BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: **661**

6th SEMESTER

DIPLOMA IN ENGINEERING

PROBIDHAN-2016

ARCHITECTURE TECHNOLOGY (661)

6th 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	66161	Architectural Design -5	1	9	4	20	30	75	75	200
2	66162	Computer Rendering & Animation -1	0	9	3	0	0	75	75	150
3	66163	Landscape Design	1	3	2	20	30	25	25	100
4	66164	Contemporary Architecture	3	0	3	60	90	0	0	150
5	69054	Environmental Studies	2	0	2	40	60	0	0	100
6	66454	Theory of structure	2	3	3	40	60	25	25	150
7	65852	Industrial Management	2	0	2	40	60	0	0	100
Total			**11**	**24**	**19**	**220**	**330**	**200**	**200**	**950**

66161 Architectural Design And Planning- V T P C
1 9 4

AIMS

To be able to-

- To be able to understand planning of an office building.
- To be able to understand the designing an office building.
- Understand the general consideration of a shopping complex planning.
- Prepare a design of shopping complex.

SHORT DESCRIPTION

Core Location of an Office; Main Stair and Fire Escape; General Principle; Office Layout; Guide for Space Allowance; Drive Way; Slopped Way/Ramp. Conception of Shopping center, retail shops, types of shopping, Design and Planning criteria, service details, self service shops.

DETAIL DESCRIPTION

Theory:

1 Understand the site selection of an office building.

1.1 Define office building.
1.2 Describe the necessity of office building.
1.3 Define down town.
1.4 Describe the site selection process of an office building.
1.5 Discuss the general requirements of an office building.
1.6 Discuss the design process of an office building.
1.7 Explain design rules of RAJUK for office building.
1.8 Discuss the necessary rules from BNBC for designing of an office building.

2 Understand the core location of an office building.

2.1 Define core area.
2.2 Describe the factors determining the size & numbers of elevators.
2.3 Describe the services that are provided in a vertical duct.
2.4 Describe the factors that determine the size, shape, location and number of lavatories.
2.5 Describe main stair and fire escape and its function.
2.6 Describe the efficiency of an office building.

3 Understand the general principle of an office building.

3.1 Mention the work flow of an office building.
3.2 Describe the straight line principle.
3.3 Describe the necessity of internal circulation of an office.
3.4 Name six basic office functions (management, financial, sales, general, technical, production – office group functions).
3.5 Describe the types of space in an office.
3.6 Describe space allowances i.e. office space & file space, special equipment, storage space, special room allowances.

4 Understand the Introduction of Retail Shops and Self Service Shop.

4.1 Define Shops.
4.2 Explain the necessity of shops.
4.3 List the types of shops.

4.4 Discuss site selection process for different types of shops.
4.5 Describe the general consideration and principles of Retail Shop.
4.6 Discuss the inducing entrance, store space organizing & interior displays.
4.7 Describe the sequence of customer flow with figure.
4.8 Describe the position of entrance for self service shop.
4.9 Discuss the parceling and delivery system of shop.
4.10 Discuss the functional aspects of shop front.

5 Understand the Retail Trading and General Design & Planning criteria of a Shopping Complex.

5.1 State the type of shopping facilities.
5.2 Describe the self or staff service.
5.3 Differentiate the open market and covered market.
5.4 Describe Shops (Shops in new development, shop layout, location), Departmental Store (Definition- display, gondolas), Shopping centers (Definition- siting, basic design), Hypermarket (definition- Design).
5.5 Describe the general consideration of site selection for shopping complex.
5.6 Describe the planning problems of shopping complex.
5.7 Explain the sales area storey heights, structural grid and aisles.
5.8 Describe the movement between floors.

6 Understand the Service Details of Shopping Complex.

6.1 State the back-up stock and goods transport.
6.2 State display window, staff entrance & staff WC.
6.3 Discuss the building regulations, entrance & exits.
6.4 Discuss the windows, cold, fire, temperature & ventilations.
6.5 Discuss the column spacing, store depth, clear height and ducts and shafts.

PRACTICAL:

1 Prepare the proposal of an office building.

1.1 Collect data for the office project.
1.2 Analysis the data as per requirements.
1.3 Line sketches the project plan.
1.4 Present the proposal.

2 Prepare the presentation drawing of an office building.

2.1 Draw a flow diagram of an office.
2.2 Sketch line plan of an office building as per general requirements.
2.3 Develop the line plan according to scale.
2.4 Make a presentation drawing for approval by the client (plan, Elevation, selection (scale - 1:100 or $^1/_8$"=1'- 0").
2.5 Draw different elevation with shade & shadow (scale - 1:100 or $^1/_8$" = 1'-0").
2.6 Show furniture arrangement of different work station.

3 Prepare the working drawing set of an office building.

3.1 Draw all floor plan showing all dimensions (scale 1:50 or ¼" = 1'- 0").
3.2 Draw front and any other side elevation (scale 1:50 or ¼" = 1'- 0").
3.3 Draw a section through stair & lift (scale 1:50 or ¼" = 1'- 0").
3.4 Draw roof plan showing rain water drainage (scale 1:50 or ¼" = 1'- 0").
3.5 Make a door-window schedule for the building.

4 Prepare landscape design in the site plan.

4.1 Draw the lay-out plan of building.
4.2 Draw 90^0, 60^0 & 45^0 car parking in the site plan.

4.3 Show the walkway, water-bodies and trees, green in the site plan.
4.4 Show the waste disposal system in the site plan.

