## TEACHING SCHEME

### BACHELOR OF ENGINEERING (CIVIL) 3rd SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Schedule of Teaching</th>
<th>Schedule of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sess</td>
<td>Exam</td>
</tr>
<tr>
<td>1</td>
<td>CIV 301</td>
<td>Surveying I</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>CIV 302</td>
<td>Building Materials</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>CIV 303</td>
<td>Structural Analysis I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>CIV 304</td>
<td>Reinforced Concrete I</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>CIV 305</td>
<td>Fluid Mechanics I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>CIV 306</td>
<td>RCC Drawing - I</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7</td>
<td>CIV 307</td>
<td>Seminar</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>100</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>CIV 308</td>
<td>Vocational Training</td>
<td>---</td>
<td>--</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>15</td>
<td>4</td>
<td>12</td>
<td>350</td>
<td>500</td>
</tr>
</tbody>
</table>

Marks of vocational Training based on workshop after 2nd semester  
TOTAL: 1250

### BACHELOR OF ENGINEERING (CIVIL) 4th SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Schedule of Teaching</th>
<th>Schedule of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sess</td>
<td>Exam</td>
</tr>
<tr>
<td>1</td>
<td>CIV 401</td>
<td>Design of Steel Structures - I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>CIV 402</td>
<td>Structural Analysis II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>CIV 403</td>
<td>Surveying II</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>CIV 404</td>
<td>Rock Mechanics &amp; Engg. Geology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>CIV 405</td>
<td>Transportation Engg. I</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>CIV 406</td>
<td>Building Construction</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>7</td>
<td>CIV 407</td>
<td>Steel Drawing - I</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>8</td>
<td>CIV450</td>
<td>General Fitness</td>
<td>--</td>
<td>--</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>18</td>
<td>4</td>
<td>10</td>
<td>300</td>
<td>600</td>
</tr>
</tbody>
</table>

TOTAL: 1250

Four weeks survey camp after 4th semester.
### BACHELOR OF ENGINEERING (CIVIL) 5TH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sess</td>
<td>Exam</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sess</td>
<td>Exam</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Practical</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>code</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CIV 501</td>
<td>Reinforced Concrete II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>CIV 502</td>
<td>Earthquake Engineering</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>CIV 503</td>
<td>Fluid Mechanics-II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>CIV 504</td>
<td>Geotechnical Engg.</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>CIV 505</td>
<td>Environmental Engg.-I</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>CIV 506</td>
<td>RCC Drawing- II</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>CIV 507</td>
<td>Survey Camp</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>15</td>
<td>5</td>
<td>10</td>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL:</strong></td>
<td></td>
<td></td>
<td></td>
<td>750</td>
<td><strong>330</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>170</td>
<td><strong>500</strong></td>
</tr>
</tbody>
</table>

### BACHELOR OF ENGINEERING (CIVIL) 6TH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sess</td>
<td>Exam</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sess</td>
<td>Exam</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Practical</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>code</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ASC 601</td>
<td>Numerical Analysis and Statistical methods</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>CIV 602</td>
<td>Design of Steel Structures - II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>CIV 603</td>
<td>Quantity Survey</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>CIV 604</td>
<td>Environmental Engg.-II</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>CIV 605</td>
<td>Foundation Engineering</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>CIV 606</td>
<td>Steel Drawing - II</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>CIV 607</td>
<td>Seminar and Departmental Instructions</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>100</td>
<td>--</td>
</tr>
<tr>
<td>8</td>
<td>CIV 650</td>
<td>General Fitness</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>15</td>
<td>5</td>
<td>9</td>
<td>350</td>
<td><strong>850</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL:</strong></td>
<td></td>
<td></td>
<td></td>
<td>310</td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

Four weeks practical training after 6th semester
### BACHELOR OF ENGINEERING (CIVIL) 7TH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CIV 701</td>
<td>Hydrology and Dams</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>2</td>
<td>CIV 702</td>
<td>Structural Analysis- III</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>3</td>
<td>CIV 703</td>
<td>Transportation Engg - I I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>4</td>
<td>CIV- 704</td>
<td>Irrigation Engg-I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>5</td>
<td>CIV- 705</td>
<td>Software Lab</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td></td>
<td>150 50</td>
</tr>
<tr>
<td>6</td>
<td>CIV 706</td>
<td>Training(after 6th sem)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>7</td>
<td>CIV 707</td>
<td>Minor Project</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td></td>
<td>200 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>12</td>
<td>4</td>
<td>12</td>
<td>200 400</td>
<td>600 550</td>
</tr>
</tbody>
</table>

