Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2019-2020
Course Handout Part II

Date: **06-01-2020**

In addition to part -I (General Handout for all courses appended to the timetable), this portion gives further specific details regarding the course.

Course No.	:	**CE F242**
Course Title	:	**Construction Planning and Technology**
Instructor-in-charge (IC)	:	**A VASAN**
Instructors	:	**Surya Prakash CH, Sheik Mohammed Zoheb Nawaz**

1. Scope and Objective of the Course:

Any civil engineering project needs meticulous planning to achieve time bound completion without compromising on the designed safety, durability constraints and cost overrun. An engineer managing such projects should be acquainted with topics other than regular subjects based on mechanics. These include systematic approaches in project planning and its implementation, procurement and contract management, estimation and rate analysis, innovative and new methods in construction technology. This course is an introduction to the above with current planning and control techniques within the context of Indian construction industries with insights to better practices followed elsewhere.

Course Outcomes: After successful completion of this course, the student will be able to:

CO1. Identify and assess the building types, their construction practices and adopt guidelines/ standards relevant to them
CO2. Design proper vertical transportation systems in line with the requirements of any building
CO3. Prepare a detailed plan, elevation, 3D rendered model using Autodesk Revit Architecture and estimate for a given structure
CO4. Plan and schedule a project for efficient working and timely completion of projects with optimal utilization of resources

Student Learning Outcomes (SLOs) assessed in this course – **(a), (b), (c), (e), (f), (g), (h), (j),** and **(k).**

2. Text Books:

T1 Punmia, B C. Building Construction. New Delhi: Laxmi Publication, 2008.

References:

R01 Arora, S P, and S P Bindra. A textbook of Building construction. Fifth Edition, New Delhi, Dhanpatrai publications, 2010.

R02 Dutta, B N. Estimating and Costing in Civil Engineering. 28th Edition, New Delhi, UBS, 2016.

R03 Relevant B.I.S Codes including National Building code of India.

3. Lecture wise Course Plan:

Lecture No.	Topics Covered	Learning Objectives	Chapter in the Text Book	SLO
1	Introduction and Overview	Course objectives and outline	-	
2-4	Principal components of a building system and their inter relationships	List and describe the types of buildings Identify the requirements of a building and its components Analyse the interrelationships between various components	T1 (1)	(a), (c)
5-7	Principal building system as affected by environmental, legal (Functional requirements and Development control rules), material, and industrial constraints	Study Climate Oriented design Choose appropriate building materials for various purposes Describe Functional planning, planning regulations and bylaws Identify important clauses in National building code	T1 (1, 31)	(a), (h), (k), (j)
8-11	Substructure - Foundation systems	Study setting out and excavations List and explain various types of foundations, their choice, failure and remedial measures Describe construction procedure of pile foundations, Identify pile construction problems, causes and suggest remediation	T1 (1, 2, 3)	(a), (c), (e)
12-17	Superstructure – Building envelope	Study Masonry construction List and explain the types of Walls and their construction Define Fenestrations Study the types and properties of Floors and Roofs and explain their construction methods Identify the various types of finishes	T1 (5-12; 15, 17)	(a), (c)
18-21	Access structures, Building services, Other protective systems	Study the various vertical transportation systems-stairs and their types Identify and explain the procedures and materials involved in plumbing and damp proofing Describe Formwork and explain its importance Explain: Shoring, underpinning and scaffolding	T1 (14,18-23, 26, 30)	(c)
22-26	Estimating and Costing; Valuation	Identify the raw materials (cement, aggregates, steel, wood and others) needed for a construction project and quantify the amounts of each raw material as per design. Estimate the cost of the quantities and prepare a budget based on	R02	(a), (b), (d)

		costing. Explain valuation of a building and identify the various kinds of values		
27-28	Contracts	Prepare a contract for a construction project with all required details. Prepare a tender for a construction project with necessary details Identify the clauses that are important while drawing a contract.	R02	(f), (g), (j)
29-30	Introduction to planning and scheduling of projects	Describe the tasks and steps necessary to plan and schedule the activities in a project. Define and form a planning and scheduling (project management) framework Define project activities Identify the resources that will be required for the particular project.	T1 (29)	(a), (h), (k)
31-36	Construction project network analysis	Construct a bar chart for network analysis of a particular project Study CPM and PERT; LOB; Precedence networks; network crashing and time cost trade off	T1 (29)	(a), (c), (e)
37-38	Resource allocation and levelling	Identify the types of resources required for a civil engineering construction. Analyse various allocation methods and arrive at the most effective and economical manner of resource allocation. Identify the differences between resource allocation & resource levelling	Class Notes	(a), (c), (e)
39	Engineering economy and cost benefit analysis of project	Identify and study the various types of construction costs: direct and indirect costs	Class Notes	(a), (c)
40-41	Development of model based planning, control and reviewing civil engineering construction	Study in detail about how technology and software (Building Information modelling) aids in better planning and control of building construction works	Class Notes	(a), (b), (e), (k)
42	Construction safety and health; acts and management	Study the basic construction safety regulations and guidelines & its aspects	Class Notes	(c), (f)

***Student Learning Outcomes (SLOs):**

SLOs are outcomes (a) through (k) plus any additional outcomes that may be articulated by the program.

(a) an ability to apply knowledge of mathematics, science and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

4. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Midsem Test	90 min	25	4/3, 1.30 -3.00 PM	Closed
Assignments (5 Nos)	Continuous	15	-	Open
Project (2 Reviews)	Continuous	15	-	Open
Surprise Quiz in Lecture & Tutorial (At least 15)*	Continuous	15	-	Open
Comprehensive Exam	180 min	30	08/05 FN	Closed

* *Best (n-2) would be considered. n is the total number of surprise quizzes conducted.*

5. Chamber Consultation Hour: Tuesday 04.30 PM – 05.30 PM

6. Make up Policy: Prior permission for all make ups are a must.

7. Notices: Notices concerning this course will be uploaded on Google Classroom Page for this course.

8. Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE