

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

ARCHITECTURE ADN INTERIOR DESIGN TECHNOLOGY

**SYLLABUS
(COURSE STRUCTURE-2010)**

**FIFTH & SIXTH
SEMESTER**

ARCHITECTURE & INTERIOR DESIGN TECHNOLOGY (87)
FIFTH SEMESTER

Sl. No	Subject code	Name of the subject	T P C			MARKS				
						Theory		Practical		Total
						Cont. assess	Final exam.	Cont. assess	Final exam.	
1	8751	Interior Design -II	1	6	3	10	40	50	50	150
2	8752	CAD & Digital Visualization	1	6	3	10	40	50	50	150
3	6443	Surveying-2	2	6	4	20	80	50	50	200
4	6433	Structural Mechanics	3	3	4	30	120	25	25	200
5	6455	Construction Process-2	3	3	4	30	120	25	25	200
6	6441	Geotechnical Engineering	2	3	3	20	80	25	25	150
7	5851	Book Keeping & Accounting	2	0	2	20	80	-	-	100
Total			14	27	23	140	560	225	225	1150

ARCHITECTURE & INTERIOR DESIGN TECHNOLOGY (87)
SIXTH SEMESTER

Sl. No	Subject code	Name of the subject	T P C			MARKS				
						Theory		Practical		Total
						Cont. assess	Final exam.	Cont. assess	Final exam.	
1	8761	Interior Design -III	3	9	6	30	120	75	75	300
2	8762	History of Architecture & Interior design	3	0	3	30	120	-	-	150
3	8763	Detailing and Fit-outs	1	6	3	10	40	50	50	150
4	6454	Theory of structure	3	3	4	30	120	25	25	200
5	6166	Model Making	0	6	2	0	0	50	50	100
6	5840	Environmental Management.	2	0	2	20	80	-	-	100
7	5852	Industrial Management	2	0	2	20	80	-	-	100
Total			14	24	22	140	560	175	175	1150

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

ARCHITECTURE & INTERIOR DESIGN TECHNOLOGY (87)

**SYLLABUS
(COURSE STRUCTURE-2010)**

FIFTH SEMESTER

Aims: After completion of the course students will be able to:

- DESIGN OF AN OFFICE BUILDING
- DESIGN THE INTERIOR OF AN OFFICE BUILDING
- PERFORM THE ARRANGEMENT OF FURNITURE IN AN OFFICE BUILDING
- MAKE A MODEL OF A HIGH RISE OFFICE BUILDING

SHORT DESCRIPTION:

INTERIOR, PLANNING, DESIGN CRITERIA, SPACE ALLOWANCES, FURNITURE ARRANGEMENTS, PARTITION WALL, FLOOR, CEILING, LIGHTING, CURTAIN MATERIALS AND FINISH WORK, MODEL MAKING.

DETAIL DESCRIPTION

THEORY:

1. Understand the designs of office space.

- 1.1 State office space planning.
- 1.2 Describe the general requirements of an office space.
- 1.3 Explain different areas of an office building.

2. Understand the form, shape, and consideration of office building.

- 2.1 Describe the shape and form of an office building.
- 2.2 Discuss the traffic pattern of an office building.
- 2.3 Define efficiency and simplicity.
- 2.4 Describe the site selection of an office building.

3. Understand the design criteria of an office building.

- 3.1 Describe the planning procedure of an office building.
- 3.2 Describe the basic grid layout adopted for framing.
- 3.3 Describe the height limitation of office building.
- 3.4 Explain the entrance about office building ramp slope.
- 3.5 Describe the break over angle of ramp angle of approach and drive way exit.

4. Understand the general principle and core area of an office building.

- 4.1 Describe the work flow of an office building.
- 4.2 Describe the straight line principle.
- 4.3 Explain the core area.
- 4.4 Explain the factors determining the size and number of elevator.
- 4.5 Describe the services which are provided in a vertical duct.
- 4.6 Describe the main stair and fire escape stair.
- 4.7 Describe the services (toilet, lavatories etc).

5. Understand the office layout according to function.

- 5.1 Describe the necessity of internal circulation of an office.
- 5.2 Describe the location of reception area and visitor control.
- 5.3 Describe the location of conference room.
- 5.4 Describe the space required for different furniture.
- 5.5 Name six basic office functions.
- 5.5 Describe the management & financial group function.

- 5.6 Describe the sales & technical group function.
- 5.7 Describe the general & marketing group function.

6. Understand the ceiling of an office.

- 6.1 Define ceiling of an office.
- 6.2 Describe different types of ceiling.
- 6.3 Describe different materials used in different ceiling.
- 6.3 Explain the reflected ceiling.
- 6.4 Mention the variation of color and texture of different ceiling materials.

7. Understand the variation of color, finish materials used in interior of an office.

- 7.1 Mention the finish materials used in interior of an office.
- 7.2 Describe the variation of texture for using different materials.
- 7.3 Mention the importance of color combination in the interior of an office.
- 7.4 Explain the variation of environment and image for using different colors.

Practical:

1. Prepare a office space layout.

- 1.1 Draw a flow diagram of an office building.
- 1.2 Calculate space as per requirements.
- 1.3. Draw the office space layout.

2. Prepare the furniture arrangement of an office.

- 2.1 Draw furniture layout of director's/manager room.
- 2.2 Draw furniture layout of individual work station.
- 2.3 Draw furniture layout of conference room.
- 2.4 Draw furniture layout of reception room and waiting area.
- 2.5 Draw furniture layout of drawing room.

3. Preparation the interior arrangement of office.

- 3.1 Draw different area of the office showing interrelationship.
- 3.2 Draw whole layout plan of the office interior.
- 3.3 Draw the detail toilet arrangement.

4. Prepare core area of an office building.

- 4.1 Draw the core area such as elevators, ducts, lavatories, cleaners, cupboards, stairs.
- 4.2 Draw the traffic alignment within the core area.

5. Prepare the presentation drawing of an office building.

- 5.1 Sketch the line plan of an office building as per general requirements.
- 5.2 Develop the line plan according to scale.
- 5.3 Draw the ground floor plan with parking.
- 5.4 Prepare the presentation drawing set (plan, elevation & section) for approval by the client.

6. Prepare a drawing with showing parking area, ramp& driveway.

- 6.1 Draw the parking area of an office.
- 6.2 Draw the ramp with sloping.
- 6.3 Draw the driveway and radius of gyration.

7. Prepare the detail drawing services for office interior.

- 7.1 Draw the detail of partition wall
- 7.2 Draw the detail of ceiling.
- 7.3 Draw the lighting arrangement of different rooms.
- 7.4 Make a color scheme for the office interior.

8. Make a model of a high rise office building.

- 8.1 Prepare the roof, base and other supports of the building.
- 8.2 Prepare the sides of the building.
- 8.3 Make the model with all necessary materials.
- 8.4 Prepare the total base of the model.
- 8.5 Place man, tree, car & other decorated materials on the model.

Reference books:

- 1. Time saver standards for interior design.
- 2. Neufret Ernest- Architect's data.

AIMS

- To be able to develop knowledge, skill and attitude of presentation of Rajuk drawing in Auto CAD command.
- To be able to develop skill of working drawing in Auto CAD.
- To be able to develop skill of plumbing drawing in Auto CAD.
- To be able to develop skill of electrical drawing in Auto CAD.
- To be able to develop skill of 3D in Auto CAD.
- To be able to develop skill in 3D max, corel draw, Phtoshop, Drawing in Auto CAD.
- To be able to understand the basic concept and purpose of digital visualization techniques.
- To be able to communicate digital ideas using visualization techniques.

SHORT DESCRIPTION

Presentation drawing; Working drawing; Detail drawing: plumbing and electrical drawing of multi storied building in Auto CAD. Drawing: Technique of 3D object; Editing & Modifying the drawing; Rendering Lighting & imaging in Auto ACD. Auto CAD relationship with corel Draw; Adobe Photoshop & 3D studio Max.

Basic knowledge of digital visualization, technical issues regarding creating and managing digital files, introduction to digital techniques, panorama, 3D models using scanners, digital cameras and computers using industry standard software.

DETAIL DESCRIPTION

Theory:

1 Understand presentation drawing.

- 1.1 Define presentation drawing.
- 1.2 List the names of drawings under the set of a presentation drawing.
- 1.3 Discuss the scale of presentation drawing.
- 1.4 List the names of drawings under a RAJUK sheet.
- 1.5. Explain how to calculate FAR .

2 Understand working drawing.

- 2.1 Define working drawing.
- 2.2 List the names of drawings under the set of a working drawing.
- 2.3 Discuss the scale of working drawing.

3 Understand detail drawing.

- 3.1 Define detail drawing.
- 3.2 List the names of drawing under the set of a detail drawing.
- 3.3 Discuss the scale and indication system of detail drawing.

4. Understand structural drawing.

- 4.1. State the meaning of R.C.C drawing.
- 4.2. Identify different types of R.C.C works.

4.3. Describe different types of R.C.C. column, footing and slab, beam and lintel.

5. Understand the use of plumbing drawing (sanitary fittings and fixtures).

5.1 Identify different types of sanitary fixture and fittings used in building.

5.2 Describe the function and location of underground and overhead water reservoir of a building.

5.3 Mention the function and location of septic tank.

6. Understand the aspects of electrical drawing.

6.1 Identify different types of electrical wiring.

6.2 List the electrical fittings used in building.

6.3 Identify the symbols used in electrical wiring diagram.

7. Understand the perspective view with rendering lighting & imaging in auto CAD.

7.1 Explain how to create perspective view.

7.2 Describe the rendering and materials effect in 3D.

7.3 Describe the uses & set up of background in 3D.

7.4 Describe the lighting & shadow in 3D.

7.5 Explain how to print 3D view.

8. Explain the auto CAD relationship with corel draw & Adobe Photoshop.

8.1 Explain the necessity to use corel draw & Photoshop.

8.2 Explain about export.

8.3 Explain how to import view from auto CAD to corel draw.

8.4 Explain how to import view from auto CAD in Photoshop.

9. Understand the auto CAD relationship with 3D studio MAX.

9.1 Explain the necessity to use 3D studio max.

9.2 Describe auto CAD object types & how to import auto CAD block in 3D studio max.

9.3 Describe smoothing & welding of 3D object / block.

9.4 Describe conversion of auto CAD to 3D studio.

10. Understand the basic Hardware & Software issues.

10.1 Identify the image file format.

10.2 Distinguish between the digital output and digital input.

10.3 Explain the terms Vector and raster.

11 Understand the Digital Techniques.

11.1 Illustrate a digital camera and their uses.

11.2 Differentiate between film and film less cameras.

11.3 Classify the types of film less cameras.

11.4 Define scanner and pixel.

11.5 Describe digital 3D model.

11.6 Describe the modeling decisions: accuracy, detail and complexity.

12 Understand the Data Storage and Archiving.

12.1 Identify the different options of storing large files.

12.2 Describe the advantages and disadvantages of storing files on a CD ROM, USB drive, DVD drive, Tape drive, web based data back up.

12.3 Explain the necessity of back up and archive data.

12.4 Explain the methods can be applied to archive data.

Practical:

1 Prepare the RAJUK sheet (Architectural) in Auto CAD.

- 1.1 Draw the ground floor plan with parking following the RAJUK rules in Auto CAD .
- 1.2 Draw the typical floor plan following the RAJUK rules in Auto CAD.
- 1.3 Draw the front elevation of the building in Auto CAD.
- 1.4 Draw the section through staircase of the building .
- 1.5 Draw the layout plan showing set back and septic tank .
- 1.6 Draw the site plan / Mouza map for identify the location of the plot.

2 Prepare a set of working drawing of the building in Auto CAD.

- 2.1 Draw the ground floor plan putting all inside and outside detail dimension in Auto CAD.
- 2.2 Draw the typical floor plan putting all inside and outside detail dimension in Auto CAD.
- 2.3 Draw the elevations (Front and any one else) of the building for working drawing set.
- 2.4 Draw long and cross section of the building with inside and outside detail dimension for working drawing set.
- 2.5 Draw the section of the stair case showing two flights and copy / array the other floors.
- 2.6 Draw the detail of steps railing nosing handrail etc. of the staircase.

3 Prepare a set of detail drawing of the building in Auto CAD.

- 3.1 Draw the sunshade and railing detail of the building and put the detail dimension.
- 3.2 Draw the door and window detail of the building and put the detail dimension.
- 3.3 Draw the grill detail of the building and put the detail dimension.
- 3.4 Draw the detail plan and section of a cabinet for the house and put the detail dimension.

4 Prepare a set of plumbing drawing of the building in Auto CAD.

- 4.1 Draw / copy the plan of kitchen and toilet showing the fixtures and fittings and put the detail dimension in Auto CAD.
- 4.2 Draw long and cross section of the kitchen and toilet put the detail dimension.
- 4.3 Draw the plan and section of the water reservoir and put the detail dimension.

5 Prepare a set of structural drawing of the building in Auto CAD.

- 5.1 Draw the plan and section of the column footing with dimension and annotation.
- 5.2 Draw the roof plan / floor slab, show reinforcement and put the dimension and annotation
- 5.3 Draw the flat slab plan showing reinforcement with dimension and annotation.
- 5.4 Draw the plan and section of sunshade drop wall railing and cornice showing reinforcement with dimension and annotation.

6 Prepare the R. C. C beam detail showing reinforcement for the set of structural drawing in Auto CAD.

- 6.1 Draw the long and two (mid and near support) cross section of simple supported rectangular beam showing reinforcement annotation and dimension.

6.2 Draw the long and two (mid and near support) cross section of continuous rectangular beam showing reinforcement annotation and dimension.