TOTAL: 1250

### BACHELOR OF ENGINEERING (CIVIL) 8TH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CIV 801</td>
<td>Maintenance of Buildings</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>2</td>
<td>CIV 802</td>
<td>Irrigation Engg-II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>3</td>
<td>CIV 803</td>
<td>Construction planning &amp; Management</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>4</td>
<td>CIV 804</td>
<td>Solid Waste Management</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>50 100</td>
<td>150</td>
</tr>
<tr>
<td>5</td>
<td>CIV 805</td>
<td>Major Project</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td></td>
<td>250 50</td>
</tr>
<tr>
<td>6</td>
<td>CIV 806</td>
<td>Irrigation drawing - II</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td></td>
<td>60 40</td>
</tr>
<tr>
<td>7</td>
<td>CIV 807</td>
<td>Seminar</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>100 50</td>
</tr>
<tr>
<td>8</td>
<td>CIV850</td>
<td>General Fitness</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>12</td>
<td>4</td>
<td>11</td>
<td>200 400</td>
<td>600</td>
</tr>
</tbody>
</table>

TOTAL: 1250
THIRD SEMESTER

COURSE NAME : SURVEYING-I
COURSE NO. : CIV. 301
L T P : 3 1 3
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION – A

INTRODUCTION TO SURVEYING (03)
Basic principles of Surveying, Plans, Scales, Maps, Different types of surveys, Perspective of chain surveying.

COMPASS SURVEY (05)
Principle, Traverses, Meridians, Bearings, Included angles from bearing and vice versa, Prismatic Compass, Surveyor's compass, Magnetic declination, local attraction, Field work for compass traverse, Plotting and adjustment errors.

LEVELLING (04)
Basic definitions, Dumpy level, Levelling staffs, Simple Levelling, Terms in Levelling, Precautions, Differential Levelling. Field Book for Levelling, Profile levelling, Cross-sectioning & Reciprocal levelling.

CONTOURING (03)
Contour characteristics, direct and indirect methods of contouring, Contour gradients and automatic levels.

SECTION – B

PLANE TABLING (04)
Plane Table and its accessories, Telescopic alidade, Principle, Basic definitions, setting and orienting the plane table, methods of plane tabling, Three point problem, Two point problem.

THEODOLITE TRAVERSING (05)
Vernier Theodolite, Basic definitions, Temporary and permanent adjustments, Measuring horizontal and vertical angle, Optical Theodolites, Electronic Digital Theodolites, Selection and marking of stations for traversing, Angular measurements.

TRAVERSE ADJUSTMENTS (05)
Balancing angles of the traverse, computation of latitudes & departures, consecutive & independent coordinates, Checks for open and closed traverses, Adjustment methods for a traverse, Gales traverse table, Omitted measurements.

TACHEOMETRIC SURVEY (05)

BOOKS:

5. C. Venkatramaish Text Book of Surveying, University Press (India) Limited, Hyderabad
1. Measurement of distance, ranging a line, plotting of details in chain survey.
2. Measurement of bearing and angles with compass, adjustment of traverse by graphical method.
3. Different methods of levelling, height of instrument, rise & fall methods.

COURSE NAME : BUILDING MATERIAL
COURSE NO. : CIV. 302
L T P : 3 0 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION – A

BUILDING STONES
General, Qualities of a good building stone, Deterioration of stones, Preservation of stones, Common building stones of India & their Uses, Artificial stones.

BRICKS
General, Constituents of bricks, desirable and harmful ingredients in brick earth, qualities of good bricks, testing of bricks, strength, Absorption, weathering of bricks. Varieties of fire bricks, sand lime bricks, building tiles- roofing; flooring and wall tiles.

LIME
Cementing material, Characteristics of good quality lime, classification & testing of Lime, Hydraulic test, acid test, setting & slaking of lime, uses of different varieties of lime

TIMBER
Advantages of timber construction, timber trees- exogenous and endogenous trees; soft and hard woods, structure of tree, felling of trees, defects in timber, characteristics of good timber, uses and testing of timber

SECTION – B

CONCRETE
 Constituents of concrete, different types of cements used in concrete, brief introduction to ingredients and manufacture of cements. Hydration and compounds of hydration. Properties and testing of cement.

CONCRETE MIXES

PRODUCTION OF CONCRETE

PROPERTIES OF FRESH AND HARDENED CONCRETE

MISCELLANEOUS MATERIALS
Paints and varnishes; Distempering; white and color washing; glass and glass products; Asphalt and Bitumen.
BOOKS:
5. Civil Engg. Materials : P.D. Kulkarni, TMH
7. Civil Engg. Materials : NITTTR Publication

COURSE NAME : STRUCTURAL ANALYSIS - I
COURSE NO. : CIV. 303
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION- A

COLUMN & BUCKLING (03)
Definitions and examples of instability; criteria for stability of equilibrium, Euler’s theory of columns, buckling, Euler’s equation for various end restraints, Rankine formula, eccentrically loaded struts, struts with initial curvature, lateral stability of beams; struts with lateral loading.

DEFLECTION OF BEAMS (04)

THIN CYLINDERS AND SPHERES (04)
Introduction, stresses and strains in thin cylinders and spherical shell, volumetric change, wire wound thin cylinders, thin vessels subjected to internal pressure.

