall.

7. Understand the Indo-Islamic Architecture in Bengal.

- 7.1 Describe the Historical development of Kantojir Mondir at Dinajpur.
- 7.2 Describe the Historical development of Dhakeyshory Mondir at Dhaka.
- 7.3 Describe the Historical development of Sonargaon at Narayangonj.
- 7.4 Describe the Historical development of Maynamoti at Comilla.
- 7.5 Describe the Historical development of Uttara Gano Bhoban at Nator.
- 7.6 Describe the Historical development of Mohastan Gor at Bogra.

8. Understand Architecture and the decorative arts of the 20th century.

- 8.1 State the Nouveau.
- 8.2 Describe the influence of Louis Sullivan in modern Architecture and decorative art.
- 8.3 Describe the functionalism and the concept beauty in Architecture.
- 8.4 Describe the contemporary approach to interior design.
- 8.5 Describe the contemporary planning and backgrounds in interior design.
- 8.6 Describe the contemporary furniture in interior.

9.0 Understand the works of Pioneer Architects.

- 9.1 Describe the important works of Walter Gropius.
- 9.2 Describe the important works of Mies Vender Rohe.
- 9.3 Describe the important works of Frank Lloyed Wright.
- 9.4 Describe the important works of Le-Corbusier.
- 9.5 Describe the important works of Pier Luige Nervi
- 9.6 Describe the important works of Luis I Kahn.

10.0 Understand the works of famous Architects in Bangladesh.

- 10.1 Describe the important works of Mazharul Islam.
- 10.2 Describe the important works of Bashirul Haque.
- 10.3 Describe the important works of Shamsul Wares.
- 10.4 Describe the important works of F.R. Khan.
- 10.5 List the modern buildings in Bangladesh with the name of the Architects.

11.0 Understand the Modern Architecture in Dhaka.

- 11.1 Describe the architectural feature of the National Memorial of Bangladesh at Savar.
- 11.2 Explain the architectural feature of the High Court building at Dhaka.
- 11.3 Explain the architectural feature of the Shahjalal International Air port at Dhaka.
- 11.4 Explain the architectural feature of the Sangshad Bhabon.
- 11.5 Explain the architectural feature of the Nagar Bhabon at Dhaka.
- 11.6 Explain the architectural feature of the City centre

REFERENCE BOOKS:

1. History of Architecture - by Fletcher.
2. Indian Architecture (Islamic Period)-by Percy brown.
3. Contemporary Architecture Bangladesh -by Institute of Architect Bangladesh.
4. Element of interior design and decoration-by Sherrill whiton.
5. The elements of style -by Stephen Calloway & Elizabeth Cromley
6. স্থাপত্যের ইতিহাস ● মো: রফিকুল ইসলাম মীর - বাংলাদেশ কারিগরিশিক্ষা বোর্ড।
৭. বাংলাদেশের প্রাচীন কীর্তি(২য় খন্ড মুসলিম যুগ) - আ.কা.মো.যাকারিয়া।
৮. মসজিদের ইতিহাস - ড: সৈয়দ মাহমুদুল হাসান।

OBJECTIVES:

At the end of course the students will be able to:

- apply relevant theory and practice of concrete construction and its quality control methods.
- perform skills for construction work and its supervision.
- understand the process, techniques and materials used in different types of masonry, Floor, Doors & Windows.

SHORT DESCRIPTION

Concrete, Brick masonry, Foundation, Painting & varnishing, Insulation, Floor, Doors, Windows.

DETAIL DESCRIPTION**Theory:****1. Understand the features of concrete.**

- 1.1 State the meaning of concrete.
- 1.2 Mention the different Types of concrete.
- 1.3 List the uses of concrete in the construction industry.
- 1.4 List the ingredients of different Types of concrete.
- 1.5 Write the characteristics of materials used in concrete.

2. Understand the properties of concrete.

- 2.1 Define the terms: strength, durability, workability, laitance and segregation.
- 2.2 State the meaning of water-cement ratio.
- 2.3 List the factors affecting the strength of concrete.
- 2.4 List the factors affecting the durability of concrete.
- 2.5 List the factors affecting the workability of concrete.
- 2.6 Describe the effect of water-cement ratio on the strength of concrete.

3. Understand the concept of curing of concrete.

- 3.1 Define of deferent type of concrete.
- 3.2 State the meaning of curing.
- 3.3 State how the curing process affects the strength of hardened concrete.
- 3.4 Describe the different methods of curing.