5 Prepare a set of drawing for private office.
5.1 Draw the desk clearance for private office.
5.2 Draw the typical modular office plan.
5.3 Draw the corridor width based of the human figure.
5.4 Draw the furniture lay-out for private office.

6 Prepare the model and presentation for the office project.
6.1 Make a model for the office building.
6.2 Place the model of a base and show landscape on it.
6.3 Design a presentation through power point or any other software for the project.
6.4 Present the project in front of audience/ jury.

7 Prepare electrical drawing of a building.
7.1 Draw the various electrical systems used in building drawing.
7.2 Draw general first and typical floor electrical fixture lay-out.
7.3 Show the conduit lay-out in the plan.
7.4 Show detail electrical circuit diagram.

8 Prepare the Preliminary design of a shopping center (multi storied - 15 shops per floor).
8.1 Draw the flow diagram of a shopping center (multi storied - 15 shops per floor).
8.2 Sketch the line plan of shopping center with given requirements.
8.3 Develop the line plan according to scale.
8.4 Draw the four side elevation of shopping center.
8.5 Draw a vertical section through stair and lift.

9 Prepare layout & landscape plan of shopping center.
9.1 Draw the layout plan according to the RAJUK rules.
9.2 Draw the landscape plan showing different plantations & structures.
9.3 Prepare door & window schedule.
9.4 Draw detail planning of core area.

10 Prepare a departmental store.
10.1 Draw a flow diagram of a departmental store.
10.2 Draw a typical plan showing different goods area.
10.3 Draw the typical plan selection of different counters.
10.4 Draw the plan of escalator used in shopping complex.
10.5 Draw the section of escalator.

REFERENCE BOOKS

1. Planning; **The Architects Hand Book**
   by E and O. E
   S. Row Land PIERCE
   PATRICK CUTBUSH
   ANTHONY WILLSAMS
2. **TIME SAVER STANDARD**; BUILDING TYPE
   BY- JOSEPH DE CHIARRA
3. The Hand book of building types. **ERNST Neufert ARCHITECTS DATA**
   By- Vincenet Jones,
   George Atkinson OBEBA (Arch) RIBA.

66162	Computer Rendering & Animation -I	T	P	C
		0	9	3

AIMS:

To be able to develop knowledge, skill and attitude in the field of Computer Rendering & Animation (Sketchup) with special emphasis on:

- Drawing environments and drawing aids.
- Different setup of drawing in Sketchup.
- Drawing commands.
- Modification & edits of drawing.
- V-Ray.
- Printing the drawing elements.

SHORT DESCRIPTION:

Drawing environments and drawing aids; Different setup of drawing in Sketchup; Drawing commands; Modification & edits of drawing; camera, material assign, lighting setup, V-ray;- camera, lighting, Rendering etc.

PRACTICAL

1. Set up the drawing environments and drawing aids.

1.1. Install & Start Sketchup software.
1.2. Identify the different areas of Sketchup screen.
1.3. Use menu bar, command prompt area, toolbox, units and drawing aids.
1.4. Use the drawing aids, different menus and dialog boxes of Sketchup package.
1.5. Import the CAD file into Sketchup.
1.6. Apply how to save the drawing & exit from the file.

2. Construct the geometrical shape or object.

2.1. Use the command to draw Line.
2.2. Erase the object using different erase commands.
2.3. Draw rectangle using rectangle commands.
2.4. Draw circles using different method of circle commands.
2.5. Draw polygon using different method of polygon commands.
2.6. Draw arc using different commands of arc.
2.7. Use the freehand tools to create polygons.
2.8. Use the paint tools.

3. Edit and modify the object.

3.1. Select and delete the object.
3.2. Move objects using the move tool.
3.3. Use the push/pull tool.
3.4. Rotate the object in different angle /direction using rotate command.
3.5. Draw lines/object in certain distance using offset commands.
3.6. Use scale command to enlarge or reduce an object in a ratio
3.7. Use the orbit tool to see the rotating view of any object.

4. Dimensioning/measurement the object.

4.1. Use the Tape measure tool to dimensioning the object.
4.2. Put dimension in the object using linear, angular, radius, diameter, ordinate, align, center, mark, continuous, base line commands.
4.3. Use the protractor tool to measure the circular/rotating dimension.
4.4. Use the axis tool to measure the axis.
4.5. Edit dimension.

5. Operate the object using the scroll/zoom command.

5.1. Use the pan tool.
5.2. Use zoom tool to customize the object size on screen.
5.3. Show the objects various ways use zoom extends & zoom window tool.
5.4. Show the objects earlier view using the previous tool.
5.5. See the objects from outdoor and indoor using the walk & look around tool.

6. Operate the status bar

6.1. Use Undo tool to cancel the immediate doing works.
6.2. Use Redo tool to recreate the works.
6.3. Use help tool.
6.4. Use the language tool for writing the text.
6.5. Look out the overview of an object use feedback & status tool.

7. Construct the shade-shadow using shadow command.

7.1. Use wireframe to show the skeleton of the object.
7.2. Use hidden tool to conceal the skeleton of the object.
7.3. Show the shaded view using shaded command.
7.4. Show the shaded view with texture.

8. Produce different view using view command.

8.1. Show isometric view in different angle using isometric view tool.
8.2. Use the front, back, left, right view tool to show the view of the object.
8.3. Use the top & bottom view tool to show the view of the object.

