

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

BUILDING CONSTRUCTION

(Code: 3335002)

Diploma Programme in which this course is offered	Semester in which offered
Architectural Assistantship	3rd Semester

1. RATIONALE

This course essentially imparts the knowledge of construction technology for construction of buildings and related components; at an introductory level. This course further introduces the student to interpret the drawings and get familiar with the functions and requirements of building components. The students will get an exposure to the general construction practices by undertaking site visits.

2. COMPETENCY (Programme Outcome according to NBA Terminology):

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competencies:

- i. Apply building construction principles and practices while planning buildings and supporting their construction.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	S/T	P	C	ESE	PA	ESE	PA	150
3	0	4	7	70	30	0	50	

Legends: L-Lecture; S/T- Tutorial/Teacher guided theory Practice – Studio; P - Practical; C – Credit; ESE - End Semester Examination; PA - Progressive Assessment

4. DETAILED COURSE CONTENT

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit – I Foundation	1a. Explain the concept and principle of foundation 1b. Prepare the sketches of different types of foundation	1.1 Definition of foundation 1.2 Purpose of foundation 1.3 Bearing Capacity of soil and its relevance to foundation 1.4 Classification of Foundation: 1.5 Shallow Foundation, Deep Foundation 1.6 Various types of foundation and its suitability, with sketches: 1.7 Spread footing 1.8 Stepped footing 1.9 Isolated and combined footing, 1.10 Raft foundation 1.11 Grillage foundation 1.12 Pile foundation (Types of piles based on Function only) 1.13 Causes of failure of foundation
Unit– II Masonry Construction	2a. Describe the main principles and features of Brick Masonry construction 2b. Describe the main principles & features of Stone Masonry construction 2c. Draw drawings showing of various types of bonds in brick masonry construction 2d. Prepare detail drawings of various types of joints in stone masonry construction 2e. Compare stone masonry & brick masonry in respect of their construction & use	2.1 Brick Masonry <ul style="list-style-type: none"> • Definition of the terms related to Brick Masonry- header, stretcher, bond, closer, frog, quoins, course, face, back, hearting, joint, bat, etc. • General principles to be followed in construction of brick masonry • Different types of Bonds: English Bond, Flemish Bond, Stretcher Bond, Header Bond, Racking Bond, Zigzag Bond, Garden Wall Bond • Plan and Elevation of above bonds. • Comparison of English Bond with Flemish Bond • Various types of junctions in Brick Masonry 2.2 Stone Masonry <ul style="list-style-type: none"> • Terms related to Stone Masonry • Joints in stone masonry: Butt Joint, Rebated Joint, Rusticated Joint, Dowel Joint • Types of Stone Masonry Rubble Masonry: Coursed Rubble, Uncoursed Rubble, Random Rubble, Dry Rubble Ashlar Masonry 2.3 Comparison between Brick Masonry and Stone Masonry

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit – III Openings	3a. Explain the function of different types openings like lintels, arches, doors, windows and ventilators 3b. Describe the types of different kinds of openings with sketches with their limitation.	3a. Lintels: Functions and types of lintels 3b. Arches: Functions and types of Arches, Technical terms related to arches 3c. Doors: Functions and types of doors 3d. Windows: Functions and types of windows 3e. Ventilators: Functions and types of ventilators Limitations with regard to openings.
Unit – IV Staircase	4a. Identify the different components of stairs 4b. Enlist the various materials used in the construction of stairs. 4c. Classify the different types of	4.1. Definition of staircase 4.2. Technical terms related to stairs 4.3. Various materials used for stairs 4.4. Types of stairs
Unit – V R.C.C. Construction	5a. Describe the main principles and advantage of R.C.C. Construction 5b. Explain the different purposes of formwork 5c. Explain the function of various types of supports used in framework.	5.1 Definition of R.C.C. 5.2 Properties of R.C.C. 5.3 Advantages of R.C.C. 5.4 Causes of failure of R.C.C. 5.5 Temporary Supports: 5.6 Formwork: Definition of Formwork, Requirements of Formwork, Materials used in Formwork, Types of Formwork, Removal of Formwork
Unit – VI Sloping Roof	6a. Identify the various components of ‘sloping roof’. 6b. Classify roofs of different types . 6c. Describe the features of steel sloping roof truss	6.1. Technical terms related to sloping roof 6.2. Classification of roof 6.3. Composite roof trusses 6.4. Steel sloping roof truss 6.5. Advantages of steel truss over timber sloping roof

5. SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Foundation	6	2	4	4	10
II	Masonry Construction	9	2	4	8	14
III	Openings	9	4	4	6	14
IV	Staircase	4	2	2	4	08
V	R.C.C. Construction	8	4	8	2	14
VI	Sloping Roof	6	2	6	2	10
	Total	42	16	28	26	70

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom’s revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

6. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (**Course Outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of **Programme Outcomes/Course Outcomes in affective domain** as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.

6A. Suggested List of Drawing Sheets to be drawn (Total 28 Hours)

S. No.	Unit No.	Practical/ Exercises (Drawing sheets)	Approx Hours Required
1	I	One sheet on Foundation	2
2	II	Two sheets on Masonry Construction	6
3	III	Two sheets on Openings	6
4	IV	One sheet on Staircase	2
5	V	Two sheets on R.C.C. Construction	6
6	VI	Two sheets on Sloping Roof	6
TOTAL			28

6B. Suggested List of Field Work/Site Visit (Total hours: 28)

The students will visit a nearby construction site at various stages of construction and observe the following (If each visit requires 4 hours, they may make 7 visits alternate week in the semester of 14 weeks):

- Technical aspects involved in workmanship
- Safety precautions to be taken at construction site
- Exposure to Brick Masonry work and Stone Masonry work
- Process of concrete mixing
- Erection and removal of form work, centering/shuttering
- Prepare a brief report on construction activities observed and methods, tools, equipment and materials being used.

Students should submit the report of the visits, with description of the activities and the sketches/drawings of different structures seen.

7. SUGGESTED LIST OF STUDENT ACTIVITIES

Student activities like: site visits, visit to engineering materials exhibitions, attending course/topic based seminars, internet based assignments, course/library/internet/lab based Mini-Projects, etc. These could be individual or group-based. Teachers need to identify, plan & facilitate student activities.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

Teachers should accompany students on visits to sites and explain them about construction procedures, materials and steps to be followed for quality construction

9. SUGGESTED LEARNING RESOURCES

A. List of Books

Sr. No.	Title of Book/Journals	Author	Publication
1.	Building Construction	S.P. Arora, S. P. Bindra	Dhanpat Rai Publication
2.	Building Construction (Vol. 1 to 5)	Barry	Wiley Publications
3.	Building Construction	B.C. Punmia	Laxmi Publications Limited
4.	Building Construction (Vol. 1 to 4)	W.B. McKay	Pearson Publication

B. List of Major Equipment/ Instrument

Models for following: For various foundations, bonds in brickwork, different types of stairs, formwork, etc.

C. List of Software/Learning Websites

- a. <http://www.constructionknowledge.net/>
- b. <http://houseconstructiontips.com/>

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. Sonal M. Jain**, Lecturer in Civil Engineering, Govt. Polytechnic, Vandagar
- **Prof. Abhijit R. Rathod**, Lecturer in Architecture, Govt. Girls Polytechnic, Ahmedabad

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. A. K. Jain**, Professor Department of Civil & Environment Engineering
- **Dr. V. H. Radhakrishnan**, Professor Department of Civil and Environment Engineering