ANALYSIS OF DETERMINATE TRUSSES (04)
Introduction, determination of forces in member of trusses by method of joints, method of sections, Deflection of Joints of plane frames by Castigliano’s first theorem and unit load method.

ANALYSIS OF DAMS, CHIMNEYS AND RETAINING WALLS (04)
Introduction, limit of eccentricity for no tension in the section, core of the section, middle third rule, wind pressure on chimneys.

SECTION- B

ROLLING LOADS (04)
Introduction to rolling loads and influence lines, Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point load, uniformly distributed load, several point loads etc.

INFLUENCE LINES (04)
Construction of Influence lines for reaction, shear forces and bending moment for simply supported, overhauled and compound beams, influence lines for girders with floor beams, Influence lines for forces in members of frames. Influence lines for deflection.

ARCHES (04)
Introduction, Analysis of three hinged, spandrel braced arches, Influence lines for horizontal thrust, shear force and bending moment for three hinged.

CABLES AND SUSPENSION BRIDGES (04)
Introduction, shape of a loaded cable, cable carrying point loads and UDL, cables with ends at different level, cable subjected to temperature stresses, suspension bridge with two hinged and three hinged stiffening girders, influence lines.

BOOKS:

5. Basic Structural Analysis : C.S. Reddy, TMH

COURSE NAME : REINFORCED CONCRETE - I
COURSE NO. : CIV. 304
L T P : 3 1 3
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with atleast 2 questions from each part.

SECTION – A

INTRODUCTION
Reinforced concrete, definition, properties of materials, grades of concrete and reinforcing steel, stress-strain curves, permissible stresses, concrete structural systems-slabs, beams, columns and foundations, design philosophies working stress design, ultimate strength and limit state design method.

LIMIT STATE DESIGN METHOD
Introduction, Limit States, Characteristic values, characteristic strength, characteristic loads, design values for materials and loads, factored loads.

DESIGN OF BEAMS
Limit State of Collapse (Flexure) Types of failures, assumptions for analysis and design of singly reinforced, doubly reinforced sections, and flanged sections.
Limit State of Collapse (Shear, bond and torsion) Introduction - Design for shear, structural components subjected to torsion, design of rectangular beam section for torsion, development length, continuation of reinforcement (beyond cut off points).

DESIGN OF COLUMNS
Limit State of Collapse (Compression) Columns and their classification, reinforcement in columns, assumptions, short and long (both tied and helical) columns subjected to axial load, short columns subject to axial, uniaxial and biaxial bending (using SP:16)

SECTION – B

LIMIT STATE OF SERVICEABILITY
Deflection, effective span to effective depth ratio, modification factors for singly reinforced, doubly reinforced and flanged beams, crack formation and its control.

DESIGN OF SLABS
Design of one-way slabs and two-way rectangular slabs

DESIGN OF STAIRCASES
Single flight and dog legged

DESIGN OF ISOLATED FOOTINGS UNDER AXIAL LOADS

DETAILING OF REINFORCEMENT USING SP: 34 ALL STRUCTURAL COMPONENTS.

BOOKS:

1. Plain & Reinforced Concrete: Jai Krishna & O.P. Jain (vol I & II), Nem Chand & Bros. Roorkee
REINFORCED CONCRETE - I (Practical)
CIV. 354

EXTERNAL: 40
SESSIONAL: 60

1. To determine the Specific Gravity of cement.
2. To determine the Standard Consistency, Initial and Final Setting Times of Cement.
3. To determine Soundness of Cement.
4. To determine the Compressive Strength of Cement.
5. To determine the Compressive Strength of Bricks/Tiles.
6. To determine the Slump of Concrete.
7. Mix Design of Concrete.
8. To determine the Compressive Strength of Concrete.
9. To carry out the Tensile and Flexural tests of Concrete.
10. To determine the Compressive Strength of hardened Concrete by Non-Destructive Test

BOOKS:
1. Laboratory Manual on Concrete Testing (Part-I) : V. V. Shastri and M. L. Gambhir
2. Laboratory Manual on Concrete Testing (Part-I) : C. B. Kukreja
3. Laboratory Manual on Concrete Technology : PD Kulkarni, LN Mittal & Hemant Sood

COURSE NAME : FLUID MECHANICS – I
COURSE NO. : CIV. 305
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION - A

FLUID AND THEIR PROPERTIES
(04)
Concept of fluid, difference between solids, liquids and gases; ideal and real fluids; Continuum concept of fluid: density, specific weight and relative density; viscosity and its dependence on temperature; surface tension and capillarity, vapor pressure and cavitation: compressibility and bulk modulus; Newtonian and non-Newtonian fluids.