9. Operate the different panels.

9.1. Use the entity info tool for the works.
9.2. Use the instructor & components tool.
9.3. Show the materials on the object.
9.4. Use the layers tool for the drawing.
9.5. Use the Scene & Display command.

10. Set up the camera & control.

10.1. Operate the Target and free Camera.
10.2. Use lens, FOV, Dolly camera etc.
10.3. Apply two cameras for the projects and adjust necessary parameters.
10.4. Set two Viewport for Rendering.

11. Assign the materials & Show Materials on object.

11.1. Use Material Editor Dialogue box and its necessary Tools.
11.2. Prepare a material Slot by adding Color.
11.3. Apply a Material to a object.
11.4. Create a glass Material by using Refraction Map.

11.5. Create a MS/SS material and assign it to the railing of the Project.
11.6. Create a Multi/sub material for Windows and assign it to the Project.

12. Set up Lighting & texture mapping .

12.1. Show standard and Photometric Light.
12.2. Create Standard Light (Target Spot, Target Direct, Omni etc.)
12.3. Use general parameters, Intensity parameters, spot light parameters, Shadow parameters etc.
12.4. Apply 1 or 2 standard light to the project and adjust the necessary parameters for best output.
12.5. Use Texture/Bitmap for material.
12.6. Practice to tilling the texture, Real-world scale, bitmap rotate reloads etc.
12.7. Assign Texture material slot to an object and apply UVW Map Modifier.
12.8. Create necessary numbers of texture materials and assign them to the project.

13. Perform Rendering.

13.1. Familiar with Render Setup dialogue Box.
13.2. Use render output size and apply it for the project.
13.3. Select a camera View and render it.
13.4. Save the Render Image in different formats such as BMP, JPEG, PNG, TIF, Targa image etc.

14. Install and setup V-Ray .

14.1. Use V-Ray and its different version for Sketch up.
14.2. Perform V-Ray installation for Sketch up.
14.3. Perform V-Ray setup for Sketch up.

15. Set up V-Ray Camera & Rendering for Sketch up

15.1. Use V-Ray Target and free Camera.
15.2. Use V-Ray lens, FOV, Dolly camera etc.
15.3. Apply to V-Ray cameras for the projects and adjust necessary parameters.
15.4. Set to Viewport for Rendering.
15.5. Create V-ray Sun.
15.6. Create V-ray Dome Light.
15.7. Create V-ray HDR Light.
15.8. Create V-ray Light (plane light, spot light, photometric web light).
15.9. Assign V-ray light to the Project and render it for output.

16. V-Ray Rendering for Sketch up

16.1. Use v-ray as an assign render under common tab of render setup Dialogue box.
16.2. Use V-ray tab and its Sub/Parameters.
16.3. Use indirect illumination Tab and its Sub parameters.
16.4. Setting and its sub parameters.

17. V-ray Materials for Sketch up

17.1. Create a V-ray material slot for color and assign it to an object.
17.2. Create a V-ray material slot for bitmap and assign it to an object.
17.3. Create material for glass, mirror, MS, SS.
17.4. Create Multi/sub material for window and door.
17.5. Assign V-ray material to the Project and render it for output.

18. Prepare a portfolio of a project.

18.1. Import the cad file of a project.
18.2. Draw base of the structure.
18.3. Use modify tool as requirements.
18.4. Use push/pull tool if needed.
18.5. Add detail to the structure.
18.6. Paint the structure.
18.7. Save the project.
18.8. Print the project.

66163	Landscape Design	T	P	C
		1	3	2

AIMS

To be able to-

- Understand the fundamentals of landscape design
- Use of Land and water, Vegetation.
- Importance of Climate, site, spaces, visible landscape, and circulation.
- Layout of water bodies, landscape & visit the site,
- Prepare a landscape model.

SHORT DESCRIPTION

Fundamentals of landscape; Use of land & water; Importance of Site, Spaces, Visible landscape, and Circulation. Layout of water bodies, landscape & visit the site.

DETAIL DESCRIPTION

1.0Understand the fundamentals of landscaping.

1.1 Define Landscape and landscape design.
1.2 Describe the necessity of landscape design.
1.3 Identify the elements of landscape design.
1.4 Describe the importance of nature in landscape.
1.5 Describe ecological basis and ecological balance.
1.6 Explain the landscape character.
1.7 Explain the natural forces, forms and feature.
1.8 Explain the importance of the built-environment.

2.0Understand the use of land.

2.1 State the land.
2.2 Describe the land as heritage
2.3 Describe the land as resource.
2.4 Explain the land grants and land rights.
2.5 Describe the importance of land surveying.
2.6 Discuss various uses of land.
2.7 Define earth forms and slope retention.

3.0Understand the use of water.

3.1 State the planning approach of water related site design.
3.2 Describe water as resource.
3.3 Explain water as landscape feature.
3.4 Define streams and rivers.
3.5 Discuss pools, fountains, cascades.
3.6 Define swimming pool and its standard measurement.

4.0Understand the importance of vegetation.

4.1 List the indoor and outdoor plants.
4.2 Describe different elements of plants in nature.
4.3 State plantation.
4.4 Discuss the importance and necessity of plantation and gardening.
4.5 Describe the planned and planted landscape.
4.6 Differentiate between the micro and macro climate.
4.7 Describe the effect of climate on plants.

5.0Understand the importance of climate.

5.1 Define weather and climate.
5.2 Differentiate between weather and climate.
5.3 Describe the physical and social characteristics of climate.
5.4 Explain different type of climate region.
5.5 Describe the microclimatology.