6.3 Draw the long and cross section of cantilever and overhanging beam showing reinforcement annotation and dimension.

6.4 Make schedules and short notes for the structural drawing.

7 Prepare a set of electrical drawing of the multi storied frame structured residential building in Auto CAD.

7.1 Draw different electrical symbols used in electrical layout plan.

7.2 Draw the ground floor plan showing electrical fittings and fixtures with dimension.

7.3 Draw the typical floor plan showing electrical fittings and fixtures with dimension.

7.4 Make the electrical fittings and fixtures schedule for the building.

8. Perform the furniture drawing of different building.

8.1 Draw the furniture layout plan of a residence unit.

8.2 Draw the different furniture of a fast food shop / self service shop.

8.3 Draw the different furniture of a small office.

8.4 Draw the furniture layout plan of a small office.

9. Perform the preparation of the perspective view with rendering lighting & imaging in auto CAD.

9.1 Draw perspective view of an object using 3D view command.

9.2 Set the material from material library for rendering.

9.3 Set the background color / image for rendering.

9.4 Set the light & create shadow using different command.

9.5 Draw perspective view of an object with full rendering.

10. Perform the view of the auto CAD drawing in corel draw, Adobe Photoshop & 3D studio max.

10.1 Import the file in Corel draw.

10.2 Open the auto CAD file to Adobe Photoshoop.

10.3 Open the auto CAD file to 3D studio Max.

10.4 Print the different 3D view file of corel Draw Photoshop & 3D Max.

11. Perform the preparation of the 3D view of furniture drawing of a residential building.

11.1 Draw the 3D view of different furniture of a bedroom.

11.2 Draw the 3D view of different furniture of a living room.

11.3 Draw the 3D view of different furniture of a dining room.

11.4 Draw the 3D view of modern kitchen room.

11.5 Draw the 3D view of bathroom

12. Perform the preparation of the 3D view of furniture drawing of a small office.

12.1 Draw the 3D view of different furniture of a typical office room.

12.2 Draw the 3D view of different furniture of a reception / waiting room.

12.3 Draw the 3D view of different furniture of a conference room. .

12.4 Draw the 3D view of Managing room.

13. Perform the preparation of the 3D view of furniture drawing of a small fast food shop / self service shop.

13.1 Draw the 3D view of different furniture of a fast food shop / self service shop.

13.2 Export the drawing to Corel Draw.

13.3 Export the drawing to Adobe Photoshop.

14. Perform the preparation of the 3D view of furniture drawing of a small building.

14.1 Export / convert the 3D studio Max.

- 14.2 Make soothing & welding of 3D studio Max.
- 14.3 Set the material for render.
- 14.4 Export the 3D view of MS power point.

15. Perform the preparation of the plan rendering of a residence.

- 15.1 Create source file: given plan (residence) in dwg format.
- 15.2 Render the plan of the residence using vector graphics software (Corel draw) showing:
 - (a) Furniture
 - (b) Soft finishing (concept & curtain)
 - (c) Indoors plants
 - (d) Lamps
 - (e) Floor finishes
 - (f) Labeling with key plans & data tables
 - (g) Fixtures

16. Perform the preparation of the plan rendering of an office.

- 16.1 Create source file given plan (a small office) in dwg format.
- 16.2 Render the plan of the office using vector graphics software (Corel draw) showing-
 - (a) Furniture
 - (b) Soft finishing (concept & curtain)
 - (c) Indoors plants
 - (d) Lamps
 - (e) Floor finishes
 - (f) Labeling with key plans & data tables
 - (g) Fixture

17. Perform the editing of an Image of Residential and Commercial building.

- 17.1 Scan a photo using a flatbed scanner.
- 17.2 Edit the scanned image by –
 - 17.2.1 Cropping
 - 17.2.2 Sharpening
 - 17.2.3 Selective masking
 - 17.2.4 Filtering
 - 17.2.5 Adding texts.
- 17.3 Save final image in jpeg, tar ga or in bmp format.
- 17.4 Make a print out to submit the image by printing in A4 layout.

18. Perform the preparation and editing of digital Photographs of residential and commercial /office building (indoors and outdoors).

- 18.1 Take series photos of a site using a digital camera and download the image in a computer.
- 18.2 Create a panoramic view of the site by digitally stitch the photos sequentially.
- 18.3 Save the output file in jpeg format.
- 18.4 Relocate / copy the digital file on a CD for submission.

19. Perform the preparation of digital modeling of a residential and office building.

- 19.1 Perform the following tasks on a given 3D Model of an interior space.
 - 19.1.1 Place appropriate furniture.
 - 19.1.2 Assign floor, wall and ceiling materials.
 - 19.1.3 Place artificial lights.
 - 19.1.4 Place plants and others objects.
 - 19.1.5 Positioning the camera.
- 19.2 Render the completed Model using rendering parameters available in the software such as:
 - 19.2.1 Resolution.
 - 19.2.2 Lighting Method (shadow map / ray trace).
- 19.3 Make a print out to submit the image by printing in A4 or on a CD.

20. Perform the preparation of digital modeling of a restaurant / hotel.

- 20.1 Perform the following tasks on a given 3D Model of an interior space.
 - 20.1.1 Place appropriate furniture.
 - 20.1.2 Assign floor, wall and ceiling materials
 - 20.1.3 Place artificial lights
 - 20.1.4 Place plants and others objects
 - 20.1.5 Positioning the camera.
- 20.2 Render the complete Model using rendering parameters available in the software such as:
 - 20.2.1 Resolution
 - 20.2.2 Lighting Method (shadow map / ray trace).
- 20.3 Make a printout to submit the image by printing in A4 or on a CD.

REFERENCE BOOKS

1. Digital Imaging for visual Artists
2. Inside 3D Studio
3. Different Web Sites of digital visualization techniques.
4. Auto CAD 2000 / Auto CAD 2001 – Engr. Md Shaha Alam.

- 1.5 Describe the use of rendering media (color, shade and shadow etc) in
Auto CAD

6443	SURVEYING – II	T	P	C
		2	6	4

AIMS

- able to use level, theodolite and tachometer
- able to conduct leveling work.
- To perform ability to conduct traversing with theodolite.
- To perform ability to determine horizontal and vertical distances of inaccessible points.

SHORT DESCRIPTION

Leveling; Contouring; Theodolite surveying; Traversing, Tachometric surveying, and Topographic surveying,

DETAIL DESCRIPTION

Theory :

1 Understand the concept of leveling.

- 1.1 Define Level and Leveling
- 1.2 Describe the purpose of leveling.
- 1.3 State the term surface.
- 1.4 Explain the following terms in leveling :

a) Level surface	b) Level line
c) Horizontal surface	d) Horizontal line
e) Vertical plane	f) Vertical line
g) Datum surface	h) Datum
i) Reduced level	j) Formation level

2 Understand the application of bench mark (BM).

- 2.1 State the meaning of bench mark.
- 2.2 Mention the classification of bench marks.
- 2.3 Describe different types of bench mark.

3 Understand the features of leveling instruments.

- 3.1 List the equipment and accessories required for leveling.
- 3.2 Identify the different types of level.
- 3.3 Label the different parts of a level.
- 3.4 Explain the following terms related to leveling:

a) Line of collimation	b) Axis of telescope
c) Axis of bubble tube	d) Vertical axis
e) Height of instrument	f) Plane of collimation
g) Focussing	h) Parallax

4 Understand the application of leveling staff.

- 4.1 Mention the purposes of leveling staff.
- 4.2 Identify different types of leveling staff.
- 4.3 Mention the procedure of taking staff reading with the help of spirit level staff and meter staff.
- 4.4 Identify the positions of setting up leveling instruments.
- 4.5 Mention the procedure of holding a leveling staff.
- 4.6 Mention the procedure of taking staff reading.

5 Understand the adjustment of leveling instrument.

- 5.1 State the meaning of adjustment of leveling instruments.
- 5.2 Mention different kinds of adjustments of level.
- 5.3 State the different steps of temporary adjustment.
- 5.4 Identify the fundamental lines of leveling instrument.
- 5.5 Mention the relations among the fundamental lines.
- 5.6 Identify the permanent adjustments of auto set and digital level.
- 5.7 Solve problems on permanent adjustments of levels.

6 Understand booking of staff reading and reduction of level.

- 6.1 Explain the meaning of following terms as used in leveling:
 - a) Back sight, foresight and intermediate sight reading
 - b) Change point
 - c) Station
- 6.2 State the necessity of level book or field book.
- 6.3 Identify different kinds of level book or field book.
- 6.4 Describe the term reduction of leveling.
- 6.5 Mention the procedure of booking of staff reading into level book.
- 6.6 Compare different methods of reduction of leveling.
- 6.7 Solve problems on reduction of leveling.
- 6.8 Solve problems on calculation of missing data of old level book.

7 Understand various classification of leveling.

- 7.1 List different kinds of leveling :
- 7.2 Identify the different kinds of leveling.
- 7.3 Describe the procedure of fly leveling, profile leveling, cross sectioning and check leveling.
- 7.4 Solve different problems on fly leveling, profile leveling, cross sectioning and check leveling.
- 7.5 State the purposes of reciprocal leveling.
- 7.6 Describe the procedure of reciprocal leveling.
- 7.7 Solve problems on reciprocal leveling.

8 Understand the aspects of plotting level sections.

- 8.1 State the meaning of longitudinal profile and cross profile of a leveling work.
- 8.2 Mention the purposes of plotting long section and cross section of leveling works.
- 8.3 Explain the various elements of longitudinal section and cross section of leveling works.
- 8.4 Describe the procedure of plotting long and cross-section.
- 8.5 Prepare longitudinal profile and cross profile from given data.

9 Understand the difficulties and errors in leveling.

- 9.1 Identify difficulties in leveling.
- 9.2 Mention the procedure of leveling in the following cases :
 - a) Ascending and descending a hill.
 - b) Staff too near the level.
 - c) Staff too low or too high.
 - d) Staff station above the line of collimation.
 - e) Board fence on the alignment.
 - f) Wall on the alignment.
- 9.3 List the instrumental and personal errors in leveling.
- 9.4 Explain the effects of earth's curvature and refraction of light on leveling.
- 9.5 Deduce the formula for earth curvature and refraction of light.
- 9.6 Solve problems on errors due to curvature and refraction.
- 9.7 Deduce the formula for distance to the visible horizon and dip of the horizon.
- 9.8 Solve problems on visible horizon and dip of the horizon.
- 9.9 List the common mistakes in leveling.
- 9.10 Specify the magnitude and permissible limits of closing error in leveling.

10 Understand the aspects of contouring.

- 10.1 Explain the terms contour, contouring, horizontal equivalent and vertical interval.
- 10.2 Mention the characteristics of contour.
- 10.3 List the uses of contour.
- 10.4 Mention the different methods of contouring .
- 10.5 State the procedure of different methods of contouring.
- 10.6 Explain interpolation of contour by estimation method only.
- 10.7 Mention the procedure of drawing contour map.
- 10.8 Draw contour maps of hill, reservoir, valley etc.

11 Understand the application of contour maps.

- 11.1 Identify the various uses of contour map.
- 11.2 State the procedure of locating the proposed route for a road, canal and drainage work.
- 11.3 Calculate the capacity of reservoir using contour map.
- 11.4 Calculate the quantity of earth in cutting and in filling by using contour map.

12 Understand the fundamentals of theodolite.

- 12.1 Distinguish between a transit and non-transit theodolite.
- 12.2 Identify the common parts of a transit (digital) theodolite.
- 12.3 Mention the functions of different parts of a transit (digital) theodolite.
- 12.4 State the meaning of diaphragm, lense, spherical aberration, chromatic aberration, centering and transiting, display board

13 Understand the adjustment of transit(digital) theodolite .

- 13.1 Identify the different types of adjustment.
- 13.2 Explain the significance of temporary adjustment.
- 13.3 State different steps of temporary adjustment of theodolite.
- 13.4 Identify the fundamental lines of transit(digital) theodolite.
- 13.5 Mention the relations among the fundamental lines.
- 13.6 Identify the permanent adjustments of transit(digital) theodolite.

14 Understand the principles of measuring angles and bearing with theodolite.

- 14.1 Mention the procedure of measuring horizontal angles.
- 14.2 Mention the procedure of measuring vertical angles.
- 14.3 Mention the procedure of measuring magnetic bearing of a line.
- 14.4 Mention the procedure of determining true bearing of a line by observing pole star.

15 Understand the application of trigonometrical leveling.

- 15.1 Explain the basic principle of trigonometrical leveling.
- 15.2 Describe the method of measuring height when the object is accessible.
- 15.3 Express the deduction of the formula for measuring height and horizontal distance when the object is inaccessible in the case of object and the station are in different vertical plane and in different levels.
- 15.4 Express the deduction of the formula for measuring height and horizontal distance when the object is inaccessible in the case of object and the station are in different vertical plane and in different levels.
- 15.5 Solve problems on finding heights and distances.

16 Understand the principles of traverse survey.

- 16.1 Explain the meaning of traverse.
- 16.2 List the field works in theodolite traversing.
- 16.3 Describe the traversing by methods of included angles and direct angle.
- 16.4 Explain the term checking of traverse.

17 Apply the concept of plotting a traverse.

- 17.1 Explain the process of plotting a traverse.
- 17.2 Calculate the bearing from angles of traverse.
- 17.3 Compute the coordinates of a traverse.
- 17.4 Describe the Bowditch's rule and Transit rule.
- 17.5 Define Balancing of closed traverse.

18 Understand the concept of traverse in solving problems.

- 18.1 Describe different types of problems in traversing.
- 18.2 Calculate the length and bearing of a missing side and any included angle

of a traverse.

- 18.3 Compute the area of closed traverse by coordinate, latitude and double meridian, departure and total latitude methods.