FLUID STATICS
(05)
Concept of pressure, Pascal’s law and its engineering hydrostatic paradox.
Action of fluid pressure on plane (horizontal, vertical and inclined) submerged surface, resultant force and center of pressure, force on a curved surface due to hydrostatic pressure.
Buoyancy and floatation, stability of floating and submerged bodies, Metacentric height and its determination, rotation of liquid in a cylindrical container.

FLUID KINEMATICS
(04)
Continuity equation in Cartesian co-ordinates.
Rotational flows- Rotational velocity and circulation, stream & velocity potential functions.

SECTION - B

FLUID DYNAMICS
(04)
Euler’s equation, Bernoulli’s equation and steady flow energy equation; representation of energy changes in fluid system, impulse momentum equation, kinetic energy and momentum correction factors, flow along a curved streamline, free and forced vortex motions.

**DIMENSIONAL ANALYSIS AND SIMILITUDE** (04)
Fundamental and derived units and dimensions, dimensional homogeneity, Rayleigh’s and Buckingham’s Pi method for dimensional analysis, dimension less number and their significance, geometric, kinematic and dynamic similarity, model studies.

**LAMINAR AND TURBULENT FLOWS** (04)
Flow regimes and Reynolds number, critical velocity and critical Reynolds number, laminar flow in circular cross section pipes. Turbulent flows and flow losses in pipes, Darcy equation, Minor head losses in pipe fittings, hydraulic and energy gradient lines.

**FLOW MEASUREMENT** (02)
Manometers, Pitot tubes, venturimeter and orifice meters, orifices, mouth pieces, notches and weirs.

**BOOKS:**
1. Fluid Mechanics : Dr. Baljeet S. Kapoor , New Age Publishers
2. Fluid Mechanics & Hydraulic Power Engineering: D.S Kumar, Kataria & Sons
5. Fluid Mechanics : Frank M White, Mcgraw Hill.
6. Fluid Mechanics & Hydraulic Machines : S.C. Gupta, Pearson Education

**COURSE NAME** : RCC DRAWING - I
**COURSE NO.** : CIV. 306
**L T P** : 0 0 4
**EXTERNAL:** 40
**SESSIONAL:** 60

Design and detailing of following structural components designed in RCC- I through AUTOCAD
1. Beams
2. Columns
3. Slabs
4. Footings
5. Stair Case

**SEMINAR**
CIV- 307

Each student shall be required to deliver presentations and submissions etc. in the class on the topics as suggested by the course teacher.

**VOCATIONAL TRAINING**
CIV- 308

Each student shall attend 4 weeks vocational training in the workshop after 2nd semester.
FOURTH SEMESTER

COURSE NAME : DESIGN OF STEEL STRUCTURES-I
COURSE NO. : CIV. 401
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION – A

**RIVETED & WELDED JOINTS**
(05)
Rivets and riveting, stresses in rivets, strength & failure of riveted joints. Riveted joints in framed structures.
Types of welds & welded joints, stresses in welds, design of welds

**TENSION MEMBERS**
(06)
Types of tension members, net & gross areas, permissible stresses. Design of members subjected to axial loads, combined bending moments & axial loads

**COMPRESSION MEMBERS**
(06)
Failure modes of columns, end conditions & effective length of columns, various empirical formulae. IS code formula, General codal provisions for design of compression members. Built up compression members, lacing and battening of compression members, splicing of compression members.

**COLUMN BASES AND FOUNDATIONS**
(05)
Types of column bases, design of slab base, Gusseted base & grillage foundations.

**DESIGN OF FLEXURAL MEMBERS**
(04)
Failure modes permissible stresses, design of laterally supported and unsupported beams.

SECTION - B

There will be one question either on
Design and Drawing details of a steel roof truss riveted with given forces in various members.

OR

Design and Drawing of welded plate girder with static load u.d.l. over whole span and concentrated load at fixed points.

BOOKS:
6. Relevant IS Codes

COURSE NAME : STRUCTURAL ANALYSIS - II
COURSE NO. : CIV. 402
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.
SECTION –A

ANALYSIS OF STATICALLY INDETERMINATE STRUCTURES (05)
Degree of static and kinematic indeterminacies, analysis of indeterminate beams, rigid frames and trusses by method of consistent deformation, law of reciprocal deflections, method of least work, induced reactions on statically indeterminate beams, rigid frames and trusses due to yielding of supports.

FIXED AND CONTINUOUS BEAMS (05)
Analysis of fixed beams, continuous beams and propped cantilevers by moment-area theorem and strain energy method, fixed end moments due to different types of loadings, sinking and rotation of supports, bending moment and shear force diagrams for fixed beams and propped cantilevers, slope and deflection of fixed beams, analysis of continuous beams by the Three moment equation (Clapeyron's theorem) due to different types of loadings, effect of sinking of supports.

SLOPE-DEFLECTION METHOD (05)
Introduction, slope-deflection equations, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements.

MOMENT-DISTRIBUTION METHOD (05)
Introduction, absolute and relative stiffness of members, stiffness and carry-over factors, distribution factors, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements, symmetrical beams and frames with symmetrical, skew-symmetrical and general loading.