6.0Understand the Site.

6.1 Define site
6.2 Describe the site selection process.
6.3 Compare the alternative sites and the ideal site.
6.4 Define site analysis and list out the procedure of systematic site analysis.
6.5 Discuss specification for topographic survey.
6.6 Describe the environmental impact assessment.
6.7 Explain the conceptual plan with diagram of the planning-design process.
6.8 Explain the terms of site systems.
6.9 Describe the site development guidelines (A checklist of helpful considerations).

7.0 Understand the Spaces.

7.1 Define site volumes.
7.2 Describe the spatial impact, spatial qualities, size, form and color.
7.3 Explain abstract spatial expression and definitions of volumes.
7.4 Distinguish the base plane and the overhead plane with examples.
7.5 Define the verticals.
7.6 Describe the verticals as enclosure for privacy.

8.0 Understand the visible landscape.

8.1 Define view and vista with their components.
8.2 Describe the axis and the axial characteristics.
8.3 Explain the axis as unifying elements with the example.
8.4 Explain symmetrical plan and asymmetrical plan.
8.5 Explain the visual resource management.

9.0 Understand the circulation.

9.1 Define motion
9.2 Discuss motion impelled by form and concept and the kinematics of motion.
9.3 Explain the pedestrian traffic and the planning consideration of pedestrian traffic- things seen, base plane, distance and grade and traffic flow.
9.4 Explain the automobile traffic and the planning consideration of automobile traffic-the road way, approach drive, entrance court and the parking compound.
9.5 Describe the rain, water and air movements.

PRACTICAL

1.0 Prepare a layout plan by visit the site.

1.1 Visit a given site and present a report about the site with photographs.
1.2 Draw the site plan showing existing structure,
1.3 Draw different roads and pavement and drive way.
1.4 Draw the parking of the site.
1.5 Sketch the surface water drainage and disposal plan of the given plot.

2.0 Prepare the layout of pools, fountain, low and high land and water bodies.

2.1 Sketch the different earth forms.
2.2 Sketch the various types of slope retention.
2.3 Sketch the docks, decks, overlooks, terraces and balconies on the slope of the banks.
2.4 Sketches the slope treatment or water edge detail of different water bodies.
2.5 Sketches the pools, fountain and cascades.
2.6 Draw the plan and section of a swimming pool.

3.0 Prepare a landscape plan of a room corner or garden or park.

3.1 Visit a park and find out the point of renovation and present a report on it with photographs.
3.2 Sketches the plan and elevation of some small plants, trees (canopy, intermediate, shrubs, vines and ground covers) and bushes.
3.3 Draw the form and space modulation of plants.
3.4 Sketches the trees as screen, natural shading device, slope and watershed protection, noise abatement and ornamentation.
3.5 Design a corner of a room/ a lobby/ a mini garden/ a lawn corner / a terrace corner with plants, seats and small pool or fountain.

4.0 Prepare a site plan.

4.1 Draw a topographic survey map.
4.2 Draw a site analysis map.
4.3 Draw the wind movement and sun path diagram.
4.4 Draw the site schematic plan.
4.5 Draw a final site plan.

5.0 Design a canopy or a fountain as a landscape element with model.

5.1 Draw the plan of the canopy/fountain.
5.2 Draw the elevation of the canopy/fountain.
5.3 Sketch a 3D view (isometric/perspective) of the canopy/fountain.
5.4 Make a model of the canopy/fountain.

Ref:

- Landscape Architecture, John Ormsbee Simonds

66164 Contemporary Architecture T P C

3 0 3

AIMS

To be able to understand the -

- Master Architects and their works
- Modern Architects in Bangladesh and their works
- International modern Structure/Buildings
- Contemporary Buildings in Bangladesh
- Contemporary Buildings in Asia, Europe and America.

DETAIL DESCRIPTION

1.0 Understand the development of new concepts in Architecture

1.1 Define modern Architectural materials.
1.2 Define traditional Architectural materials.
1.4 Explain the modern methods of construction
1.5 Describe the influence of materials on modern architecture.

2.0 Understand engineering achievement for developing architecture.

2.1 List the ten longest bridges in the world.
2.2 Describe development of bridge.
2.3 Describe role of glass in developing contemporary architecture.
2.4 Explain the role of R.C.C. and steel in developing contemporary architecture.

3.0 Understand various movements in architecture caused by works of pioneers.

3.1 Explain the movement in architecture caused by Le-Corbusier.
3.2 Explain the movement in architecture caused by Frank Lloyed Wright.
3.3 Explain the movement in architecture caused by Walter Gropius.
3.4 Explain the movement in architecture caused by Mies Vender Rohe.
3.5 Explain the movement in Architecture by Luis I kahn.

4.0 Understand the works of pioneer architects.

4.1 List & describe the important works of Walter Gropius.
4.2 List & describe the important works of Mies Vender Rohe.
4.3 List & describe the important works of Frank Lloyed Wright.
4.4 List & describe the important works of Le-Corbusier.
4.5 List & describe the important works of Pier Luige Nervi
4.6 List & describe the important works of Luis I Kahn.

5.0 Understand various movements in Bangladesh architecture caused by the works of different architects.

5.1 Explain the movement in architecture caused by Mazharul Islam.
5.2 Explain the movement in Architecture caused by Bashirul Haque.
5.3 Explain the movement in architecture caused by Shamsul Wares.
5.4 Explain the movement in architecture caused by F.R. Khan.
5.5 Explain the movement in architecture caused by Rafique Azam.