4. Understand the features of different special types of concrete.

- 4.1 Compare the properties of polymer concrete and super plasticized concrete.
- 4.2 Explain the term pre-stressed concrete.
- 4.3 Mention the procedure used in the production of pre-stressed concrete.

5. Understand the features of brick masonry.

- 5.1 State the meaning of brick masonry.
- 5.2 List the tools required for brick masonry.
- 5.3 State the specific uses of brick masonry tools.
- 5.4 Distinguish among different types of masonry structures.
- 5.5 Define the following terms: header, stretcher, lap, course, bed, joint, closer.
- 5.6 Identify the defects in brick masonry.
- 5.7 List the factors to be considered while supervising brick masonry works.

6. Understand the purpose of bond in brick masonry.

- 6.1 State the meaning of bond in brick masonry.
- 6.2 Mention the functions of good brick bonding.
- 6.3 Describe the steps for brick laying.
- 6.4 Identify different types of bonds in brick masonry.
- 6.5 Draw the neat sketches of different types of bonds in brick masonry.
- 6.6 Differentiate between English and Flemish bond.
- 6.7 Describe the bonding arrangements around openings and corners.

7. Understand the aspects of foundation.

- 7.1 Define the term 'foundation'.
- 7.2 State the functions of foundation.
- 7.3 List the essential requirements of a good foundation.
- 7.4 List the common causes of failure of foundations.

8. Understand the features of shallow foundation.

- 8.1 Define the term 'shallow foundation'.
- 8.2 Mention the advantages of shallow foundations.
- 8.3 Mention the limitations of shallow foundations.
- 8.4 Mention the suitability of various types of shallow foundations.
- 8.5 Draw the sketches of strip footing, wide strip footing, eccentrically loaded footing, raft foundation, combined footing, stepped strip foundation, grillage foundation.

9. Understand the features of deep foundation.

- 9.1 Define the term 'deep foundation'.
- 9.2 Mention the classification of pile foundations according to function or use, materials and composition, method of construction.
- 9.3 Write the advantages and limitations in each case of deep foundations.
- 9.4 Describe the following methods of casting and placing concrete pile foundation:
 - a. Cased cast-in-situ concrete pile.
 - b. Uncased cast-in-situ concrete pile.
 - c. Pre-cast concrete pile.
- 9.5 Identify the types of hammers used for pile driving.
- 9.6 Describe the methods for driving concrete pile groups and placing pile caps.

10. Understand the process of painting & Varnishing.

- 10.1 State the purpose of painting & varnishing.
- 10.2 Name the ingredients of paint & varnishes.
- 10.3 Mention the specific function of each ingredient of paint & varnishes.
- 10.4 Describe the characteristics of good paints & varnishes.
- 10.5 State the various defects in painting & varnishing.
- 10.6 Describe the factors that should be considered during the supervision of quality painting & varnishing work.
- 10.7 Differentiate between the properties and ingredients of the following:
 - a. white wash and color wash
 - b. distemper and snowcem wash
 - c. oil based paint and water based paint
 - d. plastic emulsion paint and synthetic enamel paint
- 10.8 Describe the procedure of application of the following on new and old specific surfaces:
 - a. white wash
 - b. color wash
 - c. distemper
 - d. weather coat
 - e. snowcem(cement based paint)
 - f. synthetic enamel paint.
 - g. plastic emulsion paint

11. Understand the different insulation in building.

- 11.1 Define thermal and sound insulation.
- 11.2 State the necessity of thermal and sound insulation in building.
- 11.3 List various types of materials used for thermal and sound insulation.
- 11.4 Describe the general methods of thermal and sound insulation in building.
- 11.5 Describe the process of thermal insulation of the following with neat sketches:
 - a. Floor
 - b. roof
 - c. exposed wall
 - d. exposed door and window.