19 Understand the sources of errors in theodolite traversing.

- 19.1 Identify the sources of errors in theodolite work.
19.2 List the common mistakes in theodolite work.
19.3 Explain the way to avoid errors & mistakes in theodolite work.

20 Understand the principle of stadia or tachometric surveying.

- 20.1 State the meaning of stadia surveying.
20.2 Mention the necessity of stadia surveying.
20.3 Identify the instruments required for stadia surveying.
20.4 Express the derivation of the formula based on the principle of stadia surveying.
20.5 Explain the effect of anallatic lense.
20.6 Explain the methods of determining the tachometric constants.

21 Understand the concept of angular tachometry.

- 21.1 Describe angular tachometry.
21.2 Express the derivation of the formula to determine the horizontal distance and elevation when the staff is held in vertical position for both upward and downward sights.
21.3 Express the derivation of the formula to determine the horizontal distance and elevation when the staff is held perpendicular to the line of sight for both upward and downward sights.
21.4 Describe the procedure of stadia surveying.
21.5 Solve problems on stadia surveying.

22 Understand the concept of topographic surveying.

- 22.1 State the meaning of topographic survey and the relief.
22.2 Explain the methods of representation of relief.
22.3 Mention the procedure of topographic survey.
22.4 Explain the method of locating horizontal and vertical control.
22.5 Explain the method of locating contours.
22.6 Explain the method of locating details.
22.7 Describe the procedure of plotting a topographic map.

Practical :

- 1 Demonstrate the components of level.
- 2 Perform temporary adjustments of level.
- 3 Conduct fly leveling.
- 4 Conduct profile leveling, cross-sectioning and plot level sections.
- 5 Conduct reciprocal leveling.
- 6 Conduct check leveling.
- 7 Conduct contouring by direct method over a low lying/elevated area, prepare contour map and calculate the quantity of earth work in filling/cutting.
- 8 Determine horizontal angle using a transit(digital) theodolite.
- 9 Determine vertical angle using a transit(digital) theodolite.
- 10 Determine height and distance of a tower using a transit(digital) theodolite.
- 11 Conduct traversing with a theodolite and plot maps including computation of area.
- 12 Determine the tachometric constant experimentally.
- 13 Determine horizontal and vertical distances with tachometer.
- 14 Determine horizontal and vertical distances with modern level fitted with stadia.

REFERENCE BOOKS

- | | | | |
|---|-------------------------|---|--------------------|
| 1 | Surveying | – | Aziz and Shahjahan |
| 2 | Surveying & Leveling | – | T P Kanetker |
| 3 | Surveying | – | Norman Thomas |
| 4 | Plane & Geodetic survey | – | D Clark |

6633

STRUCTURAL MECHANICS

T	P	C
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AIMS

- To enable to apply the knowledge of scientific principles to problems of a mechanical nature.
- To develop an understanding of mechanical properties of materials.
- To assist in applying mathematical and geometrical calculations to the analysis of statically determinate beams.

SHORT DESCRIPTION

Mechanical properties of materials; Work, power and energy; Laws of forces; Moment; Friction; Center of gravity; Moment of inertia; Torsion on circular shaft; Shear force and Bending moment.

DETAIL DESCRIPTION

Theory:

1. MECHANICAL PROPERTIES OF MATERIALS

1.0 Understand the important aspects of mechanical properties of materials.

- 1.1 Explain the necessity to know about the mechanical properties of materials.
- 1.2 Define the following terms:
 - a. Stress, tensile stress, compressive stress, shear stress.
 - b. Strain, tensile strain, compressive strain, shear strain,
 - c. Hooke's law, modulus of elasticity and modulus of rigidity.
- 1.3 Explain stress-strain diagram of mild steel and concrete.
- 1.4 State the meaning of the followings:
 - a. Elasticity, proportional limit, yield point, ultimate stress, breaking stress, proof stress, working stress and factor of safety.
 - b. Strength, stiffness, toughness, ductility, malleability, brittleness, creep, fatigue failure, resilience, modulus of resilience, thermal stress in simple bar and poissons ratio.
- 1.5 Compute stress, strain, modulus of elasticity and modulus of rigidity.
- 1.6 Solve problems involving resilience, thermal stress and poissons ratio.
- 1.7 Compute stress develop in composite bar under tension and compression.

2. WORK, POWER AND ENERGY

2.0 Understand about the aspects of work, power and energy.

- 2.1 Define the following terms:
 - a. work
 - b. power
 - c. energy
- 2.2 Specify the units of the followings:
 - a. work
 - b. power
 - c. energy
- 2.3 Describe work done in rotation and represent by area.
- 2.4 Mention the different kinds of energy.
- 2.5 Explain the relations of potential energy and kinetic energy.

2.6 Solve problems involving work, power and energy.

3. LAWS OF FORCES

3.0 Understand the concept of laws of forces.

3.1 Explain the laws of forces.

3.2 Define the following terms:

a. force; b. coplanar force; c. non-coplanar force; d. concurrent force; e. resultant force.

3.3 Mention the parallelogram laws of forces.

3.4 State the meaning of composition and resolution of forces.

3.5 Compute the resultant force of -

a. Triangle of forces

b. Polygon of forces

c. Converse law of triangle and polygon laws of forces graphically.

3.6 Explain Lami's theorem.

3.7 Solve problems on Lami's theorem.

4. MOMENT

4.0 Understand the aspects of moment of forces.

4.1 Define the term moment (analytically and graphically).

4.2 Differentiate moment with force.

4.3 Explain Varignon's principle of moment.

4.4 Distinguish like and unlike parallel forces.

4.5 State the meaning of couple.

4.6 Mention the properties of couple.

4.7 Solve problems on moment of couple.

5. FRICTION

5.0 Understand the concept of frictional forces.

5.1 State the meaning of friction and static & dynamic friction.

5.2 Mention the laws of static friction.

5.3 Explain angle of friction and co-efficient of friction.

5.4 Compute friction of a body on horizontal planes.

5.5 Compute friction of a body on inclined planes.

5.6 Compute frictional force acting on a ladder.

6. CENTER OF GRAVITY

6.0 Understand the aspects of center of gravity.

6.1 Explain the terms: centroid and center of gravity.

6.2 State the axis of symmetry.

6.3 Compute the center of gravity by the method of moment of the following sections:

a. rectangular

- b. circular
- c. semi-circular
- d. hollow
- e. I-shaped
- f. T-shaped
- g. L-shaped.

7. MOMENT OF INERTIA

7.0 Understand the concept of moment of inertia.

- 7.1 State 1st and 2nd moment of area.
- 7.2 Explain the meaning of radius of gyration.
- 7.3 Mention the theorems of moment of inertia.
- 7.4 Compute the moment of inertia of plane area about any axis of the following sections:
 - a. rectangular
 - b. circular
 - c. semi-circular
 - d. hollow
 - e. I-shaped
 - f. T-shaped
 - g. L-shaped.

8. TORSION ON CIRCULAR SHAFT

8.0 Understand the aspects of torsion on solid and hollow circular shaft.

- 8.1 State about the laws of motions.
- 8.2 Explain the term circular motion.
- 8.3 Define the terms: torsion and torsion stress.
- 8.4 Mention the assumptions of torsion stress.
- 8.5 Find the relation between torsion stress and strain.
- 8.6 Express the derivation of the formula for finding torque.
- 8.7 Determine the relations among torsion, horse power and velocity of shaft.
- 8.8 Solve problems involving torsion.

9. SHEAR FORCE AND BENDING MOMENT

9.0 Understand about the shear force (SF) and bending moment (BM).

- 9.1 Define the term beam.
- 9.2 List different kinds of beams.
- 9.3 State the meaning of load.
- 9.4 Mention various kinds of load on beams.
- 9.5 State the meaning of shear force and bending moment.
- 9.6 Differentiate between shear force and bending moment.
- 9.7 Mention the sign conventions of shear force and bending moment.
- 9.8 List the characteristics of shear force and bending moment diagram.
- 9.9 Draw SF and BM diagram of cantilever beams with point load, distributed load and both.

9.10 Draw SF and BM diagram of simply supported beams with point load, distributed load and both.

Practical:

1. Determine the compressive stress of a timber specimen.
2. Draw stress-strain curve of mild steel with test results.
3. Determine the hardness of mild steel plate.
4. Determine the stiffness of mild steel plate.
5. Determine the brittleness of cast iron.
6. Show the resultant of force by using the force board.
7. Prove the Lami's theorem by using the force board.
8. Determine the co-efficient of friction of timber, concrete and mild steel.
9. Determine reactions of a beam by using spring balance.

REFERENCE BOOKS

1. Structural Mechanics -- W Morgan and D T Williams
2. Structural Mechanics -- Singer / Popov
3. Mechanics of Materials -- Philip Gustave Laurson and Williams Junkin Cox
4. Structural Mechanics - A. K. Upadhyay Published by SK Kateria & Sons, India.

S.K Kataria & Sons

5 Applied Mechanics - A. K. Upadhyay

- Introduction
- Laws of Forces
- Moment
- Friction
- Centre of Gravity
- Moment of Inertia
- Laws of Motion
- Motion of Connected Bodies
- Circular Motion
- Simple Lifting Machines
- Laboratory Experiments

6 Structural Mechanics - A. K. Upadhyay

- Properties of Materials
- Stresses and strains
- Shear Force and Bending Moment
- Centre of Gravity
- Moment of Inertia

- Bending and Shear Stresses
- Slope and Deflection
- Column and Struts
- Combined Direct and Bending Stress
- Analysis of Trusses
- Experiments

AIMS**After completion of the course the students will be able**

- to understand the construction process of arch and lintel.
- to understand the construction process of different types of floor.
- to understand the construction process of stairs.
- to understand the construction process of different types of roof.
- to understand the different finishing works in building.
- to understand the construction process of doors and windows.
- to understand the different operation and maintenance construction equipment.
- to understand the construction of bridge, culvert, canals etc.

SHORT DESCRIPTION

Arches; Lintels; Ground floors; Upper floors; Damp proofing; Termite treatment; Stairs; Roof; Pitched roof; Plastering and pointing; Doors; Windows; Carpentry and joinery; Scaffolding; Form works, Pointing & Varnishing, construction equipment, Building Services, Insulation, bridge/culverts and canals etc.

DETAIL DESCRIPTION**Theory:**

- 1 Understand the different type of arches and lintels.**
 - 1.1 State the meaning of arch and lintel.
 - 1.2 Mention the functions of arch and lintels.
 - 1.3 List the common terms used in arches and lintels.
 - 1.4 Mention the different type of arches according to their shape, center and material.
 - 1.5 Describe the correct procedures of construction of arches and lintels.

- 2 Understand the floor.**
 - 2.1 State the meaning of floor.
 - 2.2 Mention the components of a floor.
 - 2.3 Mention the essential requirements of a floor.
 - 2.4 Name the suitable materials used for the construction of floor.
 - 2.5 Describe the construction procedure of the following type of floors:
 - a. Brick floor
 - b. Brick concrete floor
 - a. Terrazzo floor
 - b. Mosaic floor
 - c. Tiled floor
 - d. Marble floor
 - e. Timber floor
 - f. Plastic floor
 - g. Cork floor
 - h. Glass floor
 - i. Solid floor
 - j. Hollow floor
 - k. Composite floor

- 3 Understand the dampness of building.**
 - 3.1 Mention the causes of dampness in building.
 - 3.2 Mention the ill effects of dampness in building.
 - 3.3 Describe the methods of damp proofing of building.
 - 3.4 Define efflorescence.
 - 3.5 Describe remedial measures against efflorescence.

- 3.6 Mention the requirements of an ideal damp proofing materials.
- 3.7 Describe the damp proof course (DPC) treatment for basement and wall on undrained soil with sketches.
- 3.8 Describe the DPC treatment for basement and wall in damp soil with sketches.
- 3.9 Mention the function of PVC felt used in basement.
- 3.10 State the function of rubber stopper to prevent the leakage of water.

4 Understand the damages due to termite in building.

- 4.1 Identify different type of termites.
- 4.2 Explain the damages due to termite in building on economic point of view.
- 4.3 Name the chemicals used for anti-termite treatment.
- 4.4 Describe the methods of pre-construction anti-termite treatment.
- 4.5 Describe the methods of post-construction anti-termite treatment.

5 Understand the stairs.

- 5.1 Differentiate between stairs and staircase.
- 5.2 Mention the functions and location of stairs.
- 5.3 Define the technical terms used in stairs.
- 5.4 Name various type of steps according to shape and location.
- 5.5 Mention the requirements of a good stair.
- 5.6 Express the relationship between tread and riser.
- 5.7 List the suitable materials for construction of stairs.
- 5.8 Mention the classification of stairs.
- 5.9 Plan a staircase for a building from a given stair hall and room height.

6 Understand the roofs.

- 6.1 List the different kind of roofs.
- 6.2 Mention the functions of a roof.
- 6.3 Mention the essential requirements of a good roof.
- 6.4 Differentiate between roof structure and roof covering.
- 6.5 Define the technical terms used in roofs.
- 6.6 Compare the advantages and limitations of flat roof over pitched roof.
- 6.7 Describe the construction procedure of a lean-to-roof.
- 6.8 Distinguish between king post truss and queen post truss.
- 6.9 Mention the advantages of steel trusses over wooden trusses.

7 Understand the plastering and pointing.

- 7.1 Classify the various types of plaster.
- 7.2 Describe the various types of plaster on the basis of their suitability and uses.
- 7.3 Name the different kinds of pointing with sketches.
- 7.4 State the purpose of plastering and pointing.
- 7.5 Mention the common tools used for plastering and pointing works with their functions.
- 7.6 Describe the process of applying plaster on a new and old surface.
- 7.7 Mention the common defects in plastering and pointing.
- 7.8 State how the defects of plastering and pointing can be rectified.
- 7.9 Describe the process of pointing works.
- 7.10 Distinguish between plastering and pointing.

