

## ADVANCE DESIGN OF STRUCTURES

**Paper Code: ETEN-310**

**Paper: Advance Design of Structures**

<b>L</b>	<b>T/P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>3</b>

**INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

*Objective: To provide knowledge and competence in the application of advanced structural analysis and design based on knowledge and understanding of forces including seismic and wind forces and their application to civil engineering and Environmental Engineering structures such as water tanks, chimneys etc.*

### **UNIT – I**

**Introduction to Seismic design:** General principles of seismic design, Review of IS 1893: 2002, Load combinations and permissible stresses, Guidelines for earthquake resistant design, Ductile detailing for seismic design, Analysis of wind forces, Codal provisions.

**Concrete structure design:** Design of rectangular/circular water tanks on ground level/underground.

**[T1, T2][No. of Hours: 11]**

### **UNIT – II**

**Prestressed concrete:** Needs for prestressing, Methods of prestressing; Concept of load balancing, losses of prestress, Design of simple beams.

**[T1, T2][No. of Hours: 10]**

### **UNIT – III**

**Steel structure design:** Analysis and design of Riveted and Welded connections, Code requirements, Design and analysis of tension and compression members, Column bases and foundations, Roof trusses.

**[T1, T2][No. of Hours: 12]**

### **UNIT – IV**

**Water tanks and Chimneys:** Design of elevated rectangular/circular water tanks and design of staging, Design of chimney.

**[T1, T2][No. of Hours: 12]**

### **Text Books:**

[T1] Sinha S.N., “Reinforced Concrete Design”, Tata McGraw Hill Education (P) Ltd., New Delhi.

[T2] Raju N.K., “Prestressed Concrete”, Tata McGraw Hill Education (P) Ltd., New Delhi.

### **Reference Books:**

[R1] Gambhir M.L., “Design of Reinforced Concrete Structures”, PHI Learning (P) Ltd., New Delhi.

[R2] Jain A.K., “Limit State Design of Reinforced Concrete Structures”, Nem Chand Publishers, Roorkee.

[R3] Raju N.K., “Reinforced Concrete”, New Age International (P) Ltd., New Delhi.

[R4] Varghese P.C., “Limit State Design of Reinforced Concrete”, PHI Learning (P) Ltd., New Delhi.

[R5] Pillai S.U., “Reinforced Concrete Design”, Tata McGraw Hill Education (P) Ltd., New Delhi.

[R6] Duggal S.K., “Design of Steel Structures”, Tata McGraw Hill Education (P) Ltd., New Delhi.

[R7] Negi L.S., “Design of Steel Structures”, Tata McGraw Hill Education (P) Ltd., New Delhi.