SECTION- B

APPROXIMATE METHODS OF STRUCTURAL ANALYSIS (05)
Vertical and lateral load analysis of multistory frames, portal, cantilever and substitute-frame methods and their comparison.

INFLUENCE LINES FOR STATICALLY INDETERMINATE STRUCTURES (05)
Muller- Breslau principle for statically determinate and indeterminate beams, trusses and rigid frames, influence lines for reactions, shear force and bending moment for statically indeterminate beams, trusses and rigid frames.

REDUNDANT FRAMES:
Analysis and deflection of frames redundant to maximum of two degrees using Castigliano’s 2nd theorem, lack of fit of members, temperature stress in redundant frames.

TWO HINGED ARCHES (05)
Parabolic arches with secant variation of moment of Inertia. Derivation of expression for horizontal thrust, BM and SF diagrams for simple cases of static loads. Influence lines for horizontal thrust, and Radial force for Parabolic arches with secant variation of moment of inertia. Reaction locus and its applications. Effect of temperature, support yielding. Two hinged spandrel, braced arches - Forces on various members due to static loads, Reaction locus and their use to determine, maximum force in various members.

BOOKS :
1. Indeterminate Structures : R. L. Jindal, S. Chand
3. Indeterminate Structural Analysis : Kinney, Edison Wesley
4. Indeterminate Structures : C.K Wang, TMH
5. Basic Structural Analysis : C.S. Reddy, TMH
6. Indeterminate Structures : A.K. Jain, TMH
7. Structural Analusis (I&II) : S.S. Bhavikatti, Vikas Publishing House

COURSE NAME : SURVEYING - II
COURSE NO. : CIV. 403
L T P : 3 1 3
EXTERNAL: 100
SESSIONAL: 50
Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION – A

CURVES
(06)
Types of horizontal curves, Basic definitions, Degree of curve, elements of a curve, Peg interval, Setting out curves with and without theodolite, Setting out with total station instrument, Obstacles in curve setting, compound curves, Reverse curves.

TRANSITION CURVES
(06)
Combined circular and Transition Curves and their setting out in field. Vertical curves, Setting out vertical curves by chord gradient and tangent correction methods.

GEODETIC TRIANGULATION
(06)
Triangulation figures, Classification, Shape of triangles, Field work, Selections of stations, Intervisibility of stations, Signals, Phase correction, Reduction of Centre, Baseline site, selection Baseline measurement, Baseline corrections, Baseline Extension, Survey of India Top Sheet numbering system.

SURVEY ADJUSTMENTS
(06)

SECTION – B

TRIANGULATION ADJUSTMENTS
(06)
Station adjustments, conditions for Figure adjustment of Plane triangles, Chain of triangles, two connected triangles, Braced Quadrilaterals, Triangle with a central station, Method of equal shifts, Setting out buildings, culverts, Piers and abutments.

GIS
(04)
Introduction, concepts and terminology, utility of GIS, essential components of a GIS, data acquisition through scanners and digitizers, data storage, data manipulation and analysis applications of GIS

GPS
(04)
Introduction, working principle, various application of GPS related to civil engg., components of GPS – point positioning and differential positioning.

REMOTE SENSING
(04)
Introduction, interaction of EMR with earth surface working principles and instrumentation.

INTRODUCTION OF TOTAL STATION
(03)
Measuring horizontal and vertical angle, Angular measurements, measurement of distance

BOOKS:
5. Understanding GPS, Principles & Applications: Kaplan, E.D, Taylor & Francis

SURVEYING - II (Practical)
CIV- 453

EXTERNAL:  20
SESSIONAL:  30
1. Tacheometry
2. Triangulation using total station
3. Use of GIS/GPS softwares

BOOKS:
1. Surveying Vol. I & II : Dr. K.R. Arora
SECTION – A

GENERAL GEOLOGY
Importance of Engg. Geology applied to Civil Engg. Practices. Weathering, definition, types and effect. Geological works of rivers, wind, glaciers as agents of erosion, transportation and deposition.

ROCKS & MINERALS
Minerals, their identification igneous, sedimentary & metamorphic rocks. classification of rocks for engineering purposes. Rock quality designation (RQD)

STRUCTURAL GEOLOGY
Brief idea about stratification, apparent dip, true dip, strike and in conformities. Folds, faults & joints : definition, classification relation to engg. Operations.

ENGINEERING GEOLOGY

SECTION – B

ENGINEERING PROPERTIES OF ROCKS AND LABORATORY MEASUREMENT
Uniaxial compression test, tensile tests, permeability test, shear tests, size and shape of specimen rate of testing. Confining pressure, stress strain curves of typical rocks. Strength of intact and fissured rocks, effect of anisotropy, influence of effect of pore fluid type unsaturated and temperature.