8 Understand the doors.

- 8.1 List different type of doors.
- 8.2 Identify the technical terms used in doors.
- 8.3 Mention the factors to be considered in determining the size, shape, location and number of doors in a room.
- 8.4 Describe the various type of doors on the basis of their suitability and uses.
- 8.5 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

8.6 Describe the methods of fixing door frames.

9 Understand the windows.

- 9.1 List different type of windows.
- 9.2 Mention the factors to be considered to determine the size, shape, location and number of windows in a room.
- 9.3 Describe the various type of windows on the basis of their suitability and uses.
- 9.4 Mention the advantages and limitations of the followings:
 - a. Fixed window
 - b. Pivoted window
 - c. Sliding window
 - d. Steel casement window
 - e. Glazed or sash window
 - f. Louvered window
 - g. Bay window
 - h. Clerestory window
 - i. Corner window
 - j. Dormer window
 - k. Gable window
 - l. Lantern window
 - m. Aluminum window
- 9.5 State the functions of skylight, sunlight, fanlight and ventilator.
- 9.6 Describe the methods of fixing windows.
- 9.7 Compare among the wooden, steel and aluminum glazed window.

10 Understand the concept of carpentry and joineries used in building construction.

- 10.1 Distinguish between carpentry and joinery.
- 10.2 Differentiate between temporary and permanent carpentry.
- 10.3 Identify various type of joints used in wood works.
- 10.4 Identify various type of lengthening joints.
- 10.5 Mention the suitability of the following joints with typical dimensions:
 - a. Dove tail joint
 - b. Tennon and mortise joint
 - c. Bridle joint
 - d. Oblique tennon joint
- 10.6 Describe the importance of fastenings used in wood works.
- 10.7 Identify the defective joints and bad workmanship.

11 Understand the importance of scaffolding.

- 11.1 State the meaning of scaffolding.
- 11.2 Explain the necessity and uses of scaffolding.
- 11.3 Name the different components of scaffolding.
- 11.4 Describe different types of scaffolding.

- 11.5 Compare the advantages and limitations of timber scaffolding over steel scaffolding.
- 11.6 Differentiate between shoring and scaffolding.
- 11.7 Describe the safety requirements for scaffolding works.

12 Understand the significance of form works.

- 12.1 State the meaning of form works.
- 12.2 Define centering and shuttering.
- 12.3 Explain the necessity and uses of form works.
- 12.4 Name the different components of form works.
- 12.5 Mention the essential requirements of a good form work.
- 12.6 Describe the process of making form works of the followings:
 - a. Column
 - b. Beam and slab
 - c. Stair
 - d. Wall.
- 12.7 Describe the specifications for cleaning & treatment of forms and scrapping of form works.
- 12.8 Analyse the behavior and results of various loads on form works.
- 12.9 Describe the removal technique of form works.
- 12.10 Describe the methods for fair face concreting.

13 Understand the process of painting & Varnishing.

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

14 Understand the necessity of equipment in construction works.

- 14.1 List the equipment required for construction works.
- 14.2 Mention the specific use of the each equipment required for construction works.
- 14.3 Describe the operation and maintenance of different pumps used in construction works.
- 14.4 Describe the operation and maintenance of earth excavating machine.
- 14.5 Describe the operation and maintenance of bulldozer machine.
- 14.6 Describe the operation and maintenance of roller machine.
- 14.7 Describe the operation and maintenance of brick cutter machine.
- 14.8 Describe the operation and maintenance of crushing (brick/stone) machine.
- 14.9 Describe the operation and maintenance of concrete mixture machine.
- 14.10 Describe the operation and maintenance of concrete pump machine.
- 14.11 Describe the operation and maintenance of concrete hoisting equipment.

- 14.12 Describe the operation and maintenance of different conveyor used in construction works.
- 14.13 State the function of vibrator machine.
- 14.14 Mention various types of vibrator machine with their suitability of uses.

15 Understand the necessity of different building services.

- 15.1 State the necessity of different building services.
- 15.2 Classify different kinds of building services.
- 15.3 Describe the procedure of gas line installation in building.
- 15.4 Describe the layout of electrical wiring with various fittings in building.
- 15.5 Describe the process of installation of mechanical ventilation and air-conditioning system in building.
- 15.6 Describe the method of installation of elevator or lift and escalator system in a building.
- 15.7 Describe the fire protection system in a building.

16 Understand building codes and building by laws.

- 19.1 State different codes followed in construction methodology.
- 19.1 State the main features of Bangladesh National Building Code(BNBC),1993 with latest update in construction industry.
- 19.1 Define building bye laws.
- 19.1 Explain the municipal regulation in building planning.
- 19.1 Describe the importance of building bye laws.
- 19.1 Describe the economical planning of a residential building.
- 19.1 Define orientation of a building
- 19.1 Describe the effects of orientation of building on the basis of local climates.

17 Understand the different insulation in building.

- 17.1 Define thermal and sound insulation.
- 17.2 State the necessity of thermal and sound insulation in building.
- 17.3 List various types of materials used for thermal and sound insulation.
- 17.4 Describe the general methods of thermal and sound insulation in building.
- 17.5 Describe the process of thermal insulation of the following with neat sketches:
 - a. floor
 - b. roof
 - c. exposed wall
 - d. exposed door and window.

18 Understand the construction process of dam and embankment.

- 18.1 Define dam and embankment.
- 18.2 State the necessity of dam and embankment.
- 18.3 Describe the procedure of selection of alignment.
- 18.4 Describe the factors to be considered in designing dam and embankment.
- 18.5 Describe the process of maintenance of dam and embankment.

19 Understand the construction process of irrigation and drainage canal.

- 19.1 Define irrigation and drainage canal.
- 19.2 Describe the factors to be considered in designing irrigation and drainage canal.
- 19.3 Design an irrigation and drainage canal.
- 19.4 Describe the procedural steps of construction of irrigation and drainage canal.
- 19.5 Describe the process of maintenance of irrigation and drainage canal.

20 Understand the construction process of bridge and culvert.

- 20.1 State different types of bridge and culvert.
- 20.2 Mention different components of bridge and culvert.
- 20.3 Describe the process of setting out plan of bridge and culvert.
- 20.4 Describe the procedural steps of construction of bridge and culvert.

- 20.5 Explain the necessity of inspection of bridge and culvert for maintenance.
20.6 Describe the factors to be considered for inspection of bridge and culvert.

Practical:

- 1 Construct a semi-circle/segmental brick arch.**
 - 1.1 Select the required tools and raw materials.
 - 1.2 Make form works with suitable materials.
 - 1.3 Prepare cement mortar as required.
 - 1.4 Place the bricks on proper position with cement mortar.
 - 1.5 Do the curing of the brick work properly.
 - 1.6 Remove the form works.

- 2 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
 - 3.1 Select the required tools and raw materials.
 - 3.2 Prepare the floor according to standard specification.
 - 3.3 Clean the work site.

- 3 Perform a case study of dampness in building.**
 - 3.1 Identify a damped building.
 - 3.2 Investigate the reasons of dampness.
 - 3.3 Select the method of damp proofing.
 - 3.4 Estimate the materials to be needed for damp proofing.
 - 3.5 Prepare a report on the specified case of dampness in building.

- 4 Construct the form work of a stair.**
 - 4.1 Collect the required tools and raw materials.
 - 4.2 Draw a neat sketch of stair (at least ten nos. steps).
 - 4.3 Make the bottom supports and erect inclined way.
 - 4.4 Fix the steps and side of steps.
 - 4.5 Check the accuracy of the works.

- 5 Construct a wooden lean-to-roof.**
 - 5.1 Collect the required tools and raw materials.
 - 5.2 Draw the neat sketch with dimensions of a lean-to-roof.
 - 5.3 Make the joints and assemble the members.
 - 5.4 Erect the lean-to-roof in proper position.
 - 5.5 Check the accuracy of the work.

- 6 Construct a wooden king post roof truss.**
 - 6.1 Collect the required tools and raw materials.
 - 6.2 Draw the neat sketch with dimensions of a king post roof truss.
 - 6.3 Make the joints and assemble the members.
 - 6.4 Erect the king post roof truss in proper position.
 - 6.5 Check the accuracy of the work.

- 7 Construct a wooden queen post roof truss.**
 - 7.1 Collect the required tools and raw materials.

- 7.2 Draw the neat sketch with dimensions of a queen post roof truss.
- 7.3 Make the joints and assemble the members.
- 7.4 Erect the queen post roof truss in proper position.
- 7.5 Check the accuracy of the work.

8 Perform cement plastering to brick walls.

- 8.1 Collect the required tools and raw materials.
- 8.2 Clean the loose materials from the surface.
- 8.3 Raking out all the joints upto required depth.
- 8.4 Wash the surface with water.
- 8.5 Mix(dry) cement-sand in required proportion.
- 8.6 Add water to dry mix with maintaining water-cement ratio.
- 8.7 Provide dots and check the thickness of cement plaster.
- 8.8 Provide the screed properly.
- 8.9 Apply mortar (top to bottom and left to right).
- 8.10 Plain / level the surface as possible.
- 8.11 Check the surface accordingly.
- 8.12 Do the curing as required.

9 Perform pointing works to a boundary wall.

- 9.1 Collect the required tools and raw materials.
- 9.2 Clean the loose materials from the surface.
- 9.3 Raking out all the joints upto required depth.
- 9.4 Wash the surface with water.
- 9.5 Mix(dry) cement-sand in required proportion.
- 9.6 Add water to dry mix with maintaining water-cement ratio.
- 9.7 Apply mortar to the joints and press (top to bottom and left to right).
- 9.8 Draw the tools accordingly.
- 9.9 Check the joints accordingly.
- 9.10 Do the curing as required.

10 Construct a single layer and double layers scaffolding.

- 10.1 Collect the required tools and raw materials.
- 10.2 Erect the vertical members.
- 10.3 Place the horizontal members and tied with jute rope.
- 10.4 Place the boards for platform.
- 10.5 Provide the bracings accordingly.
- 10.6 Check the properness of the scaffolding work.
- 10.7 Disassemble all the members and store the materials used.

11 Prepare form works for columns and beams.

- 11.1 Collect the required tools and raw materials.
- 11.2 Make the boards according to required size.
- 11.3 Erect the boards and attached accordingly so that they can easily remove.
- 11.4 Check the dimensions of the column/beam.
- 11.5 Disassemble the form works and store the materials used.

12 Perform white washing on new and old surface.

- 12.1 Collect the required tools and raw materials.
- 12.2 Prepare the surface as necessary.
- 12.3 Prepare white wash as required.
- 12.4 Apply first coat of white wash and allow to drying.
- 12.5 Apply second coat of white wash and allow to drying.
- 12.6 Apply the final coat of white wash.

13 Perform color washing on new and old surface.

- 13.1 Collect the required tools and raw materials.
 - 13.2 Prepare the surface as necessary.
 - 13.3 Prepare color wash as required.
 - 13.4 Apply first coat of color wash and allow to drying.
 - 13.5 Apply second coat of color wash and allow to drying.
 - 13.6 Apply the final coat of color wash.
- 14 Perform distemping on new and old surface.**
- 14.1 Collect the required tools and raw materials.
 - 14.2 Prepare the surface as necessary.
 - 14.3 Prepare distemper as required.
 - 14.4 Apply first coat of distemper and allow to drying.
 - 14.5 Apply second coat of distemper and allow to drying.
 - 14.6 Apply the final coat of distemper.
- 15 Perform snowcem washing and weather coating on new and old surface.**
- 15.1 Collect the required tools and raw materials.
 - 15.2 Prepare the surface as necessary.
 - 15.3 Prepare paint as required.
 - 15.4 Apply first coat of paint and allow to drying.
 - 15.5 Apply second coat of paint and allow to drying.
 - 15.6 Apply the final coat of paint.
- 16 Perform plastic emulsion painting on new and old surface.**
- 16.1 Collect the required tools and raw materials.
 - 16.2 Prepare the surface as necessary.
 - 16.3 Prepare paint as required.
 - 16.4 Apply first coat of paint and allow to drying.
 - 16.5 Apply second coat of paint and allow to drying.
 - 16.6 Apply the final coat of paint.
- 17 Perform varnishing on new and old wooden surface.**
- 17.1 Collect required tools and raw materials.
 - 17.2 Prepare the surface as necessary.
 - 17.3 Prepare varnish as required.
 - 17.4 Apply first coat and allow to drying.
 - 17.5 Apply second coat and allow to drying.
 - 17.6 Apply the final coat of varnish.
- 18 (a) Draw plan and sectional elevation of on irrigative and drainage canal.
 - (b) Prepare a typical model of a drainage canal with suitable materials.
 - 19 (a) Draw plan and sectional elevation of a RCC bridge or culvert.
 - (b) Prepare a typical model of a RCC bridge with or culvert suitable materials.
 - 20 Make a site visit/field trip.

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

6441	Geotechnical Engineering	T	P	C
		2	3	3

AIMS

- To enable to understand of the origin, composition, classification and properties of soil.
- To assist in understanding the plasticity characteristics and hydraulic properties of soil.
- To assist in understanding the consolidation characteristics of soil.
- To assist in understanding the lateral earth pressure of soil.
- To provide understanding of the site investigation and method of sample collection.
- To provide basic field skill for collection of soil sample.
- To provide basic laboratory skill required to determine soil properties and to perform the relevant calculations.

SHORT DESCRIPTION

Introduction to geotechnic ; Preliminary definition and simple tests; Particle size of soil; Plasticity characteristic of soil; Hydraulic properties of soil; Consolidation characteristics of soil; Subsurface investigation; Lateral earth pressure; Bearing capacity of soil.