6.0 Understand the works of important architects in Bangladesh by visit the working places.

6.1 List & describe the important works of Mazharul Islam.
6.2 List & describe the important works of Bashirul Haque.

6.3 List & describe the important works of Shamsul Wares.
6.4 List & describe the important works of F.R. Khan.
6.5 List & describe the important works of Rafique Azam.
6.6 Visit the important works/places and present the reports on that.

7.0 Understand the important architecture in the world.

7.1 Describe the architectural feature of the United Nation Headquarter at New York.
7.2 Describe the architectural feature of the UNESCO secretarial building at Paris.
7.3 Explain the architectural feature of the Royal Festival Hall at London.
7.4 Explain the architectural feature of the Sydney Opera House.
7.5 Explain the Architectural feature of Sangshed Bhabon.
7.6 Describe the architectural feature of the Guggenheim museum.

8.0 Understand the modern architecture in the world.

8.1 List the ten tallest structures in the world.
8.2 Describe the architectural feature of the Kaba Sharif, Makkah.
8.3 Describe the architectural feature of the Patronus Twin Tower, Malaysia.
8.4 Describe the architectural feature of the Borze-Al-Arab.
8.5 Describe the architectural feature of the Eiffel Tower & Canada National Tower.
8.6 Describe the architectural feature of the Statue of Liberty.
8.7 Describe the architectural feature of the Borze – Kholifa.

9.0 Visit & Understand the modern Architecture in Dhaka.

9.1 Visit & Describe the architectural feature of the National Memorium of at Savar.
9.2 Visit & Explain the architectural feature of the Kamalapur railway station at Dhaka.
9.3 Visit & Explain the architectural feature of the Baitul Mokaram national mosque at Dhaka..
9.4 Visit & Explain the architectural feature of the Shahjalal International air port at Dhaka..
9.5 Visit & Explain the architectural feature of the Sangshad Bhabon.
9.6 Visit & Explain the architectural feature of the Nagar Bhabon at Dhaka..
9.7 Visit & Explain the architectural feature of the Art College at Dhaka..

10.0 Understand the Bridges in the world.

10.1 Explain the feature of Jamuna Bridge.
10.2 Explain the feature of London Bridge.
10.3 Explain the feature of Golden Gate Bridge.
10.4 Explain the feature of Hawra Bridge.
10.5 Explain the feature of Vidya Sagar Setu.

11.0 Understand the Contemporary Architecture of Bangladesh.

11.1 Visit & report the important works of Mustapha Khalid.
11.2 Visit & report the important works of Rafiq Azam
11.3 Visit & report the important works of Marina Tabassum.
11.4 Visit & report the important works of Kashef Mahbub Chowdhury.
11.5 Visit & report the important works of Tanzim Hasan Salim/Naheed Farzana.

12.0 Understand the Contemporary Architecture of Asia.

12.1 Analyse & report about important works of B.V.Doshi.
12.2 Analyse & report about important works of Geoffrey Bawa
12.3 Analyse & report about important works of Tadao Ando.

13.0 Understand the Contemporary Architecture of Europe.

13.1 Analyse & report about important works of Norman Foster.
13.2 Analyse & report about important works of Zaha Hadid.
13.3 Analyse & report about important works of Renzo Piano.

14.0 Understand the Contemporary Architecture of Asia.

14.1 Analyse & report about important works of Daniel Libskind.

14.2 Analyse & report about important works of Peter Eisenman.

14.3 Analyse & report about important works of Frank Gehry.

69054 Environmental Studies

T P C
2 0 2

AIMS

- To be able to understand the basic concepts of environment and environmental pollution.
- To be able to understand the concepts of ecology and ecosystems
- To be able to understand the basic concepts of environmental degradation relating to industrial production.
- To be able to understand the major environmental issues and problems.
- To be able to understand legislative measures to protect environment.

SHORT DESCRIPTION

Basic concepts of environment; natural resources; biogeochemical cycling; ecology and ecosystem; air; water; soil; solid waste management; development and environment; global environmental challenges; legislative protection of environment.

DETAIL DESCRIPTION

Theory:

1. **Understand the multidisciplinary nature of environmental studies.**
   1.1. Define environment, nature, pollution, pollutant, contaminant.
   1.2. Describe the scope of environmental studies.
   1.3. Describe the importance of environmental studies.
   1.4. Describe the formation and structure of the Earth.
   1.5. Describe the earth's natural system.
   1.6. Describe the changing attitudes to the natural world.
   1.7. Mention the main components of environment.
   1.8. Define natural and man-made environment.
   1.9. Distinguish between natural and man-made environment.
2. **Understand the natural resources.**
   2.1. Define natural resources.
   2.2. Classify natural resources.
   2.3. Describe forest resources.
   2.4. Describe water resources.
   2.5. Describe mineral resources.
   2.6. Describe food resources.
   2.7. Describe energy resources.
   2.8. Describe land resources.
   2.9. Describe environmental problem relating to resources use.
   2.10. Describe the role of an individual in conservation of natural resources.
3. **Understand the biogeochemical cycling.**
   3.1. Define biogeochemical cycle.
   3.2. Describe hydrologic cycle.
   3.3. Describe carbon cycle.

3.4. Describe nitrogen cycle.
3.5. Describe oxygen cycle.
3.6. Describe phosphorus cycle.
3.7. Describe sulfur cycle.
3.8. Describe nutrient cycle.