12. Understand the floor.

- 12.1 State the meaning of floor.
- 12.2 Mention the components of a floor.
- 12.3 Mention the essential requirements of a floor.
- 12.4 Name the suitable materials used for the construction of floor.
- 12.5 Describe the construction procedure of the following type of floors:
 - a. Brick floor
 - b. concrete floor
 - c. patent stone floor
 - d. Mosaic floor
 - e. Tiles floor
 - f. Marble floor
 - g. Timber floor
 - h. Composite floor

13. Understand the doors.

- 13.1 List different type of doors.
- 13.2 Identify the technical terms used in doors.
- 13.3 Mention the factors to be considered in determining the size, shape, location and number of doors in a room.
- 13.4 Describe the various types of doors on the basis of their suitability and uses.
- 13.5 Mention the advantages and limitations of the followings:
 - a. Panel door
 - b. Flush door
 - c. Glazed door
 - d. Louvered door
 - e. Revolving door
 - f. Sliding door
 - g. Swing door
 - h. Collapsible door
 - i. Rolling shutter door
 - j. Mild steel sheet door
 - k. Plastic door
 - l. Aluminum door
- 13.6 Describe the methods of fixing door frames.

14. Understand the windows.

- 14.1 List different type of windows.
- 14.2 Mention the factors to be considered to determine the size, shape, location and number of windows in a room.
- 14.3 Describe the various types of windows on the basis of their suitability and uses.
- 14.4 Mention the advantages and limitations of the followings:
 - a. Fixed window
 - b. Sliding window
 - c. Steel casement window
 - d. Glazed or sash window
 - e. Louvered window
 - f. Bay window
 - g. Aluminum window
- 14.5 State the functions of skylight, sunlight, fanlight and ventilator.
- 14.6 Describe the methods of fixing windows.

15. Understand the importance of scaffolding.

- 15.1 State the meaning of scaffolding...
- 15.2 Explain the necessity and uses of scaffolding.
- 15.3 Name the different components of scaffolding.
- 15.4 Describe different types of scaffolding.

- 15.5 Compare the advantages and limitations of timber scaffolding over steel scaffolding.
- 15.6 Differentiate between shoring and scaffolding.
- 15.7 Describe the safety requirements for scaffolding works.

PRACTICAL:

- 1 Draw the grading curves for various samples of aggregates and find out the FM value.**
- 2 Perform slump test of different concrete works.**
- 3 Conduct cube test for concrete and interpret the results.**
- 4 Conduct brick masonry work to erect pillars of sizes 25 cm x 25 cm to 50 cm x 50 cm with English bond up to 5 layers.**
- 5 Perform brick masonry work to erect pillars of sizes 25 cm x 25 cm to 50 cm x 50 cm with Flemish bond up to 5 layers.**
- 6 Construct sample corner (L) joints of 25 cm to 50 cm width English bond brick wall up to 5 layers.**
- 7 Construct sample tee (T) joints of 25 cm to 50 cm width English bond brick wall up to 5 layers**
- 8 Construct any one of the following floors with suitable materials.**
 - a. Brick floor
 - b. Brick concrete floor
 - c. Terrazzo floor
 - d. Mosaic floor
 - e. Tiled floor
 - f. Timber floor
 - g. RCC solid floor
 - h. RCC ribbed floor
 - 8.1 Select the required tools and raw materials.
 - 8.2 Prepare the floor according to standard specification.
 - 8.3 Clean the work site.
- 9 Perform white washing on new and old surface.**
 - 9.1 Collect the required tools and raw materials.
 - 9.2 Prepare the surface as necessary.
 - 9.3 Prepare white wash as required.
 - 9.4 Apply first coat of white wash and allow to drying.
 - 9.5 Apply second coat of white wash and allow to drying.
 - 9.6 Apply the final coat of white wash.
- 10 Perform color washing on new and old surface.**
 - 10.1 Collect the required tools and raw materials.
 - 10.2 Prepare the surface as necessary.
 - 10.3 Prepare color wash as required.
 - 10.4 Apply first coat of color wash and allow to drying.
 - 10.5 Apply second coat of color wash and allow to drying.
 - 10.6 Apply the final coat of color wash.
- 11 Perform snowcem washing and weather coating on new and old surface.**
 - 11.1 Collect the required tools and raw materials.
 - 11.2 Prepare the surface as necessary.
 - 11.3 Prepare paint as required.
 - 11.4 Apply first coat of paint and allow to drying.
 - 11.5 Apply second coat of paint and allow to drying.