DETAIL DESCRIPTION

Theory :

INTRODUCTION TO GEOTECHNIC

1. Understand the basic concept of geotechnic.

- 1.1 Define rock, soil and soil engineering.
- 1.2 Describe origin and formation of soil.
- 1.3 Describe historical origin and formation of soil of Bangladesh.
- 1.4 Explain limitation of soil engineering.
- 1.5 Mention the soil classification system.
- 1.6 State textural, AASHO and unified ASTM system.
- 1.7 State field identification test such as; dilatancy, toughness, dry strength test.
- 1.8 List general properties of soil.

PRELIMINARY DEFINITION AND SIMPLE TESTS

2. Understand preliminary definitions and simple test soil.

- 2.1 Define the following terms: void ratio, porosity, degree of saturation, percentage of air voids, air content, water content, bulk unit wt, dry unit wt, saturated unit wt, submerged unit wt, unit wt. of solids, specific gravity of solids, density index.
- 2.2 Explain three-phase diagram in terms of void ratio.
- 2.3 Explain three-phase diagram in terms of porosity.
- 2.4 Solve problems on soil properties.
- 2.5 Explain oven drying method of water content determination.
- 2.6 Explain specific gravity determination by pycnometer method.

PARTICLE SIZE OF SOIL

3. Understand the particle size of soil.

- 3.1 Define index properties of soil.
- 3.2 State mechanical analysis of soil.
- 3.3 Describe sieve analysis.
- 3.4 Mention and derive stokes law.
- 3.5 Describe particles size analysis by hydrometer.

PLASTICITY CHARACTERISTICS OF SOIL

4. Understand the plasticity characteristics of soil.

- 4.1 Define: plasticity of soil, Atterberg limit, liquid limit, plastic limit, shrinkage limit, plasticity index, liquidity index, consistency index, flow index and toughness index.
- 4.2 State the method of measurement of consistency.
- 4.3 Define the terms: sensitivity and thixotropy.
- 4.4 List the uses of consistency (Atterberg) limits.

HYDRAULIC PROPERTIES OF SOIL

5. Understand the hydraulic properties of soil.

- 5.1 Define the following: Permeability of soil, hydraulic head, piezometric head, position head and Darcy's law.
- 5.2 State the meaning of constant head and variable head permeability test for determination of co-efficient of permeability.
- 5.3 Describe the pumping out tests for determination of coefficient of permeability.
- 5.4 Compute effective pressure and pore water pressure.

- 5.5 List the factors affecting permeability of soil.
- 5.6 Define seepage pressure, seepage velocity, equipotential line and flow net.

CONSOLIDATION CHARACTERISTICS OF SOIL

6. Understand the consolidation characteristics of soil.

- 6.1 Define consolidation and initial, primary and secondary consolidation.
- 6.2 State behavior of saturated soil under pressure.
- 6.3 Draw consolidation characteristics of preloaded deposits.
- 6.4 Identify triaxial compression test apparatus.
- 6.5 Interpret the results of triaxial tests.
- 6.6 Explain unconfined and confined compression test.
- 6.7 Differentiate between consolidation and compaction.
- 6.8 State standard proctor test of compaction and standard proctor moisture density curve for material.

SUBSURFACE INVESTIGATION

7. Understand the purpose of subsurface investigation.

- 7.1 State the meaning of subsurface investigation of soil.
- 7.2 Mention the stages in subsurface explorations.
- 7.3 Mention the purposes of subsurface investigation of soil.
- 7.4 Compute the depth and lateral extent of explorations.
- 7.5 Describe the open excavation methods of explorations.
- 7.6 Describe auger boring, wash boring, rotary drilling, percussion drilling and core boring.
- 7.7 Identify various types of soil samples.
- 7.8 Identify split barrel sampler, spring core catches, scraper bucket and piston sampler for collecting samples.

- 7.9 Describe the method of standard penetration test.
- 7.10 State the procedure of writing subsoil investigation report.

LATERAL EARTH PRESSURE

8. Understand the aspect of lateral earth pressure.

- 8.1 State the meaning of at-rest pressure, active earth pressure and passive earth pressure.
- 8.2 explain active and passive earth pressure of Rankine's theory with non-surcharge.
- 8.3 State the formula of active earth pressure of Rankine's theory with surcharge.
- 8.4 State the fundamental assumptions of Coulomb's wedge theory.
- 8.5 State the formula of active earth pressure of Coulomb's theory with surcharge.

BEARING CAPACITY OF SOIL

9. Understand the bearing capacity of soil.

- 9.1 Define bearing capacity of soil.
- 9.2 Correlate between penetration resistance and unconfined compressive strength for cohesive soil.
- 9.3 Correlate between penetration resistance and angle of shearing resistance for cohesion less soil.
- 9.4 Explain the bearing capacity from Standard Penetration Test (SPT).
- 9.5 List the causes of foundation settlement.

Practical:

1. Determine the water content of soil by oven drying method.
2. Determine the specific gravity of soil by pycnometer method.
3. Determine the particle size of soil by sieve analysis.
4. Determine the particle size of soil by hydrometer analysis.
5. Determine the liquid limit of soil by casagrand's apparatus.
6. Determine the plastic limit of soil.
7. Determine the co-efficient of permeability of soil by constant head test.
8. Collect the sample of soil by wash boring method.
9. Determine the bearing capacity of soil from Standard Penetration Test (SPT).
10. Determine the amount of compaction and the water content by standard proctor test.
11. Determine the shear characteristics of soil by unconfined compression test.
12. Perform the consolidation test.

REFERENCE BOOKS

- 1 **Foundation Engineering**
- **Ralph B Peck, Walter, E Hanson**
- 2 **Soli Mechanics and Foundation Engineering**
- **Dr. K. R. Arora.**
3. **Soil Mechanics and Foundation**
- **Dr. B. C. Punmia.**
- 4 **Foundation Analysis and Design**
- **Josef and Vawels**

5851	BOOK KEEPING & ACCOUNTING	T	P	C
		2	0	2

AIMS

- To be able to understand the principles and practices of book keeping and accounting.
- To be able to understand the procedures of general accounting, financial accounting and their applications.

SHORT DESCRIPTION

Concept of book keeping and accounting; Transactions; Entry systems; Accounts; Journal; Ledger; Cash book; Trial balance; Final accounts; Cost account & financial accounting; Depreciation; Public works accounts.

DETAIL DESCRIPTION

1 Understand the concept of book keeping and accounting.

- 1.1 Define book keeping and accountancy.
- 1.2 State the objectives of book keeping.
- 1.3 State the advantages of book keeping.
- 1.4 Differentiate between book keeping and accounting.
- 1.5 State the necessity and scope of book keeping and accounting.

2 Understand the transactions.

- 2.1 Define transactions and business transaction.
- 2.2 Explain the importance of transactions.
- 2.3 Describe the characteristic features of transactions.
- 2.4 Discuss the classification of transaction.
- 2.5 Identify the transaction from given statements stating reasons.

3 Understand the entry system.

- 3.1 State the aspects of transactions.
- 3.2 Define single entry system.
- 3.3 State the objectives of single entry system.
- 3.4 Discuss the disadvantages of single entry system.
- 3.5 Define double entry system.
- 3.6 Discuss the principles of double entry system.
- 3.7 Justify whether double entry system is an improvement over the single entry system.
- 3.8 Distinguish between single entry and double entry system of book keeping.

4 Understand the classification of accounts.

- 4.1 Define accounts.
- 4.2 State the objectives of accounts.
- 4.3 Illustrate different type of accounts with example.
- 4.4 Define "Golden rules of Book keeping".
- 4.5 State the rules for "Debit" and "Credit" in each class of accounts.
- 4.6 Determine Debtor (Dr) and Creditor (Cr.) from given transactions applying golden rules.
- 4.7 Define accounting cycle.
- 4.8 State the different steps of accounting cycle.

5 Understand the Journal.

- 5.1 Define Journal.
- 5.2 State the object of Journal.
- 5.3 State the functions of Journal.

- 5.4 Mention the various names of Journal.
- 5.5 Interpret the form of Journal.
- 5.6 Journalize from given transactions.

6 Understand the ledger.

- 6.1 Define ledger.
- 6.2 Interpret the form of ledger.
- 6.3 State the functions of ledger.
- 6.4 Distinguish between Journal and Ledger.
- 6.5 Prepare ledger from given transactions.
- 6.6 Explain why ledger is called the king of all books of accounts.

7 Understand the cash book.

- 7.1 Define cash book (single, double and triple column).
- 7.2 Explain cash book as both Journal and Ledger.
- 7.3 Prepare double column cash book from given transactions showing balances.
- 7.4 Prepare triple column cash book from given transaction and find out the balances.
- 7.5 Define petty cash book.
- 7.6 Prepare analytical and imprest system of cash book.
- 7.7 Define discount.
- 7.8 Explain the different types of discount.

8 Understand the trial balance.

- 8.1 Define trial balance.
- 8.2 State the object of a trial balance.
- 8.3 Discuss the methods of preparation of a trial balance.
- 8.4 Explain the limitations of a trial balance.
- 8.5 Prepare trial balance from given balance.

9 Understand the final accounts.

- 9.1 State the components of final account.
- 9.2 Distinguish between trial balance and balance sheet.
- 9.3 Identify the revenue expenditure and capital expenditure.
- 9.4 Select the items to be posted in the trading account, profit & loss account and the balance sheet.
- 9.5 State the adjustment to be made from the given information below or above the trial balance.
- 9.6 Prepare trading account, profit & loss account and balance sheet from the given trial balance & other information.

10 Understand the cost and financial accounting.

- 10.1 Define financial accounting.
- 10.2 State the objectives of financial accounting.
- 10.3 Define cost accounting.
- 10.4 Discuss the relationship between financial Accounting and cost accounting.
- 10.5 State the elements of direct cost and indirect cost.
- 10.6 Prepare cost sheet showing prime cost, factory cost, cost of production, total cost and selling price.
- 10.7 Discuss the capital budgeting
- 10.8 Discuss the discounted cash flow method
- 10.9 Explain the following terms:
 - a. Fixed cost b. Variable cost c. Factory cost d. Overhead cost e. Process cost
 - f. Direct cost g. Operating cost h. Standard cost

11 Understand the depreciation

- 11.1 Define depreciation.

- 11.2 State the objects of depreciation.
- 11.3 Discuss the necessity for charging depreciation.
- 11.4 Describe the different methods of determining depreciation.
- 11.5 Explain the relative merits and demerits of different method of depreciation.

12 Understand the public works accounts.

- 12.1 State the important aspects of public works accounts.
- 12.2 Describe the main features of public works accounts.
- 12.3 Explain "Revenue and Grant".
- 12.4 Define Value Added Tax (VAT)
- 12.5 State the merits and demerits of VAT.
- 12.6 Define Bill and Voucher.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

ARCHITECTURE & INTERIOR DESIGN TECHNOLOGY (87)

**SYLLABUS
(COURSE STRUCTURE-2010)**

SIXTH SEMESTER

INTERIOR DESIGN-III

8761

T P C
3 9 6

Aims:

DESIGN OF A SHOPPING CENTER CUM commercial BUILDING.
DESIGN THE INTERIOR OF A SHOPPING CENTER.
PERFORM THE ARRANGEMENT OF SHOPS.
DESIGN THE INTERIOR OF A RESTAURENT.
DESIGN OF A HOSPITAL.

SHORT DESCRIPTION:

INTERIOR PLANNING, DESIGN CRITERIA, SPACE ALLOWANCES, SHOP ARRANGEMENTS, GYM & RESTARURENT, CEILING, AND RAJUK RULES.HOSPITAL DESIGN.

DETAIL DESCRIPTION

THEORY:

1. Understand the general consideration of the planning of a shopping center

- 1.1 Describes the general consideration of site selection of a shopping center.
- 1.2 Describe the general feature of a shopping center.
- 1.3 Describe the planning problem of shopping centre.
- 1.4 Describe the factor to be considered for the traffic pattern of shopping centre.
- 1.5 Describe the list of store by location.

2. Understand the service detail of a shopping center.

- 2.1 Describe the store front and sign on the shopping center.
- 2.2 Describe the working area, storage area, outdoor area & parking area.
- 2.3 Explain merchandising area, display area, staff entrance and staff W.C.
- 2.4 Describe the necessary location of core area used in shopping center.

3. Understand the introduction of retail & self service shop.

- 3.1 Define Retail shop and its function.
- 3.2 Describe the self or staff service.
- 3.3 Describe the column spacing of shop, store depth, clear height, ducts and shafts.
- 3.4 Explain the entrance of retail & self service shop.
- 3.5 Describe the general consideration and principals of retail shop.

4. Understand the function of men's & women's wear and gift shop.

- 4.1 Describe the men's & women's wear and gift shop.
- 4.2 Describe the sales & display area of men's & women's wear and gift shop.
- 4.3 Explain the lighting system of men's & women's wear and gift shop.
- 4.4 Describe the selling & interior display of gift shop.
- 4.5 Describe the show window & non selling area of gift shop.

5. Understand the location of jewelry, shoe and barber shop.

- 5.1 Define shop front of jewelry, shoe and barber shop.
- 5.2 Describe the principle of jewelry, shoe and barber shop.

- 5.3 Explain the sales & display area of the jewelry shop.
- 5.4 Describe the shop clearness of barber shop.
- 5.5 Describe the general requirement of shoe store.

6. Understand the general information for planning of a restaurant.

- 6.1 Define restaurant.
- 6.2 Describe the decisions which are made initial planning for restaurant.
- 6.3 Mention the space allowance in relation to investment.
- 6.4 Mention the terms which are required to calculate area.

