Program : **Diploma in Civil Engineering**	
Course Code : **5018**	Course Title: **Structural Engineering Drawing Lab**
Semester : **5**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3** (**L:0, T:0, P:3**)	Periods per semester: **45**

Course Objectives:

- To provide hands-on experience with the basic concepts in structural engineering.
- To apply the collection of sectional requirements to detailing and prepare the bar bending schedule of different RCC structural members.

Course Prerequisites:

Topic	Course code	Course name	Semester
Basic knowledge of different building materials & methods of construction		Building Construction & Construction Materials	3
Basic concepts of theory of Structures		Theory of structures	3
Basic concepts of building drawing		Building Drawing	3

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	To illustrate the concept of limit state design and detailing of RCC beams and slabs.	11	Applying
CO2	To illustrate the concept of limit state design and detailing of RCC columns, footings and stairs.	16	Applying
CO3	To illustrate the concept of limit state design and detailing of tension and compression steel members.	14	Applying
	Lab Tests	4	

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			3			
CO2	3			3			
CO3	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**To illustrate the concept of limit state design and detailing of RCC beams and slabs.**		
M1.01	Sketch cross section, strain diagram & stress diagram for singly reinforced section.	1	Understanding
M1.02	Sketch cross section, strain diagram & stress diagram for doubly reinforced section.	1	Understanding
M1.03	Determine the sectional properties and sketch the detailing of a singly reinforced beam and prepare bar bending schedule.	3	Applying
M1.04	Determine the sectional properties and sketch the detailing of a one-way slab and prepare bar bending schedule.	3	Applying
M1.05	Sketch the reinforcement details of a two-way slab, corners held down and not held down and prepare bar bending schedule.	3	Applying
CO2	**To illustrate the concept of limit state design and detailing of RCC columns, footings and stairs.**		
M2.01	Summarize the provisions of IS 456 required for the design of a column.	1	Understanding
M2.02	Sketch the reinforcement detailing of the circular and square column and prepare bar bending schedule.	3	Understanding
M2.03	Determine the sectional properties and sketch the detailing of an isolated column footing and prepare bar bending schedule.	3	Understanding

M2.04	Draw sketches of the plan and longitudinal section - Staircase - dog legged and open well showing all the details and dimensions (A typical structural drawing may be adopted.)	3	Understanding
M2.05	Prepare a detailed report of site visit for reinforcement detailing of structural elements like beams, columns, staircase & footing and prepare bar bending schedule.	3	Applying
M2.06	Sketch the detailing of a cantilever retaining wall and prepare its bar bending schedule.	3	Understanding
	Lab Test - I	2	
CO3	**To illustrate the concept of limit state design and detailing of tension and compression steel members.**		
M3.01	Summarize the clauses from IS 800 required for the design of a compression member and submit it in report form.	1	Applying
M3.02	Sketch the single & double lacing of given built up columns.	3	Understanding
M3.03	Sketch the battening of the given built up column.	2	Understanding
M3.04	Prepare a report on the IS 800 provisions pertaining to design of lacing & battening.	1	Applying
M3.05	Sketch the elevation and cross-section of a plate girder	3	Understanding
M3.06	Sketch the beam – column connection.	2	Understanding
M3.07	Sketch the elevation and plan of a Gusseted base of a column.	2	Understanding
	Lab Test - II	2	

Text / Reference:

T/R	Book Title/Author
T1	Shah, V. L., and Gore, V., Limit State Design of Steel Structures, Structures Publications, Pune.
R2	Dayarathnam, P., Design of Steel Structures, S. Chand and Company, Delhi.
R3	Subramanian N., Design of Steel Structures, Oxford University Press.
R4	Sairam, K.S., Design of Steel Structures, Pearson Publication, Chennai, Delhi.
R5	Shah, V. L., and Karve, S.R., Limit State Theory and Design of Reinforced Concrete Structures, Structures Publications, Pune,2014.
R6	Sinha N.C., and Roy S.K., Fundamentals of Reinforced Concrete, S. Chand & Co., New Delhi.
R7	Krishna Raju, and N.Pranesh, R.N., Reinforced Concrete Design Principles and Practice, New Age International, Mumbai.

Online Resources:

Sl.No	Website Link
1	https://nptelvideos.com/course.php?id=294
2	https://www.nptel.ac.in/courses/105105105/
3	nptel.ac.in/courses/105106112
4	https://www.nptel.ac.in/noc/courses/noc19/SEM2/noc19-ce25/