11.6 Apply the final coat of paint.

12 Perform plastic emulsion painting on new and old surface.

12.1 Collect the required tools and raw materials.

12.2 Prepare the surface as necessary.

12.3 Prepare paint as required.

12.4 Apply first coat of paint and allow to drying.

12.5 Apply second coat of paint and allow to drying.

12.6 Apply the final coat of paint.

13 Perform varnishing on new and old wooden surface.

13.1 Collect required tools and raw materials.

13.2 Prepare the surface as necessary.

13.3 Prepare varnish as required.

13.4 Apply first coat and allow to drying.

13.5 Apply second coat and allow to drying.

13.6 Apply the final coat of varnish.

REFERENCE BOOKS

- 1 Building Construction - B C Punmia
- 2 A Text Book of Construction - - S P Aurora & S P Bindra
- 3 Building Construction - G J Kulkarni
- 4 Building Construction - S C Rangwala
5. Construction and Foundation Engineering - Dr. J Jha, S K Sinha
6. Building Construction - Shushil Kumar

Aims

To be able to develop knowledge, skill and attitude in the field of perspective drawing and rendering, special emphasis on:

- System and method of perspective drawing
- One point, two point and three point perspective
- Technique of distortion in perspective
- Shades and shadows on perspective

SHORT DESCRIPTION

Perspective drawing, perspective projection, two point perspective, two point perspective, one point perspective, three point perspective, distortion in perspective, shades and shadows on perspective

Theory**1. Understand the general features of perspective drawing**

- 1.1 Define the meaning of perspective drawing.
- 1.2 Explain classification of perspective drawing.
- 1.3 Outline the importance of orthographic drawing.
- 1.4 Describe the methods of perspective drawing.

2. Understand the principle of perspective Projection

- 2.1 Identify the Picture Plane and horizon line
- 2.2 Explain vanishing point and station point.
- 2.3 Mention the true height line, cone of vision and reduced height line.
- 2.4 Identify the eye level, central visual ray and focus point.

3. Understand the principle of two point Perspective

- 3.1 Explain the meaning of the two point perspective
- 3.2 Identify the vanishing points in two point perspective
- 3.3 Mention the relationship between station point and picture point
- 3.4 Describe the methods of determining height in perspective

4. Understand the principle of one point perspective

- 4.1 Describe the meaning of the one point or parallel perspective
- 4.2 Identify the location of picture and station point.
- 4.3 Describe the direct projection method of one point perspective.

5. Understand the principle of three point perspective

- 5.1 Mention the meaning of three point perspective.
- 5.2 Describe the direct projection method of three point perspective
- 5.3 Explain the perspective plan method of three point perspective.

6. Understand the distortion in perspective

- 6.1 Mention the meaning of the distortion in perspective.
- 6.2 Distinguish between the acceptable and desirable distortion.
- 6.3 Mention the meaning of the term reflection

6.4 Describe the reflection side to side and front to back.

7. Understand the principle of shades and shadows on perspective.

7.1 State the principle of shadow casting.

7.2 Describe the shadow with the light rays parallel to picture plane.

7.3 Describe the shadow of slanting and oblique lines.

7.4 Describe the shadow of steps.

PRACTICAL

1. Perform the Common Method of Two-Point Perspective

1.1 Draw plan, picture plane and station point.

1.2 Draw ground line, elevation and horizon line.

1.3 Determine Left and right vanishing points.

1.4 Draw two-point perspective view of a cube.

2. Perform perspective in front and behind picture plane.

2.1 Draw object in front of picture plane.

2.2 Draw object behind picture plane.

3. Perform two-point perspective of exterior and interior.

3.1 Draw two-point perspective of a simple exterior.

3.2 Draw two-point perspective of a simple interior.

3.3 Draw two-point exterior perspective of one storied building.

3.4 Draw two-point interior perspective of one storied building.

4. Perform the Common Method of One-Point Perspective.

4.1 Draw plan, picture plane and station point.

4.2 Draw ground line, elevation and horizon line.

4.3 Determine vanishing point.

4.4 Draw one-point perspective view of a cube.

5. Perform three point perspectives.

5.1 Draw three point of a cube using direct projection method.

5.2 Draw three point perspective of a desk.

5.3 Draw three point perspective of a simple building.

6. Perform shadows on perspective drawing.

6.1 Draw shadows with the light rays parallel to the picture plane.

6.2 Draw shadows on multi-view orthographic plan.

6.3 Draw shadows on perspective plans.

7. Draw Shades and Shadows.

7.1 Block

7.2 Cone

7.3 Cylinder

REFERENCE BOOKS

1. Architectural Rendering – Alberto. Halse

3. Professional Architectural Graphics – C. Leslie Martin.

66447

BASIC ESTIMATING & COSTING

T P C
3 3 4

AIMS

- To provide the ability of quantity analysis of civil engineering works
- To enable to estimate volume, quantities of materials used in construction works
- To provide understanding cost abstract of civil engineering works
- To be able to improve knowledge and skill of estimating two storied building consisting of spread footing and frame structure (Colum footing) .
- To develop skill in estimating RCC and bituminous road .
- To develop skill in rate analysis process for different items of work in the building trades.

