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**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:

1. Identify and assess the building types, their construction practices and adopt guidelines/ standards relevant to them
2. Design proper vertical transportation systems in line with the requirements of any building
3. Prepare a detailed plan, elevation, 3D rendered model using Autodesk Revit Architecture and estimate for a given structure
4. 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:

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

**References:**

1. Arora, S P, and S P Bindra. A textbook of Building construction. Fifth Edition, New Delhi, Dhanpatrai publications, 2010.
2. Dutta, B N. Estimating and Costing in Civil Engineering. 28th Edition, New Delhi, UBS, 2016.
3. 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 costing.  Explain valuation of a building and identify the various kinds of values | R02 | (a), (b), (d) |
| 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.

1. an ability to apply knowledge of mathematics, science and engineering
2. an ability to design and conduct experiments, as well as to analyze and interpret data
3. 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
4. an ability to function on multidisciplinary teams
5. an ability to identify, formulate, and solve engineering problems
6. an understanding of professional and ethical responsibility
7. an ability to communicate effectively
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. a recognition of the need for, and an ability to engage in life-long learning
10. a knowledge of contemporary issues
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## 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.*

## Chamber Consultation Hour: Tuesday 04.30 PM – 05.30 PM

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

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

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## 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**