

# Construction Engineering

<b>Course Code</b> CE-375	<b>Credit Hours</b> 3-0
------------------------------	----------------------------

## Course Description

Civil engineering construction requires professional supervision of different skills and equipment to bring the design to life. Construction engineering encompasses building skills and types and supervision requirements for structural elements and services. Construction machines occupy the centre stage of construction activities which are accomplished by men in the intimate company of machines. The course offered focuses on site preparation, setting out works and type and foundation layout. It covers various building envelope elements and their construction technologies. It encompasses finishing and decorative works and building services planning and execution. It provides background knowledge for employment, planning and integration of construction machine in construction activities. These will enable students to select skills for implementing different elements and integrate machines to deliver various construction elements in appropriate time frame.

## Text Book:

1. Douglas ,D. G. Calin M. P. and Richard, C. R. ( 2006 ). Construction Equipment Management for Engineers, Estimators and Owners. Taylors and Francis Ltd.
2. Peurofy, R. L. and Schexnayder, C. J. ( 2007 ). Construction Planning, Equipment and Methods. McGraw-Hill Inc.
3. Nunnally. S. W. Managing Construction Equipment 2<sup>nd</sup> edit. Prentice Hall New Jersey
4. Mehta, Scarborough and Armpriest . Building Construction, Principles, materials and Systems, Prentice Hall.
5. Allen and Iano. Fundamental of Building Construction. John Wiley & Sons, Inc.
6. Chudley and Greeno. Building Construction Handbook. Butterworth Elsevier.
7. Merritt and Ricketts Building Design and Construction Handbook;; McDraw-Hill.
8. Ching, Building Construction Illustrated, John Wiley & Sons, Inc.
9. Chudley and Greeno, Construction Technology, Pearson.
10. Uniform building Code.
11. Pakistan Building Code

**Reference Book:**

**Prerequisites:**

Nil.

**ASSESSMENT SYSTEM FOR THEORY**

	<b>Without Project (%)</b>	<b>With Project/Complex Engineering Problems (%)</b>
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

**ASSESSMENT SYSTEM FOR LAB**

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

**Teaching Plan**

<b>Week No</b>	<b>Topics/Learning Outcomes</b>
1	<b>Construction Industry</b> Introduction to Construction Projects and Categories. Types of Civil Engineering Structures, Building Permits, Codes and Construction Standards.
2-3	<b>Theory</b> Define the project's purpose and objectives. Perform a feasibility study to assess project viability. <b>(Topics Added)</b>
4-5	<b>Site Preparations</b> Stages of Construction, Site Selection and Orientation of Buildings, Preliminary Site Investigations and Clearance, Setting & Layout of Works, Role of Site Engineers, Initial Checks on Drawings <b>(Topics Added)</b>
6	<b>Excavations</b> Excavation and Related Aspects: (a) Methodologies in different types of soils, (b) Stability of Excavations. Safety Precautions and Solution of Particular Problems arising out of condition of Sub-Soil at Site. Protection of adjacent Structures and Water Proofing. Termite Proofing Techniques.
7	<b><u>Sub-Structures</u></b>

	<p>Understanding the Geotech Report, Compaction Criteria of Soils for Bldgs and Rds, Backfill Specs. Foundations: Method of Construction for different types of footings, Piling Works, Use of Sulphate Cement.</p> <p><b>(OHT-1)</b></p> <p><b>(Topics Added)</b></p>
8	<p><b>Masonry Construction</b></p> <p>Brick, Stone &amp; Block Masonry, Type of Bonds, Types of Mortars, Masonry in Seismic Zones, Construction Methodology, Quality Control Measures, Damp Proof Courses, Plinth Protection and Pointing and Plaster. Crew Size.</p> <p><b>(Topic Added)</b></p>
9	<p><b>Wood Works</b></p> <p>Types of Wood, Seasoning Procedures, Types of Doors, Windows &amp; Floors, Fitting / Fixtures and Hardware, Quality Control Measures.</p> <p><b>Finishing Works</b></p> <p>Paint, Distemper, Weather Shield, Tiling, Marble, Metal Finishing Works etc.</p>
10	<p><b><u>Roof Insulation</u></b></p> <p>Types, Techniques and Quality Issues</p> <p><b><u>Services</u></b></p> <p>Construction Requirements and Methods of laying sewers, sui gas plumbing, water supply and drainage systems.</p>
11	<p><b>Temporary Works</b></p> <p>Overview of Temporary Structures, Types and Uses of Formwork for various Building Units/ members, Stripping Times, Safety Precautions.</p>
12	<p><b>Structural Construction</b></p> <p>Reinforced Concrete Frame Construction such as columns, beams, slab, roof, pre-stressed concreting. Methods of concreting vertical and horizontal members, including mechanized placement, ready mix concrete, under water concreting, short concreting. CMD and Timelines, Curing, Concrete pouring machinery and Quality Control Measures. Overview of Construction Aspects of Infrastructure Engineering Projects</p> <p><b>(Topics Added).</b></p>
13	<p><b>Reinforcement</b></p> <p>Steel fixing practice, understanding test results and requirements, Standard reinforcement detailing techniques, Overview of Steel Construction.</p>

14	<p><b>Overview of Construction Aspects of Infrastructure Engineering Projects:</b> Pavements - Introduction to Types, Typical Sections and Materials, Methodology for Construction and Repair, Quality Control Measures and Tests requirements, Understanding JMF, Construction Joints.</p> <p><b>(Topics Added)</b></p>
15	<p><b>Inspection Checklists</b></p> <p>General checks for Works, Buildings, Roads, Drains, Water Supply and Sewerage. Inspection Report on Quality Control for Projects.</p>
16	<p><b>Construction Equipment</b></p> <p>Types of construction equipment, Productivity estimation for different heavy equipment, Construction equipment economics for analysis of owning and operating costs. Introduction to Concrete and Asphalt plants, compactors, mixing machines.</p> <p><b>Visit</b></p> <p>Visit to TTT Bn (MT-park) for demonstration of different construction machinery.</p>
17	<b>End Semester Exam</b>
18	<b>End Semester Exam</b>

**Practical:** Nil.