SHORT DESCRIPTION

Introduction to estimating ,Quantity estimation of excavating tank, road embankment steps, boundary wall, bituminous & RCC road, complete estimate of a single storied building with verandah and two storied frame structure building with verandah, and rate analysis.

DETAIL DESCRIPTION

Theory

1 Understand the basic concept of estimating .

- 1.1 Define the term estimating .
- 1.2 State the methods of estimating .
- 1.3 Mention the rules and methods of measurements of works.
- 1.4 Mention the rules of deduction for opening, bearing etc. in masonry .
- 1.5 List unit weight of different materials used in construction works
- 1.6 Mention the unit of different items of works as per standard practice.

2 Estimate the quantity of earth work in excavation of a tank and embankment.

- 2.1 Mention the rules of finding out the volume of earth work by mid area method.
- 2.2 Mention the rules of finding out the volume of earth work by mean area method.
- 2.3 Mention the rules of finding out the volume of earth work by prismoidal method.
- 2.4 Identify the side slopes for different heights of road embankment.
- 2.5 Identify the cross section of road embankment.
- 2.6 State the method of finding out the volume of earth work in embankment by mid area method..
- 2.7 State the method of finding out the volume of earth work in embankment by mean area method..
- 2.8 State the method of finding out the volume of earth work in embankment by prismoidal method.

3 Estimate the different quantities of work in steps , boundary wall and roads.

- 3.1 Identify different parts of a step .
- 3.2 List different items of works in a boundary wall .
- 3.3 List different items of works in a bituminous road .
- 3.4 List different items of works in a RCC road.
- 3.5 Calculate the quantity of different items : .(a) Step (b) RCC road (c) bituminous road

4 Understand the procedure of estimating a simple building.

- 4.1 State the centre line and separate wall method.
- 4.2 Mention the advantage and disadvantage of centre line and separate wall methods.
- 4.3 Explain the methods of deduction for opening.
- 4.4 Define sub-structure and super- structure.

4.5 Identify main wall, partition wall, outer wall, inner wall, parapet wall etc.

4.6 Identify RCC work in lintel, beam, stair, floor/roof slab, sunshade, shelf, railing, drop wall etc.

5 Understand the procedure of estimating of a simple two storied frame structure building.

5.1 Calculate the quantity of earth work in excavation of column footing.

5.2 Calculate the quantity of RCC work for column footing upto grade beam.

5.3 Calculate the quantity of RCC work for grade beam.

5.4 Calculate the quantity of RCC column up to roof level.

5.5 Calculate the quantity of RCC beam of ground floor.

5.6 Calculate the quantity of RCC work in roof slab.

6. Understand the estimate of plumbing, sanitary and electrical works.

6.1 State the method of estimate plumbing and sanitary works.

6.2 Name the different fittings and fixtures required for water supply and sanitary works

6.3 Describe the method of estimation the drainage works of a buildings.

6.4 List the different electrical appliances and fittings for drawing room of residential building.

7. Understand the process of analysis of rates of various items of work as per PWD standard for sub-structure

7.1 State the meaning and purposes of rate analysis

7.2 State the rate analysis of the following items.

7.2.1. Earth work in excavation for foundation trenches.

7.2.2. Earth and sand filling in foundation and plinth.

7.2.3. one layer brick flat soling in foundation and floor.

7.2.4. Cement concrete work (1:3:6) in foundation and floor.

7.2.5. Brick work in foundation up to plinth with 1:6 cement mortar.

7.2.6 75 mm thick damp proof course (DPC) in proportion 1 :1.5: 3.

8. Understand the process of analysis of rates of various items of work as per PWD standard for super structure.

8.1. Brick work of 250 mm thick wall with 1:6 and 1:4 cement mortar.

8.2. Brick work of 125mm thick wall with 1:4 cement mortar.

8.3. RCC work in proportion 1:2:4 and 1:1.5:3 including shuttering cost.

8.4. Mild steel reinforcement fabrication work in different types of RCC of work (1000 kg/1 ton of work .

8.5 Patent stone flooring in proportion 1:1.5:3 with neat cement finishing.

8.6 20 mm thick cement plaster (1:4) with neat cement finishing.