4. Understand the ecology and ecosystem.

4.1. Define ecology and ecosystem.
4.2. Structure and function of an ecosystem.
4.3. Describe the components of ecosystem.
4.4. Explain the stability of ecosystem.
4.5. Describe ecological factors.
4.6. Describe interdependency between abiotic and biotic component.
4.7. Describe the meaning of following terms: species, population, community, ecological succession, community periodicity, climax community, ecological niche, habitat, plankton, nekton, ecological indicator, evolution, adaptation, producers, consumers, decomposers, food chains, food webs, ecological pyramids, bio-concentration, bio-magnification, biodiversity, threatened species, endanger species, extinct species, exotic species, biodiversity conservation and biogeography.
4.8. Describe energy flow in the ecosystem.
4.9. Describe the ecosystem of pond, ocean, estuary, grassland, cropland, forest, desert and mangrove.

5. Understand the air as a component of environment.

5.1. Define air.
5.2. Describe the composition of the clean dry atmospheric air at ground level.
5.3. Describe the atmospheric structure.
5.4. Define air pollution.
5.5. Describe major air pollutants and their impacts.
5.6. Describe the sources of air pollutants.
5.7. Explain the formation of photochemical smog and its effects.
5.8. Describe the effects of air pollution on vegetation, animal, human health and materials and resources.
5.9. Define sound and noise.
5.10. Describe the classification of sound.
5.11. Describe the effects of noise.

6. Understand the water as a component of environment.

6.1. Define water.
6.2. Describe the characteristics of water.
6.3. Describe the sources of water.
6.4. Describe the uses of water.
6.5. Explain that the water is a universal solvent.
6.6. Define water pollution, biological oxygen demand (BOD), effluent treatment plant (ETP).
6.7. Describe the sources of water pollution.
6.8. Describe the effects of water pollution.

7. **Understand the soil as a component of environment.**
   7.1. Define soil.
   7.2. Describe the constituents of soil.
   7.3. Define soil pollution.
   7.4. Describe causes soil degradation.
   7.5. Describe the sources of soil pollution.
   7.6. Describe the effects of soil pollution

8. **Understand the concept of solid waste management.**
   8.1. Define solid waste, refuse, garbage, rubbish, trashes, demolition and construction waste, e-waste, agricultural waste, pathological waste, radioactive waste, hazardous waste, 3R, 4R.
   8.2. List the sources of solid waste.
   8.3. Mention the classification of solid waste.
   8.4. Mention the methods of collection of solid waste.
   8.5. Describe the recycling of solid wastes.
   8.6. Describe resource recovery from solid waste.
   8.7. Describe the potential method of disposal of solid waste.
   8.8. Describe control measures of urban and industrial wastes.

9. **Understand the development and environment.**
   9.1. Define environmental ethics and environmental stress.
   9.2. Describe environmental stress.
   9.3. Define sustainable development.
   9.4. Define urbanization.
   9.5. Describe the causes of urbanization.
   9.6. Describe the effects of urbanization on environment.
   9.7. Define industrialization.
   9.8. Describe the causes of industrialization.
   9.9. Describe the effects of industrialization on environment.

10. **Understand the global environmental challenges.**
   10.1. Define greenhouse gas and greenhouse effects.
   10.2. Make a list of greenhouse gases and their contribution on greenhouse effects.
   10.3. Describe the causes and consequences of greenhouse effects.
   10.4. Describe acid rain.
   10.5. Describe importance of ozone layer.
   10.6. Define ozone depleting substances (ODS).
   10.7. Describe ozone layer depletion mechanism.
   10.8. Describe hazardous waste.
   10.9. Describe chemicals pesticides.
   10.10. Describe radioactive pollution.
   10.11. Describe natural disaster.

11. Understand the legislative protection of environment.

11.1. Define environmental impact assessment (EIA) and environmental auditing (EA).

11.2. Mention environmental act and legislations prescribed for air, noise, water, soil and wild life protection.

11.3. Describe environmental conservation act 1995 in Bangladesh.

11.4. Describe the environment conservation rule 1997 in Bangladesh.

11.5. Describe the environmental framework in Bangladesh.

11.6. Describe The Montreal Protocol and The Kyoto Protocol.

11.7. Describe role of an individual in prevention of pollution.

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2. Ecology and Environment, P.D. Sharma, Rastogi Publications.
3. Basics of Environmental Science, Michael Allaby, Routledge.
4. Environmental Science, Jonathan Turk and Amos Turk, Sauders golden sunburst series.

66454 Theory of Structure

T	P	C
2	3	3

AIMS

- To be able to consolidate and extend the fundamental understanding of the behavior of statically determinate structures i.e. beams, frames etc.
- To be able to develop of awareness of structural behavior such as deflection and stability of masonry dam.
- To be able to develop understanding for selection of suitable section of beam and member of the truss.

SHORT DESCRIPTION

Shear force and bending moment of beams; Stresses in beams; Deflection of beams; Joints and connections; Forces in frames; Steel structure; Masonry dam; Column; Moving loads; Thin Cylindrical shells.

DETAIL DESCRIPTION

Theory:

1. Understand shear force and bending moment of beams.

1.1 Define determinate, indeterminate and homogeneous structure.
1.2 Mention different types of support condition.
1.3 Explain the relations between shear force and bending moment.
1.4 Define dangerous section and point of contra flexure.
1.5 Solve problems on SF and BM of cantilever beam with concentrated load, distributed load, inclined load and combined loads.
1.6 Solve problems on SF and BM of simply supported beam with concentrated load, distributed load, inclined load and combined loads.
1.7 Solve problems on SF and BM of overhanging beam with concentrated load, distributed load, inclined load and combined loads.

