BANGLADESH TECHNICAL EDUCATION BOARD

Agargoan, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: **661**

4th SEMESTER

DIPLOMA IN ENGINEERING

PROBIDHAN-2016

ARCHITECTURE TECHNOLOGY (661)

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	66142	Architectural Design -3	1	6	3	20	30	50	50	150
2	66141	History of Architecture -1	2	0	2	40	60	0	0	100
3	66143	Working Drawing With CAD	0	9	3	0	0	75	75	150
4	66446	Fundamental Construction Process	2	3	3	40	60	25	25	150
5	66144	Model Making	0	6	2	0	0	50	50	100
6	66447	Basic Estimating & Costing	3	3	4	60	90	25	25	200
7	65841	Business Organization and Communication	2	0	2	40	60	0	0	100
		Total	**10**	**27**	**20**	**200**	**300**	**225**	**225**	**950**

66142 Architectural Design - 3

T	P	C
1	6	3

AIMS:

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

- Site planning of Stall & Pavilion.
- Design of Stall & Pavilion.
- Planning & design of Religious building.
- Building by-Laws,
- RAJUK / Responsible Authority approval sheet.
- Landscape drawing.

SHORT DESCRIPTION:

Site Planning & Design of Stall & Pavilion, Planning & design of Religious building, Building by-Laws, RAJUK / Responsible Authority approval sheet & Landscape Drawing.

Theory:

1. **Understand Stall and Pavilion.**
   - 1.1. Define stall and pavilion.
   - 1.2. Distinguish between stall and pavilion.
   - 1.3. State the necessity features of a stall.
   - 1.4. Discuss the advantages and disadvantages of a stall.
   - 1.5. State the necessity features of a pavilion.
   - 1.6. Discuss the advantages and disadvantages of a pavilion.
2. **Understand the Religious Building.**
   - 2.1. Define religious building.
   - 2.2. Define different types of religious buildings (Mosque, Church, Temple, Pagoda etc.).
   - 2.3. Discuss the religious aspects of -
     - 2.3.1. Mosque
     - 2.3.2. Church
     - 2.3.3. Temple
     - 2.3.4. Pagoda
   - 2.4. Discuss the design features of different religious buildings.
3. **Understand the Mosque.**
   - 3.1. Define mosque.
   - 3.2. Discuss the design aspects of a mosque (prayer hall, mimber/pulpit, mihrub, minar, dome, ablution etc.).
   - 3.3. Describe Prayer hall with different dimension & allocation.
   - 3.4. Explain Mimber & Mihrub with dimension & allocation.
   - 3.5. Discuss ablution area & Shan with dimension & allocation.
   - 3.6. Explain necessity of Dome & Minar with dimension & allocation.
4. **Understand the Building by - Laws and Building Approval.**
   - 4.1. Define Building - by - Laws and BNBC.

4.2. Define Rajuk Sheet/ Building approval Sheet.
4.3. Explain different features of a Rajuk Sheet/building approval sheet.
4.4. Explain different terms related to Building by-laws/ Rajuk Sheet (FAR, MGC, Set-Back)/building approval sheet.
4.5. Discuss Rajuk rule for Parking, Stair and other rules'2010.

5. Understand Structural features.

5.1. Define structural features of a building.
5.2. Define beam with classification (simply supported, semi continuous, continuous, cantilever, overhanging beam etc.).
5.3. State column with classification (long & short column).
5.4. Define slab with classification (one way & two way)
5.5. Explain footing, lintel, sunshade, and stair and water reservoir.

PRACTICAL

1. Prepare preliminary drawings of stall/pavilion.

1.1. Visit any stall or pavilion and make a presentation on it.
1.2. Make free hand sketches of a stall.
1.3. Draw presentation drawings of the stall/pavilion.
1.4. Draw a plan of the stall/ pavilion in 1:20 scale.
1.5. Draw four sides elevation of the stall/pavilion in 1:20 scale.
1.6. Draw a 3D view (free hand) of the stall.

2. Prepare a set of presentation drawings of stall/pavilion.

2.1. Draw a plan of the stall/pavilion in 1:20 scale to internal arrangements (Passage, Products, Displays etc.).
2.2. Draw a long section of the stall/pavilion in 1:20 scale.
2.3. Draw the transverse section of the stall/pavilion in 1:20 scale.
2.4. Draw a roof plan of the stall/pavilion in 1:20 scale.
2.5. Draw a site plan of the stall/pavilion in 1:50 scale.
2.6. Make a model of the stall/pavilion.