7. Understand the space allowances and table sizes.

- 7.1 Describe a chart of space allowance for common types of seating & services.
- 7.2 Show area required by individual diner.
- 7.3 Describe table size for one to twelve diners and also show a chart of tables for varying numbers of people.
- 7.4 Show banquet seating including space for area and service.
- 7.5 Discuss minimum aisle circulation widths.

8. Understand the miscellaneous facilities of a restaurant.

- 8.1 Explain the space allowance for kitchen for the various functions.
- 8.2 Describe the booths of restaurant.
- 8.3 Explain the cashier counter of restaurant.
- 8.4 Explain the coat checking for the restaurant.
- 8.5 Explain the telephone facilities for the restaurant.

9. Understand the electrical & air-conditioning plan for shopping center.

- 9.1 Mention the definition & purpose of the electrical plan.
- 9.2 Explain the electrical service for commercial building.
- 9.3 Discuss the types of wiring & electric outlets.
- 9.4 Discuss drafting the air conditioning plan.
- 9.5 State the schedules of the air conditioning system.

10. Understand the rules and regulation of RAJUK about shopping center.

- 10.1 Define setback.
- 10.2 Explain FAR.
- 10.3 Describe ramp and Escalator.
- 10.4 Discuss the parking rules.

11. Understand the general conception of Hospital.

- 11.1 State the Hospital and Health Service.
- 11.2 Define the teaching Hospital.
- 11.3 Define the Community Hospital.
- 11.4 List the points for discussion about hospital.
- 11.5 Analyze the need of exit health codes and basic building code requirements.
- 11.6 Describe the effect of project location and feasibility by limitation of existing building.

12. Understand the patient Rooms.

- 12.1 State the general conception of patient room.
- 12.2 Determine the size of the patient room.
- 12.3 Describe the closets ,furniture and its size for a patient room.
- 12.4 Explain the door and windows of the patient room.

12.5 Describe built in equipment, medical equipment and space allocation for a patient room.

12.6 Describe the lighting ,electrical requirements and medical cases for patient room.

13. Understand the admitting Department of Hospital.

13.1 State the sequence of the flow chart of admitting Department.

13.2 Describe the legend for central admitting department with adjacent medical record department for 100 bed hospital.

13.3 State the relationship between different department.

13.4 Describe the special problems of design and construction of a hospital.

13.5 Discuss the external factors such as air-conditioning, fire safety, means of escape and their location.

Practical:

1. Prepare the preliminary design of a shopping centre.

1.1 Draw the flow diagram of a shopping centre.

1.2 Sketch the line plan of shopping centre with given requirements.

1.3 Develop the line plan according to scale.

1.4 Draw the four side elevation of shopping centre.

1.5 Draw the vertical section through stair and lift.

2. Prepare the detail drawing of Retail (Man's and Woman's)Shop.

2.1 Draw the detail floor plan showing different display area.

2.2 Draw the four side elevation of man's and woman's ware shop.

2.3 Draw the detail section of man's and woman's ware shop.

2.4 Draw the detail section of man's and woman's ware shop display case/ counter.

2.5 Draw the detail section of man's and woman's ware shop show window.

3. Prepare the detail drawing of Departmental store.

3.1 Draw a flow diagram of a departmental store.

3.2 Draw a typical floor plan showing different goods area.

3.3 Draw different display case plan, elevation and section of a departmental store.

3.4 Draw plan , elevation and section of cash counter of a departmental store.

3.5 Draw the front loading area and dispatch area.

4. Prepare the detail drawing of barber shop/ beauty shop and jewelry shop.

4.1 Draw the detail plan showing different seating arrangement of barber shop/ beauty shop .

4.2 Draw the detail plan showing different display area of a jewelry shop.

4.3 Draw the elevation and section of barber shop/beauty shop.

4.4 Draw the elevation and section of a jewelry shop.

5. Prepare the detail drawing of shoe Store.

- 5.1 Draw the detail plan showing different arrangement of barber shop/ beauty shop.
- 5.2 Draw foot mirror elevation and section of shoe shop.
- 5.3 Draw different type of show case detail for shoe shop.
- 5.4 Draw the different type of setting arrangement of shoe shop.

6. Prepare the detail drawing of a self service food court .

- 6.1 Draw the detail plan showing different setting arrangement of a self service food court/fast food shop.
- 6.2 Draw the detail Banquette seating arrangement and limiting dimension including space for access and service of a self service food court/fast food shop.
- 6.3 Draw the different display case elevation and section of self service food court/fast food shop.
- 6.4 Draw the false ceiling plan of a self service food court/fast food shop.
- 6.5 Draw a 3D view of a self service food court/fast food shop.

7. Prepare the detail drawing of a restaurant.

- 7.1 Draw the detail plan, elevation and section of a restaurant.
- 7.2 Draw the different size and types of kitchen for restaurant showing different goods location.
- 7.3 Draw the detail plan, elevation and section of restaurant cashier counter.
- 7.4 Draw the detail plan and section of a lunch counter of a restaurant.
- 7.5 Draw a 3D view of a restaurant.

8. Prepare layout plan of shopping centre.

- 8.1 Draw a layout plan according to the rajuk specification.
- 8.2 Draw the landscape plan showing different plantation and structure.
- 8.3 Draw a roof plan of a shopping centre showing rain water drainage.
- 8.4 Draw the different electrical fixture layout of a shopping centre.

9. Draw detail drawing of service area of a shopping centre.

- 9.1 Draw detail drawing of core area of a shopping centre.
- 9.2 Draw the plan, elevation of a escalator used in shopping centre.
- 9.3 Draw detail plan ,elevation and section of a emergency stair of a shopping centre.
- 9.4 Draw toilet area for gents and ladies of shopping centre.
- 9.5 Draw plan and elevation of information desk of a shopping centre.

10. Prepare the flow chart of a Hospital.

- 10.1 Draw the flow chart of a Hospital
- 10.2 Draw the flow diagram of Administration Department.
- 10.3 Draw the flow diagram of emergency department and diagnostic facilities.
- 10.4 Draw the flow diagram of obstetrical and out patient department.
- 10.5 Draw the flow diagram of service facilities and laundry department.

11. Design the patient room and living area of a hospital.

- 11.1 Draw the plan, elevation and section of single patient room.
- 11.2 Draw the plan, elevation and section of operation room and diagnostic room.

11.3 Draw the plan ,elevation and section of reception area of a hospital.

12. Prepare the preliminary design of a Hospital.

12.1 Draw the line sketch plan of a 100 bed district level hospital.

12.2 Draw the plan of 100 bed district level hospital.

12.3 Draw the elevation and section of the hospital.

12.4 Draw the detail drawing of car parking area.

12.5 Draw the landscape plan of a hospital.

REFERENCE BOOK:

1.Time Saver Standards for Building Types (2nd edition)

-Joseph De. Chiara & Join Callender.

2.planning

The Architect Hand Book.

by-E and O.E

S.Row Land pierce.

patrick cutbush

anthony willsams

3.Neufert Architects Data.

4.Bangladesh National Building Code.

5.The handbook of building types.

ERNST NEUFERT

ARCHITECT DATA

by-Vincenet jones

George Atkinson OBEBBA(aRCH)riba.

AIMS

- To be able to acquire Understand the style of Antiquity
- To be able to Understand miscellaneous style & arts.
- To be able to Understand Architecture & the decorative arts of the 20th century.
- To be able to Understand Federal & Empire period, American Victorian period
- To be able to Understand the Architectural characteristics of Egyptian, west Asiatic, Hellenic period of Greek Architecture, Roman Civilization.
- To be able to develop the knowledge of beginning of Islamic architecture in India and be able to know the development of Islamic architecture during Mughal period.
- To be able to understand the East Bengal Architecture.

SHORT DESCRIPTION

Style of Antiquity , miscellaneous style & arts, decorative arts , Federal & Empire period , American Victorian period, Egyptian, west Asiatic, Hellenic period of Greek Architecture, Roman Civilization, Development of Islamic architecture during Mughal period, architecture in East Bengal;

DETAIL DESCRIPTION

1. Understand the style of Antiquity.

- 1.1 Describe the prehistoric Art.
- 1.2 Describe about Mesopotamia & Palestine historic periods.
- 1.3 State the main division of Egyptian history.
- 1.4 State the character of Egyptian wall decoration & ornament.
- 1.5 State the Egyptian Furniture.

2. Understand miscellaneous style & arts.

- 2.1 Describe the historical styles of decorative art.
- 2.1 Describe the Islamic arts of the Mohammedan countries.
- 2.3 Describe the American Indian arts (pre-Columbian).
- 2.4 Describe the African Negro sculpture.

3. Understand Architecture & the decorative arts of the 20th century.

- 3.1 State about the nouveau.
- 3.2 Describe the influence of Louis Sullivan in modern Architecture and decorative art.
- 3.3 Describe the functionalism and the concept beauty in Architecture.
- 3.4 Describe the contemporary approach to interior design.
- 3.5 Describe the contemporary planning and backgrounds in interior design.
- 3.6 Describe the contemporary furniture in interior.

4. Understand Federal & Empire period (1780-1850) in Architecture.

- 4.1 State the characteristics of the federal and empire period in Architecture.
- 4.2 State "Neo-Classical" term in federal and empire period in Architecture.
- 4.3 Describe federal or Adamesque home entrance door style.
- 4.4 Describe several features distinguish federal windows from colonial period.
- 4.5 Describe characteristics of walls of the federal period.

- 4.6 Describe the characteristics of ceiling of the federal period.
- 4.7 Describe the characteristics of floors of the federal period.

5. Understand the American Victorian period (1840-1910) in Architecture.

- 5.1 State the characteristics of the American Victorian period in Architecture..
- 5.2 Describe the characteristics of walls of the American Victorian period.
- 5.3 Describe the characteristics of doors of the American Victorian period.
- 5.4 Describe the characteristics of built-in furniture.
- 5.5 Describe the characteristics of lighting system in walls and ceiling.
- 5.6 Describe the characteristics of staircase.

6. Understand the Architectural characteristics of Egyptian Architecture.

- 6.1 Describe the historical influence of Egyptian architecture.
- 6.2 Describe the evolution of pyramid.
- 6.3 Describe the architectural features of great pyramid of Cheops.
- 6.4 Explain the architectural characteristics of the temples of amun at karnak.
- 6.5 Explain the architectural characteristics of the temples of Queen Hatshepsut.

7. Understand the Architectural characteristics of west Asiatic Architecture.

- 7.1 Describe the architectural characteristics of west Asiatic civilization.
- 7.2 Identify the material & building technology adopted by the west Asiatic architecture.
- 7.3 Explain the architectural characteristics of the planning of the city of Khorsabad city.
- 7.4 Explain the architectural features of the planning of the palace of Persepolis.
- 7.5 Explain the architectural characteristics of the city of Babylon.

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

- 8.1 Describe the historical influence of the Greek architectural.
- 8.2 Explain the architectural features of the Greek order.
- 8.3 Compare Doric and Corinthian order
- 8.4 Explain the planning features of the acropolis at Athens.
- 8.5 Explain the architectural feature of Parthenon.
- 8.6 Describe the comparative analysis of Greek Architecture.

9. Understand the Architectural Characteristics of Roman Civilization.

- 9.1 Describe the history influence of the Roman Civilization.
- 9.2 Describe the Architectural characteristics of the basilica of Constantine.
- 9.3 Explain the Architectural characteristics of Roman Coliseum.
- 9.4 Explain the Architectural characteristics of Roman house.

10 Understand the development of the Islamic Architecture during the Mogul period.

- 10.1. Describe the historical influence in the development of Mogul Style.
- 10.2 Describe the development in the planning of Fathepur Sikri.
- 10.3 Explain the Architectural development in the planning of Red Fort.
- 10.4 Explain the Architectural development in the planning of Agra Fort.
- 10.5 Identify the Architectural Feature of the Delhi-jame Masjid.
- 10.6 Describe the Architecture feature of Humayan's Tomb.
- 10.7 Describe the Architecture feature of the Taj Mahal.

11. Understand the Development of Islamic Architecture in Bengal.

- 11.1 Describe the historical influence on the Islamic Architectural style of Bengal.

- 11.2 Visit and Explain the Architectural features of the Sat Gambuj Masjid ,Khulna.
- 11.3 Visit and Explain the Architectural features of the Atia Masjid ,Tangail.
- 11.4 Visit and Explain the Architectural features of the Lal-bag Fort.
- 11.5 Visit and Explain the Architectural features of the Ashan Monjil.
- 11.6 Visit and Explain the Architectural features of the Karjan Hall.

12. Understand the Architecture in East Bengal.

- 12.1 Visit and Describe the Historical development of Kantojir Mondir at Dinajpur.
- 12.2 Visit and Describe the Historical development of Dhakeyshory Mondir at Dhaka.
- 12.3 Visit and Describe the Historical development of Sonargaon at Narayangonj.
- 12.4 Visit and Describe the Historical development of Maynamoti at Comilla.
- 12.5 Visit and Describe the Historical development of Uttara Gano Bhoban at Nator.
- 12.6 Visit and Describe the Historical development of Mohastan Gor at Bogra.

REFERENCE BOOKS:

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

DETAILING AND FITOUTS

AIDT 8763

T P C

1 6 3

AIMS

To be able to understand the purpose and benefits of detailing in relation to design.

To be able to identify problems related to poor detailing and suggest appropriate detailing.

To be able to acquire knowledge interior fit out components and techniques.

SHORT DESCRIPTION

Partitions and wall finishes, floors, suspended ceiling. lighting fixtures , walls cladding ,door and window details, furniture hardware and kitchen.

DETAIL DESCRIPTION

Theory

1 Understand the partition and wall finishes

- 1.1 Define partition wall.
- 1.2 Describe the characteristics of interior partitions.
- 1.3 Illustrate the details of metal stud and gypsum board partitions.
- 1.4 Describe the ceramic tile wall finishing.
- 1.5 Describe the wood frame partition systems for sound control.
- 1.6 Describe the recommended uses of various partition walls.

