

NIRMA UNIVERSITY
Institute of Technology
School of Engineering
Master of Technology - Civil Engineering
(Computer Aided Structural Analysis and Design)
Semester- I

L	T	P	C
3	0	2	4

Course Code	6CL104
Course Name	Design of Steel Structures

Course Outcomes:

At the end of the course, students will be able to -

1. apply plastic method for design of beams and frame
2. evaluate the critical load on beam and column using stability criteria
3. analyze and design castellated beam and industrial shed
4. analyze and design multi-storey building and bridge.

Syllabus:

Teaching hours: 45

Unit-1: Methods of Design

Hours: 05

Review of design methods such as allowable stress design, plastic design method & load and resistance factor design, Plastic design of continuous beam and portal frames.

Unit-2: Stability of Beam and Column

Hours: 06

Local buckling of compression flange and web, Lateral torsional buckling, Slenderness ratio, Bracing of column.

Unit-3: Design of Connection

Hours: 06

Beam to beam, Beam to column, Column to foundation etc.

Unit-4: Multi-storey Building

Hours: 06

Design of steel and steel-concrete composite elements.

Unit-5: Bridge

Hours: 06

Estimation of load and load combinations, Design of various elements.

Unit-6: Industrial Shed

Hours: 06

Estimation of load and load combinations, Shielding effect, Design of truss and other members.

Unit-7: Castellated Beam

Hours: 05

Advantages, Application, Design specification, Design of various components.

Unit-8: Advancements in Steel Design

Hours: 05

Use of cold-formed sections, Hollow-steel sections, Pre-engineered Buildings.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work comprises of analyse and design of following:

1. Multi storeyed structures
2. Bridge

The design report shall contain details of planning, modelling, analysis, design, reference and all necessary drawing in the form of neat dimension sketches drawn to scale.

Suggested Readings:

1. Subramanian, N. *Design of Steel Structures: Theory and Practice*, Oxford University Press.
2. Gambhir, M. L. *Fundamentals of Structural Steel Design*, McGraw Hill Education.
3. Shah, V. L. & Gore, V. *Limit State Design of Steel Structures IS:800-2007*, Structures Publication.
4. Shiyekar, M. R. *Limit State Design in Structural Steel*, PHI Learning.
5. Duggal, S. K. *Limit State Design of Steel Structures*, Tata McGraw Hill.
6. Bhavikatti, S. S. *Design of Steel Structures by Limit State Methods as Per IS 800-2007*, IK International Publishing House.
7. Codes: IS:800, IS:875, SP:6.

L= Lecture, T= Tutorial, P= Practical, C= Credit

w.e.f. academic year 2019-20 and onwards