IN-SITU DETERMINATION OF ENGG. PROPERTIES OF ROCK MASSES
Necessity of in-situ tests, uniaxial load tests in tunnels and open excavations, cable tests, flat jack test, shear test, pressure tunnel test. Simple methods of determining in situ stresses bore hole technique-bore hold deformation gauges.

IMPROVEMENT IN PROPERTIES OF ROCK MASSES
Pressure grouting for dams and tunnels, rock reinforcement rock bolting.

BOOKS:
Introduction to Rock Mechanics : Richard E. Goodman., Willey
Engineering Geology : Parbin Singh, Katson Publishing House

SECTION- A

HIGHWAY DEVELOPMENT & PLANNING

(03)
Principles of Highway Planning, Road Development in India, Classification of Roads, Road Patterns, Planning Surveys.

**HIGHWAY ALIGNMENT** (02)
Requirements, Alignment of Hill Roads, Engineering Surveys.

**HIGHWAY GEOMETRIC DESIGN** (03)

**HIGHWAY MATERIALS** (04)
Properties of Sub-grade and Pavement Component Materials, Tests on Sub-grade Soil, Aggregates and Bituminous Materials.

**HIGHWAY CONSTRUCTION** (03)
Earthen/Gravel Road, Water Bound Macadam, Wet Mix Macadam, Bituminous Pavements, Cement Concrete Pavements.

**HIGHWAY DRAINAGE** (03)
Importance, Surface Drainage and Subsoil Drainage, Construction in Water-logged areas.

**SECTION- B**

**HIGHWAY MAINTENANCE** (03)

**HIGHWAY ECONOMICS & FINANCING** (03)
Total Transportation Cost, Economic Analysis, Sources of Highway Financing.

**TRAFFIC CHARACTERISTICS** (03)
Road User Characteristics, Driver Characteristics, Vehicular Characteristics

**TRAFFIC STUDIES** (02)
Volume and Speed Studies, O-D Survey, Parking Study

**TRAFFIC SAFETY** (03)
Cause and Type of Accidents, Use of Intelligent Transport System

**TRAFFIC CONTROL MEASURES** (02)
Signs, Markings, Islands, Signals

**TRAFFIC ENVIRONMENT INTERACTION** (02)
Noise Pollution, Vehicular Emission, Pollution Mitigation Measures

**BOOKS:**

**TRANSPORTATION ENGINEERING – I (Practical)**

**CIV- 455**

**EXTERNAL:** 20
**SESSIONAL:** 30

**AGGREGATE TESTS**
Sieve Analysis of fine and coarse aggregates
Aggregate Crushing Value Test.
Aggregate Impact Value Test.
Los Angles Abrasion Value Test.
Aggregate Soundness Test.
Flakiness Index and Elongation Index Test.
Specific Gravity and Water Absorption Test.
Laboratory CBR Test.

**BITUMEN TESTS**
Penetration Test.
Ductility Test.
Softening Point Test.
Viscosity Test.
Flash Point and Fire Point Test.

**REFERENCES**
2. Relevant IS Standards

**COURSE NAME** : BUILDING CONSTRUCTION
**COURSE NO.** : CIV. 406
**L T P** : 3 0 0
**EXTERNAL**: 100
**SESSIONAL**: 50

**Note:** The examiner shall set 8 questions i.e 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

**SECTION - A**

**BRICK & STONE MASONRY** (04)
Terms used; types of bonds; their merits and demerits; Rubble and ashlar joints in stone masonry, introduction to cement concrete hollow blocks, advantages and disadvantages of concrete block masonry over brick masonry.

**WALLS AND FOUNDATION** (03)
Load bearing and non-load bearing walls, estimation of load on walls and footings, Thickness considerations, partition and cavity walls design of masonry walls, pillars and footings.

**DAMP PROOFING** (02)
Sources, Causes of dampness in buildings, bad effects of dampness, methods of damp proofing.

**ARCHES AND LINTELS** (03)
Introduction to terms used in Arches; different types of arches; brick and stone arches, types and functions of lintels.

**ROOFS** (03)
Introduction terms used types of roof trusses and roof coverings, details of rain proofing, rain water pipes.

**SECTION - B**

**DOORS AND WINDOWS** (03)
Introduction terms used location of doors and windows, types of doors and windows, methods of fixing doors and window frames in walls. Ventilators.

**PLASTERING, POINTING AND PAINTING** (03)
Introduction, objects and types, special materials for plastered surfaces, distempering, white washing and color washing of plastered surfaces.