3. Prepare a set of presentation drawing of mosque.

3.1. Visit different historical/contemporary mosque & present a report on it.
3.2. Draw a free hand line sketch of the mosque.
3.3. Convert the line sketch into 1:100 scale.
3.4. Make necessary correction in needed.
3.5. Draw the final plan of the mosque in 1:100 scale.
3.6. Draw the four side elevation of the mosque in 1:100 scale.
3.7. Draw the long & cross section of the mosque in 1:100 scale.

4. Prepare a Rajuk sheet/ Building Approval sheet.

4.1. Draw all necessary drawings for Rajuk sheet/ Building Approval sheet residence or religious building as per required scale.
4.2. Calculate all necessary measurements.
4.3. Calculate FAR, MGC, Set back rules.
4.4. Write the title box with all necessary information.

5. Prepare a set of working drawing of mosque.

5.1. Draw the plan of the mosque with detail dimensions in 1:50 scale.
5.2. Draw the front elevation of the mosque in 1:50 scale.

5.3. Draw the side elevation of the mosque in 1:50 scale.
5.4. Draw the long section of the mosque in 1:50 scale with dimensions.
5.5. Draw the cross section of the mosque in 1:50 scale with dimensions.

6. Prepare a set of detail drawing of mosque.

6.1. Draw the floor pattern of tiles/mosaic etc.
6.2. Draw the detail plan of Mihrab & Mimber in 1:20 scale.
6.3. Draw the detail plan of ablution and toilet showing all fixture 1:20 scale.
6.4. Draw the reflected ceiling plan of the mosque 1:50.
6.5. Draw the plan & section of Minar 1:20.

7. Prepare the miscellaneous drawing of mosque.

7.1. Draw the detail plan & section of the Dome in 1:20 scale.
7.2. Make calligraphy for the mosque.
7.3. Draw the detail plan, elevation & section of entry door and other door.
7.4. Draw the detail plan, elevation & section of the window.
7.5. Draw the gateway detail of the mosque.

8. Prepare the landscape drawing of mosque.

8.1. Draw the site plan of the mosque in 1:50 scale.
8.2. Draw the parking area of the mosque.
8.3. Draw the walk way, roads, garden, fountain etc. in the site plan.
8.4. Draw the landscape plan of the mosque.
8.5. Make a model of the mosque with landscape.

REFERENCE BOOKS:

1. Architecture Drafting and Design by Donald E. Hepler.
2. Architecture Drafting - Wallach.

66141 History of Architecture– I

T	P	C
2	0	2

AIMS

- To be able to understand Architectural knowledge from different civilization.
- To be able to understand the Architectural development of early Indian Architecture.
- To be able to know the historical development of early Christian & Byzantine & Romanesque Architecture.

SHORT DESCRIPTION

Architecture in the pre-historic ages; Egyptian Architecture; West Asiatic Architecture; Greek Architecture, Roman Architecture; Architecture of Northern-Indian Hindu style; Christian Architecture; Byzantine Architecture; Romanesque Architecture.

DETAILS DESCRIPTION

1. **Understand the development of Architecture in the pre-historic ages.**
   - 1.1 Define stone ages.
   - 1.2 Describe the different features of stone ages
   - 1.3 Describe the earliest form of human dwelling.
   - 1.4 Explain the Architectural aspects of hut, Menhir, Dolmens, Beehive hut, cave and tents.
   - 1.5 Explain the Architectural features of 'Stonehenge'.
2. **Understand the Architectural characteristics of Egyptian Architecture.**
   - 2.1 Describe the historical influence of Egyptian Architecture.
   - 2.2 Describe the evolution of pyramid.
   - 2.3 Describe the Architectural features of the great pyramid of Cheops.
   - 2.4 Explain the architectural characteristics of the temples of Amun at Karnak.
   - 2.5 Explain the Architectural characteristics of the temple of Queen Hatshepsut.
3. **Understand the Architectural characteristics of West Asiatic Architecture.**
   - 3.1 Describe the Architectural characteristics of West Asiatic civilization.
   - 3.2 Identify the material and building technology adopted by the West Asiatic culture.
   - 3.3 Explain the Architectural characteristics of the planning of the city of Khorsabad.
   - 3.4 Explain the architectural features of the planning of the place of Persepolis.
   - 3.5 Explain the architectural characteristics of the city of Babylon.
4. **Interpret the Architectural characteristics of Hellenic period of Greek Architecture.**
   - 4.1 Describe the historical influences on the Greek Architecture.
   - 4.2 Explain the Architectural features of the Greek orders.
   - 4.3 Compare Doric, Ionic and Corinthian order.
   - 4.4 Explain the planning features of the Acropolis at Athens.
   - 4.5 Explain the Architectural features of Parthenon.
5. **Understand the Architectural characteristics of Roman civilization.**
   - 5.1 Describe the historical influences of the Roman Architecture.

