UNIT - I

1. Steel as a structural material, various grades of structural steel, properties, various rolled steel sections (including cold formed sections, structural pipe (tube) sections) and their properties. Introduction to I.S. 800,808,816,875 etc. (8)

2. Design of axially loaded members : (a) Tension members, (b) Compression members (9)

3. Design of roof truss : Load assessment for DL, LL and WL. (6)

UNIT - II

4. Design of simple built up beams : Laterally restrained and unrestrained, (symmetrical as well as unsymmetrical section). Curtailment of flange plates. (10)

SECTION B

UNIT - III

5. Design of welded plate girder, concept of gantry girder. (8)

6. Design of single rolled steel section column subjected to axial load and biaxial moment including base design (8)

7. Design of axially loaded built up columns. Laced and battened (Column bases slab base gusseted base moment resistant bases) (9)

UNIT - IV

8. Structural Fasteners :

A) Behavior of bolted and welded connections (types, Designations, properties, permissible stresses), failure of bolted and welded joints. Strength of bolt and strength of weld. Efficiency of joints. Design of simple bolted and welded connections. Moment resistant bolted and welded connection. (bending and torsion) (6)

B) Design of connection Beam to beam, beam to column-framed connection.

Term Work

Minimum two design assignments based on above topics along with the detailed structural drawings on A2 size sheets.

Practical Examination shall be based on the above Practical work.
SECTION – A

UNIT - I
1. General Aspects of Environmental Engineering – System of collection and conveyance of sewage – separate and combined systems, patterns of sewage collection systems. Quantity of storm water and sanitary wastewater sewer. Types, Shapes, Hydraulic Design (Capacity, Size, Grade, etc.) (8)

UNIT - II

UNIT - III
3. Physical and chemical characteristics of wastewater, significance of BOD, COD, BOD rate constant, Sewage treatment flow sheet, site selection for sewage treatment plant Preliminary and primary treatment – Screens, Grit chambers, Primary settling tank (including simple design) (8)

SECTION – B

UNIT - IV

UNIT - V
5. Rural sanitation – Pit privy, aqua privy, bio-gas recovery. Septic tank including soak pit, (including design problem) Sullage collection and disposal. (5)

6. Industrial Waste Water Treatment – Significance of Industrial Waste Water Treatment, important physical – Significance of Industrial Waste Water Treatment, important physical and chemical parameters, unit operations and treatment processes (flow equalization, neutralization, adsorption, chemical and biological treatment etc.) (5)

UNIT - VI
7. Introduction to air pollution Sources of air pollution an its classification III-effects of air pollutants on man, animal & materials Metrological parameters Methods of air pollution control. (8)

Reference Books :
UNIT – I Tacheometric Surveying (8)
Classification, principle of stadia method, theory of Anallatic lens, distance and elevation formulae, tangential method, errors in stadia surveying.

UNIT – I Simple, Compound, Reverse Curves, Vertical Curves (8)
a) Simple Curves: Elements of simple curves, methods of Curve ranging obstacles in setting out curves. (4)
b) Compound Curves: Elements of compound Curves, setting out the curve. (1)
c) Reverse Curves: Elements of vertical curves, types, tangent correction, location of highest or lowest point. (1)
d) Vertical Curves: Elements of vertical curves, types, tangent correction, location of highest or lowest point. (2)

UNIT – III Transition Curves (8)
Elements of transition curves, superelevation, length of transition curve, Ideal transition curve, characteristics of transition curve, setting out the transition curve.

SECTION-B

UNIT – IV Geodetic Surveying and Triangulation Adjustment (10)
a) Geodetic Surveying: Classification of triangulation survey, intervisibility of stations, field work, reduction to centre, base line measurement, corrections. (7)
b) Triangulation Adjustment: Definitions, weighted observations, laws of weights, station adjustment, figure adjustment (triangle only) (3)

UNIT – V Photographic Surveying (8)
Basic definitions, terrestrial and aerial photography, tilt and height displacements, heights from parallax measurements, flight planning, study of phototheodolite and stereoscope.

UNIT – VI A (8)
a) Astronomy: Elements of spherical trigonometry, Napler’s rule of circular parts, celestial sphere, astronomical terms. (2)
b) Remote Sensing: Introduction, definitions, Remote sensing systems, advantages over conventional system energy Interaction in the atmosphere, Indian remote sensing satellite series and their characteristics (3)
c) GIS & GPS: Components of geographical information system (GIS), advantages, function of GIS, Raster and vector data, advantages and disadvantages, global positioning system, (GPS), Introduction, definitions, GPS receivers, antenna, advantages of GPS.
LIST OF PRACTICAL:
A) PRACTICALS: Any five Practical out of following:

1) Determination of constants of Tacheometer.
2) Determination of elevation of points by Tacheometric surveying.
3) Determination of elevation of points and horizontal distance between them by Tacheometrical survey.
4) Determination of gradient of given length of road by Tacheometric survey.
5) Setting out of simple circular curve by offsets from chord produced method.
6) Setting out of simple circular curve by Rankine method of tangential angle.
7) Setting out of simple transition curve by tangential angle method.
8) Study of stereoscope.