2 Understand the floors.

- 2.1 Define floor.
- 2.2 Describe different types of floor.
- 2.3 Explain the edging, tile joiners, reduces strips and their uses.
- 2.4 Describe the typical characteristics of different floor finishing.
- 2.5 Describe the construction process of different floor.
- 2.6 Describe the floor construction with sound insulation.

3 Understand the suspended ceiling.

- 3.1 Define false ceilings.
- 3.2 Describe the suspended ceiling system.
- 3.3 Describe the function of suspended ceiling system.
- 3.4 Describe the different types of suspended ceiling system.
- 3.5 list the materials used for suspended ceiling system.

4. Understand the lighting fixtures.

- 4.1 List the different types of lamp of general lighting purpose.
- 4.2 Describe minimum shade height.
- 4.3 Describe the residential valance lighting and down lighting.
- 4.4 Identify\ calculate the recommended lighting levels for office and industrial space.
- 4.5 Illustrate various types of lighting.

5. Understand the walls cladding.

- 5.1 Describe the purpose of wall cladding.
- 5.1 describe different types of wall cladding.
- 5.2 illustrate diagrammatically the installation of aluminium composite cladding.

6 Understand the furniture hardware.

- 7.1 identify different types of hinges and mention its different parts(leaf,gain,knuckle,butt hinge,pintle etc)
- 7.2 State the uses of different hinges.
- 7.3 State the uses of drawer runners.
- 7.4 State the uses of magnetic & spring catches, bolts,locking system.
- 7.5 Describe different types of shelf support.

PRACTICAL

1. Prepare the wooden door detail.

- 1.1 Draw plan, elevation and section of wooden solid door.
- 1.2 Draw plan, elevation and section of wooden panel door.
- 1.3 Draw plan, elevation and section of wooden flush door.
- 1.4 Make different wooden door joint in woodshop(lap joint, butt joint, tenon joint, mortises joint, corner joint).

2. Prepare the detail drawing of aluminum Door.

- 2.1 Draw plan,elevation and section with all detail of Allumunum sliding door in suitable scale.
- 2.2 Draw plan,elevation and section with all detail of Allumunum swing door in suitable scale.

- 2.3 Draw plan, elevation and section with all detail of Aluminum fixed door in suitable scale.
- 2.4 Draw plan, elevation and section with all detail of hollow metal door in suitable scale.

3. Prepare the Aluminum window detail.

- 3.1 Draw plan, elevation and section with all detail of Aluminum sliding window in suitable scale.
- 3.2 Draw plan, elevation and section with all detail of Aluminum swing window in suitable scale.
- 3.3 Draw plan, elevation and section with all detail of Aluminum fixed window in suitable scale.
- 3.4 Draw plan, elevation and section with all detail of steel glazed window in suitable scale.
- 3.5 Draw plan, elevation and section with all detail of wooden glazed window in suitable scale.

4. Prepare the partition and wall finishes.

- 3.1 Draw plan, elevation and section with all detail of wooden partition wall.
- 3.2 Draw plan, elevation and section with all detail of Aluminum partition wall.
- 3.3 Draw plan, elevation and section with all detail of glass partition wall.
- 3.4 Draw plan, elevation and section with all detail of decorative masonry partition wall.
- 3.5 Draw plan, elevation and section with all detail of composite partition wall.
- 3.6 Draw all detail and of fitting, fixture of alcobond in wall and column.

5. Prepare the detail of floor.

- 5.1 Draw the detail of tile floor in different pattern.
- 5.2 Draw the detail of marble floor in different pattern.
- 5.3 Draw the detail of wooden floor in different pattern.
- 5.4 Draw the detail of PVC floor in different pattern.
- 5.5 Draw the detail of Decorative terrazzo floor in different pattern.

6. Prepare the suspended ceiling .

- 6.1 Draw the acoustical tile and lay-in-panel ceiling suspension system.
- 6.2 Draw the reflected ceiling of gypsum board and PVC board.
- 6.2 Draw the reflected ceiling of laminated board .
- 6.3 Draw the exposed grid and canceled spine suspended ceiling.
- 6.4 Draw the curved ceiling with recessed lighting and vaulted ceiling.

7. Prepare the lighting fixtures detail.

- 7.1 Sketch different types of floor lamps, table lamps, desk lamps and wall mounted lamps.
- 7.2 Sketch different types of residential valance lighting and down lighting.
- 7.3 Sketch different types of cove lighting detail.

- 7.4 Draw the different stair lighting system.
- 8. Prepare the wall cladding detail.**
- 8.1 Draw detail drawing of masonry wall cladding.
- 8.2 Draw detail drawing of Aluminum wall cladding.
- 8.3 Draw detail drawing of steel wall cladding.
- 9. Prepare the furniture hardware detail.**
- 9.1 Sketch different types of hinges.
- 9.2 Fix the hinge on a door/folding table.
- 9.3 Sketch different types of drawer runner.
- 9.4 Fix the drawer runner on a table/chests drawer.
- 9.5. Sketch the magnetic and spring catches bolts.
- 9.6 Sktch different types of shelf supports.
- 9.7. Sktch different types of nails,screws and bolts.
- 9.8 Sktch different types of handrial and lock.
- 10. Prepre working drawing of Kitchen Interior.**
- 10.1 Draw the plan of a kitchen .
- 10.2 Draw different side elevation of kitchen cabinet.
- 10.3 Draw diffenent section of kitchen cabinet.
- 10.4 Draw different type of Base cabinet/floor cabinet,wall cabinet details.

REFERENCE BOOKS:

1.Building construction illustrated-third edition

By-Francis D.K.Ching

2.A visual dictionary of Architecture

By-Francis D.K.Ching

3.Interior construction and detailing for Architects-

David Kent Ballast

4.Advanced Interior design detailing and construction document

Greg Hall

5. Time saver standard for Interior Design and space planning

Joseph de chiara ctal.

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 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; Masonry dam; Column; Moving loads; Thin Cylindrical shells.

DETAIL DESCRIPTION**Theory:****1 Understand shear force and bending moment of beams.**

- 1.1 State different type of loads on beam.
- 1.2 Mention different types of support condition.
- 1.3 Define point of contraflexure or inflection point.
- 1.4 Define dangerous section
- 1.5 Explain the relations between shear force and bending moment.
- 1.6 Characteristics of SF and BM diagrams.
- 1.7 Solve problems on SF and BM of cantilever beam with concentrated load, distributed load, inclined load, couples, pure moment and combined loads.
- 1.8 Solve problems on SF and BM of simply supported beam with concentrated load, distributed load, inclined load, couples, pure moment and combined loads.
- 1.9 Solve problems on SF and BM of overhanging beam with concentrated load, distributed load, inclined load, couples, pure moment and combined loads.
- 1.10 Solve problems on SF and BM diagram to loading diagram of cantilever, simply supported and overhanging beams.

2 Understand the bending (flexural) 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 bending stresses of circular, rectangular, I, T, L and hollow sections of beams.
- 2.7 Solve problems on section modulus 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 beam, RCC slab and steel trusses.
- 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.
- 4.10 Compute the maximum deflection for simply supported beam with unsymmetrical concentrated load.

5 Understand the importance of joints.

- 5.1 Define joint, pitch, back pitch and repeating section.
- 5.2 State the necessity of joints.
- 5.3 Mention the classification of joints.
- 5.4 State the meaning of efficiency of joints.
- 5.5 Explain the modes of failure and remedial measures of riveted joints.
- 5.6 Solve problems on simple lap joint subjected to axial load only.
- 5.7 Solve problems on butt joint subjected to axial load only.

6 Understand the significance of welded connections.

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

7 Understand the action of forces in frames.

- 7.1 Define the terms: truss, tie, strut, perfect, imperfect, deficient, redundant, web and chord member.
- 7.2 Mention different types of roof trusses and bridge trusses.
- 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, jib crane and howe truss with dead load by Analytical (joint and moment method) and 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 and suitable section 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 Express the derivation of 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 Rankine-Gordon formula.
- 9.7 Calculate the safe load on column using Rankine-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 beam.

11. Understand the concept of Thin Cylindrical Shells.

- 11.1 Introduction.
- 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 over hanging 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 over hanging beam.
- 4 Determine the bending stresses of circular, rectangular, I , T , L & hollow sections of beams and draw the diagrams.
- 5 Determine the shearing stresses of circular, rectangular, I , T , L & hollow sections of beams and draw the diagrams.
- 6 Determine the section modulus of circular, rectangular, I , T , L & hollow sections of beams and draw the diagrams.
- 7 Determine the section of homogeneous beam with respect to shearing stress and bending stress.
- 8 Determine the deflection of cantilever and simply supported homogeneous beam with respect to concentrated and distributed load.
- 9 Draw the neat sketches of different type of riveted joints and welded connections showing the mode of failures.
- 10 Determine the forces developed on the member of a truss graphically.
- 11 Prepare some models of different types of truss with suitable materials.
- 12 Determine the buckling load of both ends fixed homogeneous column.

REFERENCE BOOKS

2. 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

AIMS

- To enable to prepare block model.
- To provide skill in preparing various models.

SHORT DESCRIPTION

Preparing block model for geometrical prism; Preparing block model of the components of building; Preparing model of an umbrella, police shed, pen-stand, flower vase, staircase and tree.

DETAIL DESCRIPTION

- 1 Prepare a block model of cube and rectangular prism.**
 - 1.1 Select the model making board and other materials for making the model of cube and rectangular prism.
 - 1.2 Select the equipment & tools for making model of cube and rectangular prism.
 - 1.3 Layout and mark as per drawing on the board for making model of cube and rectangular prism.
 - 1.4 Cut the board as per marking.
 - 1.5 Rub the edge of board with sand paper.
 - 1.6 Glue on the required cut edges.
 - 1.7 Paste & assemble the cut pieces for preparing the model.
 - 1.8 Rub & smooth the joints of the model.
- 2 Prepare a block model of circular and triangular prism.**
 - 2.1 Select the model making board and other materials for making the model of circular and triangular prism.
 - 2.2 Select the equipment & tools for making model of circular and triangular prism.
 - 2.3 Layout and mark as per drawing on the board for making model of circular and triangular prism.
 - 2.4 Cut the board as per marking.
 - 2.5 Rub the edge of board with sand paper.
 - 2.6 Glue on the required cut edges.
 - 2.7 Paste & assemble the cut pieces for preparing the model.
 - 2.8 Rub & smooth the joints of the model.
- 3 Prepare a model of an umbrella.**
 - 3.1 Select the model making board and other materials for making the model of the umbrella.
 - 3.2 Select the equipment & tools for making the model of the umbrella.
 - 3.3 Layout and mark as per drawing on the board for making the model of an umbrella.
 - 3.4 Cut the board as per marking.
 - 3.5 Rub the edge of board with sand paper.
 - 3.6 Glue on the required cut edges.
 - 3.7 Paste & assemble the cut pieces for preparing the model.
 - 3.8 Rub & smooth the joints of the model.
- 4 Prepare a model of pen stand.**
 - 4.1 Select the model making board and other materials for making model of pen stand.
 - 4.2 Select the equipment & tools for making the model of pen stand.
 - 4.3 Layout and mark as per drawing on the board for making the model of a pen stand.
 - 4.4 Cut the board as per marking.

- 4.5 Rub the edge of board with sand paper.
- 4.6 Glue on the required cut edges.
- 4.7 Paste & assemble the cut pieces for preparing the model.
- 4.8 Rub & smooth the joints of the model.

5 Prepare the model of steps.

- 5.1 Select the model making board and other materials for making the model of step.
- 5.2 Select the equipment & tools for making the model of steps.
- 5.3 Layout and mark as per drawing on board for making the model of steps & cut the board as per marking.
- 5.4 Rub the edge of the board with sand paper.
- 5.5 Glue on the required cut edges.
- 5.6 Paste & assemble the cut pieces for preparing the model.
- 5.7 Rub & smooth the joints of the model.

6 Prepare the model of car.

- 6.1 Select the model making board and other materials for making the model of a car.
- 6.2 Select the equipment & tools for making model of a car.
- 6.3 Layout and mark as per drawing on board for making model of a car.
- 6.4 Cut the board as per marking.
- 6.5 Rub the edge of the board with sand paper.
- 6.6 Glue on the required cut edges.
- 6.7 Paste & assemble the cut pieces for preparing the model.
- 6.8 Rub & smooth the joints of the model.

7 Prepare the model of a tree.

- 7.1 Select the model making board and other materials for making the model of tree.
- 7.2 Select the equipment & tools for making the model of tree.
- 7.3 Cut different material for making the model of tree.
- 7.4 Build up the tree by using different materials.

8 Make a model of stair case used in two storied building with gratis board/plastic board.

- 8.1 Select the model making board & other materials for making the model of stair case.
- 8.2 Draw the development of the stair/steps on model making board according to scale.
- 8.3 Cut the board as per drawing.
- 8.4 Paste & assemble the cut pieces for preparing the model.

9 Prepare a model of pavilion used in different exhibition with model paper.

- 9.1 Select the model making board & other materials for making the model of pavilion.
- 9.2 Select the tools & equipment for making the model of pavilion.
- 9.3 Draw the development of the pavilion on model making board according to scale.
- 9.4 Cut the board as per drawing.
- 9.5 Paste & assemble the cut pieces for preparing the model.

10 Prepare detail model of a multi-storied / high rise building.

- 10.1 Select the model making board & other materials for making the model of a multistoried high rise building.
- 10.2 Draw the side development of the building on model making board according to scale & cut the board as per drawing.
- 10.3 Paste and assemble the cut pieces for preparing the model.
- 10.4 Paste & assemble the prepared model on the base with a beautiful Landscape & presentation.