8.7 Average 12 mm thick cement plaster (1:6) to brick walls.

8.8 Average 6 mm thick cement plaster (1:4) to RCC surface.

8.9 Lime terracing work with proportion of 2:2:7 over roof slab

8.10 Teak wooden door frame and 38 mm thick paneled door shutter.

8.11 Aluminum swing and sliding door and window.

8.12 Steel glazed window shutter with Z- section, T- section, flat bars etc.

8.13 White washing, color washing, distempering, snowmen washing, plastic emulsion paint, synthetic enamel paint wherever necessary.

8.14 Installation of European type commode & Indian type long pan (WC) with low level flushing tank, bath tub, wash hand basin, sink, squatting & standing urinals.

9. Understand the preliminary estimate for building project work according to plinth area rate.

9.1 State the meaning of preliminary estimate.

9.2 Mention the basis of calculating preliminary cost estimate of a building project work.

9.3 Describe the calculation procedure of preliminary cost estimate for building project work according to plinth area rate.

PRACTICAL Works

1. Calculate the volume of earth work in excavating tank of a given cross-section by
 - a) mid area method. b) mean area method. c) prismatic method.
2. Prepare an estimate for construction of 100m long boundary wall.
 - a) using 25 cm × 25 cm brick pillar.
 - b) using 25 cm × 25 cm RCC column and grade beam.
3. Prepare an estimate for making wooden
 - a) chair b) table c) almirah d) Sofaset.

4. Calculate the quantity of m.s. reinforcement for the following items.

4.1 Rectangular beam.

4.2 Column.

4.3 Sunshade.

5. Calculate the quantity of m.s. reinforcement for roof slab. (a) one way slab (b) two way slab.

6 Calculate the quantity of the following items of work of a two storied frame structure building (Sub-structure)

6.1 Calculate the quantity of earth work in excavation of foundation trenches.

6.2 Calculate the quantity of sand filling in plinth.

6.3 Calculate the quantity brick flat soling and mass concrete in foundation and floor.

6.4 Estimate the reinforced cement concrete work in foundation up to plinth level.

6.5 Calculate the quantity of brick work up to plinth level.

7. Calculate the quantity of the following items of work of a two storied frame structure building (Superstructure)

7.1 Calculate the quantity of brick work in ground floor and above(250 mm thick).

7.2 Calculate the quantity of brick work in ground floor and above(125 mm thick).

7.3 Estimate the cement plaster work on brick wall (1:6).

7.4 Estimate the reinforced cement concrete work (a) Ground floor (b) 1st floor and above.

7.5 Estimate the cement plaster to RCC surfaces (1:4).

7.6 Estimate the quantity of wood work in frame and shutters.

7.7 Estimate the wood, steel and aluminum work in window frames and shutters.

7.8 Estimate the grill works for window and verandah.

7.9 Estimate the patent stone flooring, mosaic work, tiles to skirting.

7.10 Estimate the lime terracing (2:2:7) over RCC roof slab.

7.11 Estimate the quantity of white wash, color wash, snowcem wash, distemper, plastic paint where necessary.

7.12 Estimate the painting and varnishing works to doors, windows, grills and skirting.

7.13 Calculate the total cost per square metre according to PWD rate of a two storied frame structure building.

8. Calculate the cost per square metre for a residential building (Including sanitary & electrical works).

REFERENCE BOOKS

1. Estimating and costing - B N Datta
2. Estimating and costing - Gurucharan Singh
3. Estimating and costing - S.C Rangwala
4. A Text book of Estimating and costing - G. S. Birdie.

65841 Business Organization & Communication

T P C
2 0 2

AIMS:

- To be able to understand the basic concepts and principles of business organization.
- To be able to understand the banking system.
- To be able to understand the trade system of Bangladesh.
- To be able to understand the basic concepts of communication and its types, methods.
- To be able to perform in writing, application for job, complain letter & tender notice.

SHORT DESCRIPTION:

Principles and objects of business organization; Formation of business organization; Banking system and its operation; Negotiable instrument; Home trade and foreign trade. Basic concepts of communication Communication model & feedback; Types of communication; Methods of communication; Formal & informal communication; Essentials of communication; Report writing; Office management; Communication through correspondence; Official and semi- official letters.