5.2 Explain the Architectural characteristics of the Basilica of Constantine.
5.3 Explain the Architectural characteristics of Roman Coliseum.
5.4 Explain the architectural characteristics of the Pantheon at Rome.
5.5 Describe the architectural characteristic of Roman houses.

6. Understand the Architectural Development of early India Architecture.
6.1 Describe the historical influences on the Indus-valley civilization.
6.2 Describe the historical influences of Vedic Architecture.
6.3 Explain the development of Chaittya Arch.
6.4 Describe the historical influences of the Buddhist Architecture.
6.5 Explain the Architectural features of Ashokan pillar.
6.6 Explain the Architectural features of Chaittya hall of Elora Rockcut temple.

7. Understand the Architecture of Northern-Indian Hindu style.
7.1 Describe the Architectural features of the great temple of Bhuvanessor.
7.2 Describe the Architectural features of the temple in Orrissa.
7.3 Explain the Architectural features of the great temple of Mothura.
7.4 Explain the Architectural features of the Pandyan temple.

8. Understand the development of the early Christian architecture.
8.1 Describe the historical influence on the early Christian Architecture.
8.2 Describe the Architectural characteristic of Christian Architecture.
8.3 Identify the Architectural features of the Basilica church.
8.4 Explain Architectural feature of the Basilica church of S. Peter Rome.
8.5 Explain Architectural feature of the church of nativity, Bethlehem.
8.6 Explain Architectural feature of St. Paul at England.

9. Understand the development of the Byzantine Architecture.
9.1 Describe the historical influences of Byzantine Architecture.
9.2 Describe the Architectural characteristic of Byzantine Architecture.
9.3 Explain the Architectural feature of S. Sophia at Constantinople.
9.4 Describe the comparative analysis of Byzantine Architecture.

10. Understand the Romanesque Architecture.
10.1 Describe the historical influences of Romanesque Architecture in Italy.
10.2 Describe the Architectural character of central Italy.
10.3 Describe the historical influences of Romanesque Architecture in France.
10.4 Describe the Architectural character of France.
10.5 Describe the historical influences of central Europe.
10.6 Describe the Architectural character of central Europe.

REFERENCE BOOKS

1. History of Architecture – Fletcher
2. স্থাপত্যের ইতিহাস-১ - মোঃ রফিকুল ইসলাম মীর - বাংলাদেশ কারিগরি শিক্ষা বোর্ড

66143 Working Drawing with CAD

T	P	C
0	9	3

AIMS

To be able to develop knowledge, skill and attitude in the field of Architectural Drawing with special emphasis on:

- working drawing,
- detail drawing of staircase,
- fixture layout of kitchen and toilet,
- septic tank detail,
- water reservoir detail.
- working drawing with Auto CAD
- structural & electrical drawing with Auto CAD

SHORT DESCRIPTION

Working drawing, detail drawing of staircase, fixture layout of kitchen and toilet detail, septic tank detail, water reservoir detail & working drawing, structural drawing, electrical drawings with Auto CAD.

DETAIL DESCRIPTION

Practical:

1. **Construct the floor plan of a 2-Bed room House.**
   - 1.1. Draw the floor plan in 1:50 (1/4″=1′-0″) scale of a 2-bedroom house.
   - 1.2. Show the inside and outside detail dimension in the drawn plan (1.1).
   - 1.3. Draw Front and side elevation (minimum one) in 1:50 (1/4″=1′-0″) scale of the 2-bedroom house
   - 1.4. Draw section in 1:50 (1/4″=1′-0″) scale of the 2-bedroom house showing all dimension and material symbol.
   - 1.5. Make a finish schedule of the residence.
2. **Construct the detail drawing of a Staircase.**
   - 2.1. Draw the detail ground floor plan of a doglegged staircase in 1:50 (1/4″=1′-0″) scale.
   - 2.2. Draw the detail typical floor plan of a doglegged staircase in 1:50 (1/4″=1′-0″) scale.
   - 2.3. Draw the section of the doglegged staircase in 1:50 (1/4″=1′-0″) scale with dimension.
   - 2.4. Draw the detail of steps, nosing, handrail etc. of the staircase.
   - 2.5. Draw the detail plan & section of a three quarter stair in 1:50 (1/4″=1′-0″) scale with dimension.
3. **Construct the detail drawing of a Kitchen.**
   - 3.1. Draw the kitchen plan in 1:20 (1/2″=1′-0″) scale of the 2-bedroom house (1.1).
   - 3.2. Draw the kitchen fixtures in 1:20 (1/2″=1′-0″) scale on the drawn plan (3.1).
   - 3.3. Draw two detail section of the kitchen through sink & burner/range in 1:20 (1/2″=1′-0″) scale showing all dimension.
   - 3.4. Draw the cabinet detail showing all dimensions.

4. **Construct the detail drawing of a Toilet.**
   4.1. Draw a master bath plan in 1:20 (1/2□=1□-0□) scale showing fixtures (Cabinet Basin, Bathtub, W.C. etc.) with all dimensions.
   4.2. Draw the detail section of the master bath in 1:20 (1/2□=1□-0□) scale showing maximum fixtures and all dimensions.
   4.3. Draw the toilet/bath plan in 1:20 (1/2□=1□-0□) scale showing fixtures (Basin, Shower tray, Long Pan/Indian Pan etc.) with all dimensions.
   4.4. Draw the detail section of the toilet in 1:20 (1/2□=1□-0□) scale showing maximum fixtures and all dimensions.

5. **Construct the detail drawing of Septic Tank & Water Reservoir.**
   5.1. Draw the plan and section of a 50 user's septic tank showing the dimensions in 1:20 (1/2□=1□-0□).
   5.2. Draw the Plan of a 2500 gallon underground water reservoir showing the dimensions with R.C.C in 1:20 (1/2□=1□-0□).
   5.3. Draw the section of the water reservoir in 1:20 (1/2□=1□-0□).
   5.4. Draw the Plan & section of a 2500 gallon overhead water reservoir showing the dimensions with R.C.C in 1:20 (1/2□=1□-0□).
   5.5. Draw a roof plan of the drawn 2-bedroom house (1.1) showing slope and location of rain water pipe in 1:50 (1/4□=1□-0□) scale.

6. **Prepare the working drawing set with Auto CAD.**
   6.1. Draw different floor plan of the residence with Auto CAD.
   6.2. Show inside and outside dimension on the floor plans.
   6.3. Draw the elevation of the residence with Auto CAD.
   6.4. Draw the section of the residence with Auto CAD.
   6.5. Show the dimension & hatch on the section

7. **Prepare the staircase detail with Auto CAD.**
   7.1. Draw the detail ground floor and typical floor plan of Staircase with Auto CAD.
   7.2. Draw the detail section of Staircase with Auto CAD.
   7.3. Draw the plan of a circular stair using polar array command.
   7.4. Draw the section of the circular staircase with Auto CAD
   7.5. Draw the details (handrail, nosing, steps etc.) of the staircase with Auto CAD.
   7.6. Layout the different drawing in different scale at one sheet & make a print of the drawing.

8. **Prepare the detail drawing of kitchen with Auto CAD.**
   8.1. Draw the detail plan of kitchen with Auto CAD.
   8.2. Show the fixtures & fittings of kitchen with dimensions.
   8.3. Draw the detail section of kitchen with Auto CAD.
   8.4. Show the fixtures-fittings & materials (hatch) of kitchen with dimensions.
   8.5. Draw the roof plan showing the rain water drainage system.
   8.6. Layout the different drawing in different scale at one sheet & make a print of the drawing.

9. **Prepare the detail drawing of toilet with Auto CAD.**
   9.1. Draw the detail plan of an attached toilet with Auto CAD.
   9.2. Draw the detail plan of a common toilet with Auto CAD.
   9.3. Show the fixtures & fittings of toilet with dimensions.
   9.4. Draw the detail section of toilet with Auto CAD.
   9.5. Show the fixtures-fittings & materials (hatch) of toilet with dimensions.
   9.6. Layout the different drawing in different scale at one sheet & make a print of the drawing.