**FLOORS** (03)
Introduction, various types of floors commonly used and their suitability for different buildings, constructional details of concrete and Terrazzo floorings, marble flooring, anti-termite treatment.
MISCELLANEOUS TOPICS

1. Site selection; and orientation of building.
2. Principles of acoustical design of Building.
3. Fire proof construction methods.
4. Construction and expansion joints.
5. Building bylaws

BOOKS:

1. Building Construction: S.K. Sharma, S. Chand
2. Building Construction: Sushil Kumar, Standard Publishers

COURSE NAME : STEEL DRAWING- I
COURSE NO. : CIV 407
L T P : 0-0-4
EXTERNAL: 50
SESSIONAL: 100

Detailed working drawing for using AUTOCAD

1. Steel roof truss.
2. Plate girder (welded)
3. Stanchion beam connections.
4. Grillage foundation.
5. Composite column with lacings
FIFTH SEMESTER

COURSE NAME : REINFORCED CONCRETE - II
COURSE NO. : CIV. 501
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION – A

BEAMS CURVED IN PLAN
Introduction, Design of circular beams loaded uniformly and supported on symmetrically placed columns, semi-circular beams simply supported on 3 supports equally spaced using shear, moment and torsion coefficient, provision for torsion reinforcement

CONTINUOUS BEAMS
Design of continuous beams using I. S. Code method.

DESIGN OF FOOTINGS
Isolated footings subjected to eccentric loading, combined footings: Different types, design of rectangular, trapezoidal, strap and raft footings

SECTION – B

RETAINING WALLS
Types, behaviour, stability requirements, design of cantilever and counterfort type retaining walls.

WATER TANKS
Introduction, general design requirements on no crack basis, circular and rectangular tanks resting on ground, overhead tanks, intze type tanks and their design including staging and foundation.

DOMES
Design of spherical and conical domes

BOOKS:
1. Concrete Structure : V. N. Vazirani and M. M. Ratwani, Khanna Publishers
2. Plain and Reinforced Concrete : Jai Krishna and O. P. Jain, Nem Chand & Bros. Volumes I and II
4. Reinforced Concrete Structures : Syal and Goel, Wheeler Publishers Allahabad

COURSE NAME : EARTHQUAKE ENGINEERING
COURSE NO. : CIV. 502
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.
SECTION – A

**INTRODUCTION TO EARTHQUAKES**
Structure of the Earth, History of the Earth, Earthquake Mechanism, Propagation of Seismic Waves, Earthquake Phenomena, Earthquake Measurements, Seismicity-Global and Local, Seismic hazards

**PAST EARTHQUAKES AND LESSONS LEARNT**
Significant Historical Earthquakes, Earthquake Damages to Various Civil Engineering Structures

**EARTHQUAKE VIBRATIONS**

SECTION – B

**EARTHQUAKE DESIGN PROCEDURE & DESIGN CODES**

**SOIL RESPONSE TO EARTHQUAKES**
Liquefaction, liquefaction susceptibility, landslides, seismic slope stability analysis, soil improvement for remediation of seismic hazards.

BOOKS :
2. Elementary Earthquake Engineering: Jai Krishna & Chander Shekran, South Asian Publishers Delhi.
5. Earthquake Resistant Design of Structures, Pankaj Aggarwal & Manish Srikhande, Prentice Hall of India.
Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION -A

LAMINAR FLOW
Navier-stokes equations in Cartesian coordinates (no derivation), meaning of terms, flow between parallel plates, stokes law. Flow through porous media. Transition from laminar to turbulent flow.

BOUNDARY LAYER ANALYSIS
Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and turbulent boundary layers on a flat plate; laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Control.

TURBULENT FLOW
Definition of turbulence, scale and intensity, Effects of turbulent flow in pipes. Equation for velocity distribution in smooth and rough pipes (no derivation). Resistance diagram.

FLOW PAST IMMERSED BODIES
Drag and lift deformation Drag and pressure drag. Drag on a sphere, cylinder and Airfoil: lift-Magnus Effect and circulation, lift on a circular cylinder.

SECTION -B

UNIFORM FLOW IN OPEN CHANNELS

ENERGY AND MOMENTUM PRINCIPLES AND CRITICAL FLOW
Energy and specific Energy in an open channel; critical depth for rectangular and trapezoidal channels. Alternate depths, applications of specific energy to transitions and Broads crested weirs. Momentum and specific force in open channel flow, sequent depths.

GRADUALLY VARIED FLOW
Different Equation of water surface profile; limitation, properties and classification of water and surface profiles with examples, computation of water surface profile by graphical, numerical and analytical approaches.

HYDRAULIC JUMP AND SURGES
Theory of Jump, Elements of jump in a rectangular Channel, length and height of jump, location of jump, Energy dissipation and other uses, surge as a moving hydraulic jump. Positive and negative surges.

BOOKS :
1. Hydraulic and Fluid Mechanics : Modi and Seth, Standard Book House, Delhi
COURSE NAME : GEOTECHNICAL ENGINEERING
COURSE NO. : CIV. 504
L T P : 3 1 3
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

**SECTION- A**

**BASIC CONCEPTS** (04)
Definition of soil and soil mechanics common soil problems in Civil Engineering field. Principal types of soils. Important properties of very fine soil i.e. adsorbed water, base exchange and soil structure. Characteristics of main clay mineral groups. Basic definitions in soil mechanics. Weight volume relationship physical properties of soils.