B) SURVEY CAMP: On any of the following topics for minimum three days.

1) Road Project
2) Irrigation Project
3) Water Supply Project

Reference Books:

1) Surveying & Levelling by B.C. Punmia (Vol. 2 & Vol. 3)
2) Surveying & Levelling by Kanastkar & Kulkarni (Vol. 2)
3) Remote sensing & G.I.S. by Dr. M. Anjli Raddy
UNIT – I
1. Introduction:
Importance of Building drawing as Engineers language in construction & costing.

UNIT – I
2. Method of Drawing:
Selection of scales for various drawings. Thickness of line Dimensioning, first angle and third angle method of projection, Abbreviations and conventional representations as per IS 1962.

i) Free hand dimensioned sketches stones of various building elements Importance in Civil Engineering.

ii - a) Developing working drawings to scale as per IS 1962 from the given sketch design and general specifications for terraced and pitched roofs.

ii - b) Developing submission drawings to scale with location site and block plan complete.

UNIT – III
3. Designing of Buildings :
Introduction: Site requirements, requirements of owner and Building byelaws. Climate and design consideration, orientation, recommendations of CBRI, Roorkee and general principles of planning with emphasis on functional planning. Graph paper design (line plans) based on various requirements for residential, public, education and industrial buildings.

UNIT – IV
4. Two point perspective of Residential building neglecting small elements of building such as plinth offset, chajja projections etc.
SUBMITIONAL WORK:

1. Working drawing of residential single storied building of terrace and pitched roofs with foundation plan of load bearing structure. (Two assignment)

2. Submission drawing of single storied residential building (framed structure) with access to terrace including all details and statements as per the local bye-laws. (One assignment A1 sheet)

3. Working drawing of multistoried Public / Educational / Health / Community / Industrial building including structural details and layout of services. (One assignment).

4. Two point perspective of the single Residential building neglecting small building elements. (Two assignment – pitched & terraced roof)

5. Minimum 30 free hand self-explanatory dimensioned sketches of various building elements in sketchbook.

6. Line plans of various types of buildings e.g. public / educational / industrial / hospital / community on graph papers (04 assignments)

7. Submission drawing of 02 storied residential building framed structure including all details and statements as per the local bye laws.

8. One compulsory field exercise.
5CE05 / 5ST05 : PROJECT MANAGEMENT  
(3L+1T)

SECTION – A

I] ENGINEERING ECONOMICS

UNIT – I
1. Nature and scope of Economics and relationship with Engineering  
   (3)
2. Demand analysis: Law of demand, Elasticity of Demand, Demand Resourcing.
3. Production : Meaning and Factors of Production, Law of return, Economics of scale location of industries  
   (5)

UNIT – II
4. Cost analysis: Fixed and variable cost, Prime and supplementary costs, Average and marginal cost, methods of allocation of overhead costs  
   (5)
5. Money and banking: Functions of money, functions of Commercial and central Banks, Foreign investments  
   (3)
6. Various types of Markets and price determination under these market conditions, scope of Privatisation in India.  
   (4)

SECTION – B

II] Project Planning and Management

UNIT – III
1. Introduction: Project Management, Types of Projects, Various phases of Project, Project proposal, Components of planning, Objectives of planning, factors effecting planning, organizational setup, establishment of premises and site organization programme.  
   (2)
   (5)

UNIT – IV
   (3)
4. System approach, system formation, effectiveness and control, general principles of quality control measurements and achievements  
   (3)
5. Planning for safety construction hazards, safety in construction, industry and at work site. National safety council, Safety organization, accidents, its cost, cause, types and preventions, losses, during natural calamities, floods and fire, and methods to reduce them.  
   (3)
UNIT – V

7. Material Management: Functions, objectives, purchasing procedures, records, stock taking, inventory control, ABC analysis, storing


UNIT – VI
9. Equipments of Major Projects: Excavating machines such as : Power shovels, Drag Line, Bulldozer, Scraper, Drilling and Blasting Equipments, Material Transporting and handling equipment such as Cranes, Hoists, conveyor belts, dumpers, cableways, rail system (Size, performance and limitations) (5)


SELECT REFERENCES BOOKS:
1. Construction Management Peurifoy
2. CPM and PERT L. Srinath
3. Project Management Roy Choudhary
4. Equipment Management – Mahesh Verma

QUESTION PAPER PATTERN:
Section - A : Two questions (14 marks each) are to be solved out of three
Section – B : Four questions (13 marks each) are to be solved out of six
Highways:

Unit – 1

1. Development & Planning:
   Road transport Characteristics, Classification of roads, development plants, network patterns, data collection & Surveys, Principles of alignment, evaluation of plan proposals. (5)

2. Traffic Engineering:
   3E’s of traffic characteristics, Surveys, Intersection-types, layouts, design principles, Urban traffic, parking, lighting, Accidents, Traffic control Devices marking, Signs, Singles, Regulations Motor Vehicle Act & Rule. (5)

Unit – 2

3. Geometric Design:
   Road, road user & road vehicle characteristics, Factors affecting design standards. Cross Section elements, Stopping & overtaking sight distance overtaking zones. Horizontal alignment Curves, design of super elevation, widening, transition curves, vertical alignments, Design of summit & Valley Curves, I.R.C. Standards for geometric Design, Geometrics of Hill Roads. (7)

4. Pavement Design:
   Types of Pavements & characteristic, Design parameters, Axel & Wheel load, tyre pressure, ESWL for dual Wheels, repetitions, Group Index & CBR method of flexible pavement design. Analysis of load & temperature stresses of rigid pavement, joints. (5)

Unit – 3

5. Materials:
   Subgrade Soil – AASHO Classification, group index, Subgrade soil stabilization, CBR, aggregates physical & Mechanical properties & tests Bituminous materials classification sources properties and tests. Cutback & Emulsions, IRC/IS standards, Introduction to Geotextiles. (5)

6. Construction & Maintenance
   IRC, MOST specifications for quality & quantity of materials, techniques, tools and plant for the Earthwork, sub base, base and wearing/surfacing course of flexible pavements with gravel, WEM, stabilized Bituminous & Concrete as Construction materials, Drainage, shoulders, rob-orticulture maintenance & repairs, Choc of construction. (5)

SECTION – B

Bridges

General:
Unit – 4

7. General:
   Components, classification and identification, Data Collection site selection. Economic Span (3)

8. Hydrology:
   Estimation of flood, discharge, water way, scour depth, depth of foundation, Afflux, clearance and free board. (5)

Unit – 5

9. Loads, Forces, Stresses:
   IRC Specification & code of practices, Critical combinations. (4)

10. Sub – Structure:
    (A) Types of foundation & their choise, estimation of BC of foundation strata, Open, Pile and well foundation, pneumatic Caissons, coferdams. (6)
    (B) Abutment, piers & Wingwalls, Their types general design principles (empirical), choice. (2)

Unit – 6

11. Super Structure:
    Different structural forms culverts, caseways, minor and major bridges, suitability and choice precast post tensioned and segmental construction. Launching, operation system, Bearing, Architecture. (4)

12. Rating and Maintenance:
    Methods & Techniques of rating of existing bridges inspection, repairs, maintenance, corrosion-causes and prevention, Aesthetics. (4)

Practicals:

(A) Every student must carry minimum of 10(Ten) experiments from the following:

   (a) Subgrade Soil: Classification, group index and rating CBR test (Vide IS:2720)
   (b) Aggregates: Specific Gravity Water absorption flakiness index, impact, crushing and Abrasion value tests. Petgrgraphic identification (Vide IS:2386)
   (c) Bitumen: Penetration, Softening point, flash point, Ductility, Stripping, Viscosity of Tar & Cutback.
   (d) Students should be familiar with relevant BIS, IRC,MOST specifications of various materials for different constructions.

(B) At least one field visit & its report in journal.
5CE07 / SITE VISITS (3P)

Practical hours (College Assessment) Marks : Grade

Students should be taken for visit to various Civil Engineering construction sites such as R.C.C. Structures, Steel Structures, Bridges, culverts, Hydraulic structures watertanks, Roadworks, Railways, Watersupply and sanitary work technical Exploration, Maintenance and Rehabilitation works, irrigation systems, Formwork, Reconnaissance and Detailed Surveying & Isvelling etc.

Minimum five visits are expected. Students should submit a detailed report on the visit duly approved by the concerned teacher.

The Detailed Report should mainly consist of the following :

1. Name of Construction Site with address
2. Nature of construction work and various structural components
3. Nature of ownership, executing and supervising authority
4. Architect and Structural Engineer
5. Architectural concept and Design features
6. Commencement of the work and tentative completion
7. Present Status of work
8. Estimated cost of the work (Money spent till date)
9. Mode of availability of finance
10. Various types of manpower for the work
11. Various safety measures and amenities provided to manpower
12. Various construction equipments for the work
13. Various materials used for the work
14. CPM / PERT of the project
15. Type of inventory control
16. Resource planning implemented
17. Social benefits and implication
18. Safety measures during and posts construction
19. Post Construction maintenance provisions
20. Effect on environmental aspect and sustainable development
22. Site of precast units for the work and its mode of transportation
23. Use of local available material like fly-ash, slag, silica-fumes, etc.
24. Causes for delay / faulty construction