10. Prepare the electrical drawing set with Auto CAD.

10.1. Make a layer for electrical layout of ground floor plan.
10.2. Draw the electrical fixtures & fittings on the ground floor plan.
10.3. Make a layer for electrical layout of typical floor plan.
10.4. Draw the electrical fixtures & fittings on the typical floor plan.
10.5. Make a legend of electrical fixture & fittings.
10.6. Draw circuit diagram of the floor plan.

11. Prepare a Rajuk sheet/ Building Approval sheet.

11.1. Draw different plan necessary drawings for Rajuk sheet/ Building Approval sheet with Auto CAD.
11.2. Draw section & elevation for Rajuk sheet/ Building Approval sheet with Auto CAD.
11.3. Draw the layout plan & Mouza map for Rajuk sheet/ Building Approval sheet with Auto CAD.
11.4. Write the title box with all necessary information using text command.
11.5. Layout the different drawing in different scale at one sheet & make a print of the drawing.

12. Prepare a set of drawing of R.C.C. Beam.

12.1. Draw the longitudinal (long section) section of a given simply supported rectangular beam in 1:25 scale with Auto CAD.
12.2. Draw a two cross section (one in near supported & other mid of the span) of a simply supported rectangular beam in 1:1 scale with Auto CAD.
12.3. Draw the longitudinal (long section) section of a given continuous rectangular beam in 1:25 scale with Auto CAD.
12.4. Draw a two cross section (one in near supported & other mid of the span) of a continuous rectangular beam in 1:1 scale with Auto CAD.

13. Prepare a set of drawing of R.C.C. Column & slab.

13.1. Draw the plan and section of a given tide R.C.C. column with footing in 1:25 scale with Auto CAD.
13.2. Draw the plan and section of the spiral R.C.C. column with footing in 1:25 scale with Auto CAD.
13.3. Draw plan of a given one way R.C.C. slab showing reinforcement in 1:25 scale with Auto CAD.
13.4. Show the location of beam, lintel and false slab on a floor slab for reinforcement with Auto CAD.
13.5. Draw the plan of a given two way R.C.C. slab showing reinforcement in scale 1:25 with Auto CAD.
13.6. Draw the detail reinforcement of staircase.

REFERENCE BOOKS

1. Working Drawing -I – BTEB
2. Time Saver Standard- Building Type
3. Architectural drafting with Auto CAD - Rudaba Naz
4. Auto CAD - Samuel A Mallick
   Engr. Md. Shah Alam

66446 Fundamental Construction Process

T	P	C
2	3	3

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 lying.

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.

10.1 Name the ingredients of paint & varnishes.

10.2 Mention the specific function of each ingredient of paint & varnishes.

10.3 Describe the characteristics of good paints & varnishes.

10.4 State the various defects in painting & varnishing.

10.5 Describe the factors that should be considered during the supervision of quality painting & varnishing work.

10.6 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

10.7 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. plastic emulsion paint
g. synthetic enamel paint.

11. Understand the different insulation in building.

12.1 Define thermal and sound insulation.
11.1 State the necessity of thermal and sound insulation in building.
11.2 List various types of materials used for thermal and sound insulation.
11.3 Describe the general methods of thermal and sound insulation in building.
11.4 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 type 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.

10.4 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

66144 Model Making

T	P	C
0	6	2

AIMS

To enable to prepare templates & block model; staircase, car & trees; relief work and to provide skill in preparing various interior & exterior models.

SHORT DESCRIPTION

Preparing block model for geometrical prism; Preparing block model of the components of building; Preparing model of an umbrella, pen-stand, relief work, staircase and tree.

DETAIL DESCRIPTION

Practical:

1. **Practice to make paper strips and templates**
   - 1.1 Make different paper strips by N.T. cutter and steel edge/set square.
   - 1.2 Make thin threads by paper.
   - 1.3 Make a square template by thick paper.
   - 1.4 Make an elliptical template by thick paper.
   - 1.5 Make a circular template by thick paper.
   - 1.6 Make an octagonal template by thick paper.
2. **Prepare a block model of cube and rectangular prism.**
   - 2.1 Select the model making board and other materials for making the model of cube and rectangular prism.
   - 2.2 Select the equipment & tools for making model of cube and rectangular prism.
   - 2.3 Layout and mark as per drawing on the board for making model of cube and rectangular prism.
   - 2.4 Cut the board as per marking.
   - 2.5 Glue on the required cut edges.
   - 2.6 Paste & assemble the cut pieces for preparing the model.
3. **Prepare a block model of circular and triangular prism.**
   - 3.1 Select the model making board and other materials for making the model of circular and triangular prism.
   - 3.2 Select the equipment & tools for making model of circular and triangular prism.
   - 3.3 Layout and mark as per drawing on the board for making model of circular and triangular prism.
   - 3.4 Cut the board as per marking.
   - 3.5 Glue on the required cut edges.
   - 3.6 Paste & assemble the cut pieces for preparing the model.
4. **Prepare a model of an umbrella and pen stand.**
   - 4.1 Select the model making board and other materials, equipment & tools for making the model of the umbrella.
   - 4.2 Layout and mark as per drawing on the board for making the model of an umbrella.
   - 4.3 Cut the board as per marking and glue on the required cut edges.

4.4 Paste & assemble the cut pieces for preparing the model.
4.5 Select the model making board, equipment & tools and other materials for making model of pen stand.
4.6 Layout and mark as per drawing on the board for making the model of a pen stand.
4.7 Cut the board as per marking & glue on the required cut edges.
4.8 Paste & assemble the cut pieces for preparing the model.

5. **Prepare a relief model.**
5.1 Select the model making board and other materials for making of relief works.
5.2 Select the equipment & tools for making the model of relief works.
5.3 Layout from a concept & mark as per drawing on the board for making of relief model.
5.4 Cut the board as per marking & glue on the required cut edges.
5.5 Paste & assemble the cut pieces for preparing the model.

6. **Prepare the model of steps.**
6.1 Select the model making board and other materials for making the model of step.
6.2 Select the equipment & tools for making the model of steps.
6.3 Layout and mark as per drawing on board for making the model of steps & cut the board as per marking.
6.4 Glue on the required cut edges.
6.5 Paste & assemble the cut pieces for preparing the model.

7. **Prepare the model of car.**
7.1 Select the model making board and other materials for making the model of a car.
7.2 Select the equipment & tools for making model of a car.
7.3 Layout and mark as per drawing on board for making model of a car.
7.4 Cut the board as per marking.
7.5 Glue on the required cut edges.
7.6 Paste & assemble the cut pieces for preparing the model.

8. **Prepare the model of a tree.**
8.1 Select the model making board and other materials for making the model of tree.
8.2 Select the equipment & tools for making the model of tree.
8.3 Cut different material for making the model of tree.
8.4 Build up the tree by using different materials.

9. **Make a model of stair case used in two storied building with gratis board/plastic board.**
9.1 Select the model making board & other materials for making the model of stair case.
9.2 Draw the development of the stair/steps on model making board according to scale.
9.3 Cut the board as per drawing.
9.4 Paste & assemble the cut pieces for preparing the model.

10. **Prepare a model of pavilion used in different exhibition with model paper.**
10.1 Select the model making board & other materials for making the model of pavilion.
10.2 Select the tools & equipment for making the model of pavilion.
10.3 Draw the development of the pavilion on model making board according to scale.
10.4 Cut the board as per drawing.
10.5 Paste & assemble the cut pieces for preparing the model.

11. **Prepare detail model of a multi-storied / high rise building.**
11.1 Select the model making board & other materials for making the model of a multistoried high rise building.

11.2 Draw the side development of the building on model making board according to scale & cut the board as per drawing.

11.3 Paste and assemble the cut pieces for preparing the model.

11.4 Paste & assemble the prepared model on the base with a beautiful Landscape & presentation.

12. Prepare a detail model of a Kitchen.

12.1 Select the model making board & other materials for making the model of the Kitchen.

12.2 Select the tools & equipment for making the model of pavilion.

12.3 Draw the development of the cabinet of the L-shaped or U-shaped kitchen & Cut the model paper as per drawing.

12.4 Paste and assemble the cut pieces for preparing the model.

12.5 Make the base & wall of the kitchen.

12.6 Paste and assemble the cabinet on the base & wall.

REFERENCE BOOK

1. Model Making- II. By- Rezaul karim Robin. (Bangladesh Technical Education Board).

SUBJECT CODE **BASIC ESTIMATING & COSTING** **T P C**

66447 **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, shelve, 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) prismoidal 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 aluminium 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