DETAIL DESCRIPTION:

Theory:

1. Concept of Business organization.

- 1.1 Define business.
- 1.2 Mention the objects of business.
- 1.3 Define business organization.
- 1.4 State the function of business organization.

2. Formation of Business organization.

- 2.1 Define sole proprietorship, partnership, Joint Stock Company. and co-operative
- 2.2 Describe the formation of sole proprietorship, partnership, joint stock Company, & co operative.
- 2.3 Mention the advantages and disadvantages of proprietorship, partnership and Joint Stock Company.
- 2.4 State the principles of Co operative & various types of Co operative.
- 2.5 Discuss the role of co-operative society in Bangladesh.

3. Basic idea of Banking system and negotiable instrument.

- 3.1 Define bank.
- 3.2 State the service rendered by bank.
- 3.3 Describe the classification of bank in Bangladesh.
- 3.4 State the functions of Bangladesh Bank in controlling money market.
- 3.5 State the functions of commercial Bank in Bangladesh
- 3.6 Mention different types of account operated in a bank.
- 3.7 Mention how different types of bank accounts are opened and operated.

- 3.8 Define negotiable instrument.
- 3.9 Discuss various types of negotiable instrument.
- 3.10 Describe different types of cheque.

4. Home & foreign trade

- 4.1 Define home trade.
- 4.2 Describe types of home trade.
- 4.3 Define foreign trade.
- 4.4 Mention the advantages and disadvantages of foreign trade.
- 4.5 Discuss the import procedure & exporting procedure.
- 4.6 Define letter of credit.
- 4.7 Discuss the importance of foreign trade in the economy of Bangladesh.

5. Basic concepts of communication

- 5.1 Define communication & business communication.
- 5.2 State the objectives of business communication.
- 5.3 Describe the scope of business communication.
- 5.4 Discuss the essential elements of communication process.

6. Communication model and feedback.

- 6.1 Define communication model.
- 6.2 State the business functions of communication model.
- 6.3 Define feedback.
- 6.4 State the basic principles of effective feedback.

7. Types and Methods of communication.

- 7.1 Explain the different types of communication;-
 - a) Two-way communication
 - b) Formal & informal communication
 - c) Oral & written communication
 - d) Horizontal & vertical communication
 - e) external & internal communication
 - f) Spoken & listening communication.
- 7.2 Define communication method.
- 7.3 Discuss the various methods of communication.
- 7.4 Distinguish between oral and written communication.

8. Essentials of communication.

- 8.1 Discuss the essential feature of good communication.
- 8.2 Describe the barriers of communication.
- 8.3 Discuss the means for overcoming barriers to good communication.

9. Report writing.

- 9.1 Define report, business report & technical report.
- 9.2 State the essential qualities of a good report.
- 9.3 Describe the factors to be considered while drafting a report.
- 9.4 Explain the components of a technical report.
- 9.5 Prepare & present a technical report.

10. Office management.

- 10.1 Define office and office work.

- 10.2 State the characteristics of office work.
- 10.3 Define filing and indexing.
- 10.4 Discuss the methods of filing.
- 10.5 Discuss the methods of indexing.
- 10.6 Distinguish between filing and indexing.

11. Official and semi-official letters.

- 11.1 State the types of correspondence.
- 11.2 State the different parts of a commercial letter.
- 11.3 Define official letter and semi-official letter.
- 11.4 Prepare & present the following letters: Interview letter, appointment letter, joining letter and application for recruitment. Complain letters, tender notice.

REFERENCE BOOK:

1. উচ্চ মাধ্যমিক ব্যবসায়নীতি ও প্রয়োগ -মোহাম্মদ খালেকুজ্জামান
2. উচ্চ মাধ্যমিক ব্যাংকিং ও বীমা -প্রফেসর কাজী নুরুল ইসলাম ফারুকী
3. আধুনিক কারবার পদ্ধতি -লতিফুর রহমান
4. কারবার যোগাযোগ ও সচিবের কার্যপদ্ধতি -প্রফেসর লতিফুর রহমান ও প্রফেসর কাজী নুরুল ইসলাম ফারুকী
5. ব্যবসায়িক যোগাযোগ এবং অফিসের কর্মপ্রণালী -ড. এম, এ, মান্নান
6. ব্যবসায় যোগাযোগ – মোহাম্মদ খালেকুজ্জামান ও মোঃ মুশাররফ হোসেন চৌধুরী
7. Business organization & management- M.C. Shukla
8. Business organization & management- R.N. Gupta