2. Understand the bending stresses in beams.

2.1 State the meaning of bending stresses in beam.
2.2 List the assumptions of bending stresses in beam.
2.3 Differentiate between bending moment and bending stress.
2.4 Express and derivation of the formula for bending stress.
2.5 State the meaning of elastic section modulus.
2.6 Solve problems on section modulus of circular, rectangular, I, T, L and hollow sections of beams.
2.7 Solve problems on bending stresses of circular, rectangular, I, T, L and hollow sections of beams.

3. Understand the shearing stresses in beams.

3.1 State the meaning of shearing stresses in beam
3.2 Differentiate between maximum and average shear stress.
3.3 Relate maximum shear stress and average shear stress for rectangular, circular and triangular section.
3.4 Express the derivation of the formula for shearing stress.

3.5 Solve problems on shearing stresses of circular, rectangular, I , T, L and hollow sections of beams.
3.6 Determine the section of homogeneous beam with respect to shearing stress and bending stress.

4. Understand the deflection of beams.

4.1 Define the meaning of deflection of beam and elastic curve.
4.2 List the assumptions of deflection of beam.
4.3 State the maximum allowable deflection for RCC beam, RCC slab and steel beam.
4.4 Express the derivation of equation for elastic curve
4.5 State the 1st and 2nd area moment proposition.
4.6 Compute the slope of elastic curve for cantilever beam with concentrated and distributed load.
4.7 Compute the maximum deflection for cantilever beam with concentrated and distributed load.
4.8 Compute the slope of elastic curve for simply supported beam with symmetrically concentrated and distributed load.
4.9 Compute the maximum deflection for simply supported beam with symmetrically concentrated and distributed load.

5. Understand the concept of steel structure and joints.

5.1 Define steel structure.
5.2 Describe joint and connections of steel structure.
5.3 State the differences between cold rolled and build up section.
5.4 Name the elements of pre-fabricated building.
5.5 Define pitch, back pitch and repeating section.
5.6 State the necessity of joints.
5.7 Classify joints and state efficiency of joints.
5.8 Explain the modes of failure and remedial measures of riveted joints.
5.9 Solve problems on simple lap joint and butt joint subjected to axial load only.

6. Understand the significance of welded connections.

6.1 Define terms: Fillet, Leg, Throat.
6.2 State the significance of welded connections.
6.3 Classify different types of welded connections.
6.4 Mention the merits and demerits of welded connections.
6.5 Solve problems on fillet weld connection subjected to axial load only.
6.6 Solve problems on butt weld connection subjected to axial load only.

7. Understand the action of forces in steel frames.

7.1 Define the terms: truss, tie, strut, redundant, deficient, web and chord member, perfect, imperfect frame.
7.2 Mention different types of roof trusses, bridge trusses and beams.
7.3 State the fundamental assumptions in trusses.
7.4 Describe the methods of computing forces in trusses.
7.5 Determine the forces on frames for warren truss, cantilever and Howe truss with dead load by Analytical (joint and moment) method.
7.6 Determine the forces on frames for warren truss, cantilever and Howe truss with dead load by graphical method.

8. Understand the stability of masonry dam.

8.1 Define dam and mention the functions of a dam.

8.2 Mention the different types of dam.
8.3 Explain the stability of a masonry dam.
8.4 State the meaning of middle third law.
8.5 Express the derivation of the equation for minimum width of the base for just no tension.
8.6 Calculate the maximum and minimum pressure on the foundation bed for rectangular dam
8.7 Calculate the maximum and minimum pressure on the foundation bed for trapezoidal dam having water face vertical only.
8.8 Solve problems on stability of the dam.

9. Understand the elastic buckling of columns.

9.1 State the meaning of short and long column.
9.2 Mention the type of columns on the basis of end conditions.
9.3 Compare the equivalent length of different columns.
9.4 Interpret the Euler's formula for flexural buckling of a pin ended strut/column.
9.5 Calculate the safe load on column using Euler's formula.
9.6 State the Rankin-Gordon formula.
9.7 Calculate the safe load on column using Rankin-Gordon formula.

10. Understand the concept of moving loads.

10.1 State the meaning of moving load.
10.2 Classify different types of moving loads.
10.3 State the meaning of influence line.
10.4 Draw influence line for single concentrated load and reaction of a simply supported beam.

11. Understand the concept of Thin Cylindrical Shells.

11.1 Define cylindrical shell.
11.2 Failure of a cylindrical shell due to an internal pressure.
11.3 Stresses in a thin cylindrical shell.
11.4 Circumferential stress.
11.5 Longitudinal stresses.
11.6 Design of thin cylindrical shells

PRACTICAL:

1. Determine shear force & bending moment at different sections of simply supported beam with different types of load and draw the diagrams.
2. Determine shear force & bending moment at different sections of overhanging beam with different types of load and draw the diagrams.
3. Determine the position of dangerous section and inflection point or point of contra flexure of overhanging beam and show in diagram.
4. Determine the bending stresses of circular, rectangular & hollow sections of beams and draw the diagrams.
5. Determine the bending stresses of I, T, L sections of beams and draw the diagrams.
6. Determine the shearing stresses of circular and rectangular sections of beams and draw the diagrams.
7. Determine the shearing stresses of I & T sections of beams and draw the diagrams.
8. Determine the section of homogeneous beam with respect to shearing stress and bending stress.
9. Determine the deflection of cantilever and simply supported beam with respect to concentrated/distributed load.
10. Draw the neat sketches of different type of riveted joints showing the mode of failures.