11 Prepare a detail model of a Kitchen.

- 11.1 Select the model making board & other materials for making the model of the Kitchen.
- 11.2 Select the tools & equipment for making the model of pavilion.

- 11.3 Draw the development of the cabinet of the L-shaped or U-shaped kitchen & Cut the model paper as per drawing.
- 11.4 Paste and assemble the cut pieces for preparing the model.
- 11.5 Make the base & wall of the kitchen.
- 11.6 Paste and assemble the cabinet on the base & wall.

REFERENCE BOOK

1. Model Making- II.

By- Rezaul karin Robin. (Bangladesh Technical Education Board).

5840 ENVIRONMENTAL MANAGEMENT

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, ecosystems, global environmental issues, air pollution, water pollution, soil pollution, radioactive pollution, sound pollution, etc.
- To be able to understand the methods of controlling air pollution, water pollution and sound pollution.
- To be able to understand the management of waste, soil and pesticide pollution and
- To be able to understand the major environmental issues and problems in Bangladesh.

SHORT DESCRIPTION

Basic concepts of environment; Ecology & eco-systems; global environmental issues Air and atmospheric layers; Air pollution sources & effects; climate change, green house effect and depletion of ozone layer; Control of air pollution; Water pollution sources & effects; Monitoring of water pollution; Waste water treatment; Sound pollution and its control; Soil pollution and its management; Radioactive pollution and its control; Solid waste management; Major environmental issues and disaster management- Arsenic pollution; Pesticides pollution and its management, Environmental legislations and guidelines frame work and policy in Bangladesh.

DETAIL DESCRIPTION

1. Understand the basic concepts of environment.

- 1.1 Define: environment, Marine environment, Freshwater environment, Nutrients, Mangrove forest, Photo-chemical oxidant, Pollutant, Receptor, Sink, Pathways of pollutant, Speciation.
- 1.2 Mention the main components of environment.
- 1.3 Mention the functions of environment.
- 1.4 Describe natural environment, man-made environment and social environment.

2. Understand ecology and eco-systems.

- 2.1 Define ecology and eco-system.
- 2.2 Mention the range of tolerance in eco-system.
- 2.3 Explain the biotic and abiotic components of eco-system.
- 2.4 Explain briefly how does eco-system work.
- 2.5 Explain the stability of eco-system.
- 2.6 Explain the following ecological terms:
Food chain, Food web, Biodiversity, Biomass, Ecological pyramid, Pyramid of biomass, Pyramid of energy, Bio-concentration, Bio-magnification, Restoration ecology.
- 2.7 Narrate the following bio-geochemical cycles of eco-system.
 - a) Carbon cycle
 - b) Nitrogen cycle
 - c) Phosphorus cycle
 - d) Sulphur cycle.
 - e) Hydrologic cycle

2.8 Describe the following global environmental issues: Global environment, Earth and other environmental summits, climate change and ozone layer depletion.

3 Understand the air and the atmospheric regions.

3.1 Mention different layers of atmosphere.

3.2 Mention the average composition of the atmosphere at sea level.

3.3 Describe the chemical species and particulates present in the atmosphere.

3.4 Describe the importance ozone layer.

4 Understand the air pollution and its sources & effects.

4.1 Define air pollution.

4.2 Mention the composition of clean dry atmospheric air.

4.3 List the air pollutants.

4.4 Identify the sources of air pollutions.

4.5 List the green house gases.

4.6 Mention the effects of air pollution on human health, animals, plants and non-living things.

4.7 Explain the formation of photo-chemical smog and its effect.

4.8 List the disasters of major air pollution in the world mentioning location, causes and effects.

4.9 Explain the causes of acid rain and its effect on eco-system.

5 Understand the control of air pollution at the sources.

5.1 Mention the methods of air pollution control.

5.2 Describe the following devices: gravitational settling chamber, cyclone separator, wet scrubber, centrifugal scrubber, fabric filter, catalytic converter.

6 Understand the sources of water pollution and its effects.

6.1 Define water pollution.

6.2 Mention the specification of ideal water as per recommendation of the World Health Organization (WHO).

6.3 List the different types of water pollutants.

6.4 Describe the sources of water pollution.

6.5 Describe the effects of water pollution on human health, animal, plants and environment.

7 Understand the monitoring of water pollution.

7.1 Define the following terms:

(i) Dissolved oxygen (DO).

(ii) Biochemical oxygen demand (BOD).

(iii) Chemical oxygen demand (COD).

(iv) Total organic carbon (TOC).

(v) Threshold limit value (TLV).

7.2 Mention the method of determination of pH value of water.

7.3 Mention the method of determination of dissolved oxygen (DO) in a sample of water.

7.4 Mention the method of determination of biochemical oxygen demand (BOD) in a sample of water.

7.5 Mention the method of determination of chemical oxygen demand (COD) in a sample of water.

8 Understand the waste water treatment.

8.1 Define the primary treatment, secondary treatment and tertiary treatment of waste water.

8.2 Define the following terms; ETP, Oxidation pond, waste stabilization pond, trickling filter, Activated slug.

8.3 Mention the methods of primary and secondary treatment of industrial waste water.

- 9 Understand the sound pollution and its control.**
- 9.1 Define sound, sound wave and sound pollution.
 - 9.2 Mention the scale of measuring sound intensity.
 - 9.3 Mention the sources of sound pollution.
 - 9.4 Describe the effect of sound pollution on human health.
 - 9.5 Describe the methods of control of sound pollution.
- 10 Understand the soil pollution and its management.**
- 10.1 Define soil pollution.
 - 10.2 List the classification of soil pollution.
 - 10.3 Mention the sources of soil pollution.
 - 10.4 Describe the effect of soil pollution on human health.
- 11 Understand the radioactive pollution and its control.**
- 11.1 Define radioactive pollution.
 - 11.2 Mention the sources of radioactive pollution.
 - 11.3 List the causes of radioactive pollution.
 - 11.4 Explain the effect of radioactive pollution on human health.
 - 11.5 Describe the method of control of radioactive pollution.
- 12 Understand the solid waste management.**
- 12.1 Define solid waste.
 - 12.2 List the sources of solid waste.
 - 12.3 Mention the classification of solid waste.
 - 12.4 Mention the methods of collection of solid waste.
 - 12.5 Mention the waste management strategies in Bangladesh.
 - 12.6 Describe the recycling of solid wastes.
 - 12.7 Describe the potential method of disposal of solid waste.
- 13 Understand the major environmental issues in Bangladesh.**
- 13.1 List the major environmental issues in Bangladesh.
 - 13.2 Describe the following disaster management of Bangladesh flood, cyclone, tidal surge, Cyclone(SIDR, AILA, Nargis, Tsunami), landslide, earthquakes and salinity.
- 14 Understand the arsenic pollution in Bangladesh.**
- 14.1 Mention the arsenic pollution of water in Bangladesh.
 - 14.2 Explain the effects of arsenic pollution on human health.
 - 14.3 Describe the causes of arsenic in ground water.
- 15 Understand the pesticide pollution in Bangladesh and its management.**
- 15.1 Define pesticide.
 - 15.2 Make a list of pesticides.
 - 15.3 Mention the causes of pesticide pollution in Bangladesh.
 - 15.4 Describe the effect of pesticide pollution in the environment.
- 16 Understand the national environmental legislations and guidelines environmental frame work and policy in Bangladesh.**
- 16.1 Define, EA, EIA, IEA, NEMAP, DOE, BELA, GPS, GIS
 - 16.2 Mention environmental act and legislations prescribed for air and water quality.
 - 16.3 Describe environmental act prescribed for industries in Bangladesh.
 - 16.4 Describe the guide lines of environment prescribed for industries in Bangladesh.
 - 16.5 Describe the environmental frame work in Bangladesh.

REFERENCE BOOKS

১. পরিবেশ দূষণ (১ম ও ২য় খন্ড) – আবদুল মালেক ভূইয়া – গৌতম পাল
২. বিপন্ন পরিবেশ ও বাংলাদেশ – ডঃ এফ এম মনিরুজ্জামান
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7. Pollution control in process industries – S. P. Mahajan
8. Environmental Engineering – Peavy, Rowe and Techobanglous
9. Air pollution – V. P. Kudesia
10. Industrial Noise Control – Bruce Fader
11. Pesticide Pollution – Kudecsia and Charaya
12. Water Pollution – V. P. Kudesia
13. Peoples Report on Bangladesh Environment 2001
Atia Rahman, M. Ashraf Ali and Farooque Choudhury

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 the network , PERT, CPM & MBO
- To be able to perform the marketing.
- To be able to maintain inventory.

SHORT DESCRIPTION

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

1 Understand the 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.
- 1.6 State the activity level of industrial management from top personnel to workmen.
- 1.7 Describe the relation among administration, organization & management.
- 1.8 Define Production Management and functions of Production Management.
- 1.9 Explain the social responsibilities of management.

2 Understand the concept of scientific management.

- 2.1 Define scientific management.
- 2.2 Discuss the basic principles of scientific management.
- 2.3 Explain the different aspects of scientific management.
- 2.4 Discuss the advantages and disadvantages of scientific management.
- 2.5 Describe the difference between scientific management and traditional management.
- 2.6 Describe the following four periods of management thought:
 - (i) pre-scientific management.
 - (ii) scientific management.
 - (iii) human relations
 - (iv) refinement extension and synthesis of management theories and practices.

3 Understand the concepts of organization and organization structure.

- 3.1 Define management organization.
- 3.2 State the elements of management organization.
- 3.3 Discuss the types of organization structure
- 3.4 Describe different forms of organization structure.
- 3.5 Distinguish between line organization and line & staff organization.
- 3.6 Distinguish between line organization and functional organization.

3.7 Describe the feature advantages and disadvantages of different organization structure.

3.8 Define organizational chart.

3.9 Describe the different types of organizational chart.

4 Understand the basic concept of span of supervision.

4.1 Define span of supervision and optimum span of supervision.

4.2 Discuss the considering factors of optimum span of supervision.

4.3 Discuss advantages and disadvantages of optimum span of supervision.

4.4 Define delegation of authority.

4.5 Explain the principles of delegation of authority.

4.6 Explain the terms: authority, responsibility and duties.

5 Understand the concept of motivation.

5.1 Define motivation.

5.2 Discuss the importance of motivation.

5.3 Describe financial and non-financial factors of motivation.

5.4 State the motivation process or cycle.

5.5 Discuss the motivation theory of Maslows and Harzbergs.

5.6 Differentiate between theory-X and theory-Y.

5.7 Discuss the relation between motivation and morale.

6 Understand the concept of leadership.

6.1 Define leadership.

6.2 Discuss the importance and necessity of leadership.

6.3 Discuss the functions of leadership.

6.4 Identify the types of leadership.

6.5 Describe the qualities of a leader.

6.6 Distinguish between autocratic leader and democratic leader.

7 Understand the basic concepts and techniques of decision making.

7.1 Define decision making.

7.2 Discuss the importance and necessity of decision making.

7.3 Discuss different types of decision making .

7.4 Describe the steps in decision making.

8 Understand the concept of personnel management and human relation.

8.1 Define personnel management.

8.2 Discuss the importance of personnel management.

8.3 Discuss the functions of personnel management.

8.4 Define staffing.

8.6 Define recruitment and selection of employees.

8.7 Describe various sources of recruitment of employees.

8.8 Describe the various methods of selection of employees.

8.9 Discuss the advantages and disadvantages of internal sources of recruitment.

8.10 Discuss the disadvantages of external sources of recruitment.

8.11 Define training and orientation of employee.

8.12 Discuss the importance and necessity of training.

8.13 Discuss the various methods of training of workmen, technicians and executive personnel.

9. Understand the concept of inventory control

9.1 Define inventory.& inventory control.

9.2 Describe the function of inventory control.

- 9.3 Discuss the necessity and importance of inventory control.
- 9.4 Mention the advantages and disadvantages of inventory control.
- 9.5 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).
 - PERT
 - CPM
 - NETWORK
 - MBO

10 Understand the concept of economic lot size & break even analysis

- 10.1 Define economic lot size.
- 10.2 Discuss the effects of over supply and under supply.
- 10.3 Describe the method of determination of economic lot size.
- 10.4 Explain the terms :
- Safety stock
 - Determination of safety stock
 - Lead time
- 10.5 Define break even point and break even chart.
- 10.6 Explain the terms :
- Break even analysis.
 - Fixed cost.
 - Variable cost.
- 10.7 Discuss the importance of break even analysis.
- 10.8 Describe the method of preparing break even chart.
- 10.9 Describe different methods of break even analysis.
- 10.10 Draw break even chart in different method.
- 10.11 Mention the advantages and disadvantages of break even analysis.

11 Understand the concept of Marketing and inventory control

- 11.1 Define marketing.
- 11.2 Discuss the function of marketing.
- 11.3 State the objectives of marketing.
- 11.4 Explain the terms :
- Brand
 - Producer
 - Consumer
 - Customer
 - Copyright
 - Trade mark
- 11.5 Discuss product life-cycle and marketing strategies in different stages of a product life-cycle
- 11.6 Define purchasing
- 11.7 Describe the five “R” of purchasing principles

12 Understand the concept of trade union and industrial law

- 12.1 Define trade union.
- 12.2 Mention the objectives of trade union.
- 12.3 Discuss the function of trade union.
- 12.4 Describe different types of trade union.
- 12.5 Mention the names of major trade union in Bangladesh.
- 12.6 Define labour and industrial law.

12.7 Discuss the importance of labour and industrial law.

12.8 Explain the terms :

- Factory Act. (1965)
- Minimum Wage Act (1957).
- Industrial Disputes Act.
- Work Men Compensation Act.
- Trade Union Act.