11. Determine the forces developed on the member of a truss graphically.
12. Prepare some models of different types of truss with suitable materials.
13. Draw a sketch of a pre-fabricated building and show the different elements in the figure.

REFERENCE BOOKS

1. Theory of simple structure – T C Shed and J Vawter
2. Strength of materials and structures – J Case and A H Chilver
3. Theory of structures – R S Khurmi
4. Strength of Materials – R S Khurmi
5. Steel Structure - Gay Lord

65852 **INDUSTRIAL MANAGEMENT** **T P C**
2 0 2

AIMS

• To be able to develop the working condition in the field of industrial or other organization.
• To be able to understand develop the labor management relation in the industrial sector.
• To be able to develop the management techniques in the process of decision making.
• To be able to manage the problems created by trade union.
• To be able to understand Planning
• To be able to perform the marketing.
• To be able to maintain inventory.

Course Outline

Basic concepts of management; Principles of management; Planning, Organization, Scientific management; Span of supervision; Motivation; Personnel management and human relation; Staffing and manpower planning ; Training of staff; Concept of leadership; Concepts and techniques of decision making; Concept of trade union; Inventory control; Economic lot size ; Break even analysis; Trade Union and industrial dispute, Marketing;

1 Basic concepts & principles of management.

1.1 Define management and industrial management.
1.2 State the objectives of modern management.
1.3 Describe the scope and functions of management.
1.4 State the principles of management.
1.5 State the activity level of industrial management from top personnel to workmen.
1.6 Describe the relation among administration, organization & management.

2. Concept of Planning

2.1 Define Planning
2.2 Discuss the importance of Planning
2.3 Discuss the Types of Planning.
2.4 Discuss the steps in Planning

3 . Concepts of organization and organization structure.

3.1 Define management organization.
3.2 State the elements of management organization.
3.3 Describe different forms of organization structure.
3.4 Distinguish between line organization and line & staff organization.
3.5 Distinguish between line organization and functional organization.
3.6 Describe the features, advantages and disadvantages of different organization structure.

4. Concept of scientific management.

4.1 Define scientific management.
4.2 Discuss the basic principles of scientific management.
4.3 Explain the different aspects of scientific management.
4.4 Discuss the advantages and disadvantages of scientific management.
4.5 Describe the difference between scientific management and traditional management..

5. Concept of span of supervision.

5.1 Define span of supervision and optimum span of supervision.
5.2 Discuss the considering factors of optimum span of supervision.
5.3 Discuss advantages and disadvantages of optimum span of supervision.
5.4 Define delegation of authority.
5.5 Explain the principles of delegation of authority.
5.6 Explain the terms: authority, responsibility and duties.

6 . Concept of motivation.

6.1 Define motivation.
6.2 Discuss the importance of motivation.
6.3 Describe financial and non-financial factors of motivation.
6.5 Discuss the motivation theory of Maslow and Harzberg.
6.6 Differentiate between theory-X and theory-Y.

7. Concept of leadership.

7.1 Define leadership.
7.2 Discuss the importance and necessity of leadership.
7.3 Discuss the functions of leadership.
7.4 Describe the qualities of a leader.

8. Basic concepts and techniques of decision making.

8.1 Define decision making.
8.2 Discuss the importance and necessity of decision making.
8.3 Discuss different types of decision making .
8.4 Describe the steps in decision making.

9 .Concept of personnel management and human relation.

.9.1 Define personnel management.
.9.2 Discuss the functions of personnel management.
9.3 Define staffing.
9.4 Define recruitment and selection of employees.
9.5 Describe various sources of recruitment of employees.
9.6 Describe the methods of selection of employees.
9.7 Define training and orientation of employee.
9.8 Discuss the importance and necessity of training.
9.9 Discuss the various methods of training of workmen, technicians and executive personnel.

10. Concept of inventory control & Economic lot size

10.1 Define inventory.& inventory control.
10.2 Describe the function of inventory control.
10.3 Define Economic lot size and the Method of determination of economic lot size.
10.4Discuss the effects of over supply and under supply.
10.5 Explain the following terms :

- Bin card or Bin tag.
- Purchase requisition.
- Store requisition.
- Material transfer note.
- First in first out (FIFO).
- Last in first out(LIFO).
- Safety stock
- Lead time

11. Concept of Break Even Point(BEP)

11.1 Define Break Even Point and Break Even Chart.
11.2 Describe the method of determination of BEP
11.3 Explain the terms :

- Break even analysis.
- Fixed cost.
- Variable cost

12 . Concept of Marketing

12.1 Define marketing.
12.2 Discuss the function of marketing.
12.3 State the objectives of marketing.
12.4 Explain the terms :

- Purchase
- Brand
- Producer
- Consumer
- Customer
- Copyright
- Trade mark

12.5 Discuss product life -cycle and marketing strategies in different stages of a product life-cycle

13. Concept of trade union and industrial dispute

13.1 Define trade union.
13.2 Mention the objectives of trade union.
13.3 Discuss the function of trade union.
13.4 Describe different types of trade union.
13.5 Define industrial dispute
13.6 Discuss different type of industrial dispute

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