**INDEX PROPERTIES** (03)
Determination of Index properties, classification of coarse grained soils and fine grained soils.

**COMPACTION** (06)

**CONSOLIDATION** (06)
Definition and object of consolidation difference between compaction and consolidation. Concept of various consolidation characteristics i.e. a, m, and C, primary and secondary consolidation. Terzaghi’s method for one-dimensional consolidation. Consolidation test. Determination of C, from curve fitting methods. Normally consolidated and over consolidated clays importance of consolidation settlement in the design of structures.

**SECTION- B**

**PERMEABILITY AND SEEPAGE** (06)

**SHEAR STRENGTH** (06)

**EARTH PRESSURE** (06)
Terms and symbols used for a retaining wall. Movement of wall and the lateral earth pressure. Rankine’s and Coulomb’s theory for lateral earth pressure. Culmann’s graphical construction and Rebhan’s graphical construction.

**BOOKS :**

GEOTECHNICAL ENGINEERING (Practicals)
CIV- 554

EXTERNAL: 40
SESSIONAL: 60

1. Determination of water content.
2. Determination of field density by Core cutter method
3. Determination of field density by Sand replacement method
4. Grain size Analysis by Mechanical Method.
5. Grain size Analysis by Hydrometer Method.
6. Determination of Specific Gravity by Pycnometer.
8. Determination of Permeability by constant head permeameter.
9. Unconfined Compression Test.
10. Direct Shear Test.
11. Determination of compressibility characteristics of fine grained soils by Consolidation test.
12. Determination of shear strength of dry and saturated sands by Tri-axial shear test

COURSE NAME : ENVIRONMENTAL ENGINEERING - I
COURSE NO. : CIV. 505
L T P : 3 1 3
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION – A

SOURCES OF WATER SUPPLY
Measurement of rainfall and runoff variations; mass diagram; Definition and Design factors, Groundwater and springs Definition - various types of wells - well construction and development - specific yield and various tests - Infiltration wells and galleries; choice of source of water supply.

QUALITY OF WATER
Testing of various physical-chemical and biological characteristics and their significance; standards of quality for different uses of water

WATER SUPPLY SYSTEMS
Municipal water demands and demand variations, Population forecasting and water demand estimations; Intakes and transmission systems, pipes for transporting water and their design, water distribution systems and appurtenances; Data and background information for the design of water supply system; Water supply network design and design of balancing and service reservoirs; operation and maintenance of water supply systems.

SECTION – B

PUMPS AND PUMPING
Necessity of pumping, classification of different type of pumps and their characteristics and selection criteria, economical diameter of the rising main, pumping stations

WATER TREATMENT
Water treatment schemes; Basic principles of water treatment; Design of plain sedimentation, coagulation and flocculation, filtration: slow, rapid and pressure; Disinfection units; Fundamentals of water softening, fluoridation and defluoridation, and water desalinization and demineralization.
Small scale and household level water purification system and water fixtures

BOOKS:
7. Waste water Engineering : S.N. Paul & Arvind Kumar, APH Publishing House

ENVIRONMENTAL ENGINEERING – I (Practical)
CIV- 555

EXTERNAL: 40
SESSIONAL: 60
1) Determination of Color & Turbidity.
2) Determination of Solids: Total, Dissolved and Suspended; dissolved solids.
3) Determination of Alkalinity and its species.
4) Determination of pH, and Acidity and its species.
5) Determination of Hardness (different types)
6) Determination of Chlorides.
7) Determination of Fluorides.
8) Jar test for optimum coagulant dose estimation.
9) Determination of residual chlorine and chlorine dose.

COURSE NAME : RCC DRAWING - II
COURSE NO. : CIV. 506
L T P : 0-0-4
EXTERNAL: 40
SESSIONAL: 60

Detailed working drawings of following (using AUTOCAD)

1. Footings ( Isolated, combined rectangular and trapezoidal, strap, raft)
2. Continuous Beams
3. Retaining walls (Cantilever and Counter fort)
4. Water tanks
5. Spherical and Conical domes.

SURVEY CAMP
CIV – 507

EXTERNAL: 50
SESSIONAL: 150

The students will be required to make a topographic map of an undulating hilly terrain measuring about 250 acres. The work will be as under:

Reconnaissance, selection of main stations, measurement of horizontal and vertical angles, measurement of base line, determination of R.L. of main station by double leveling from B.M., measurement of bearing of any one line, computation of coordinates of station points, plotting of details, interpolation of contours.
SIXTH SEMESTER

COURSE NAME : NUMERICAL ANALYSIS AND STATISTICAL METHODS
COURSE NO. : ASC. 601
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e 4 from each part and students shall be required to attempt a total of 5 questions with atleast 2 questions from each part.

SECTION – A

FLOATING-POINT NUMBERS: Floating-point representation, Rounding, Chopping, Error analysis, Condition and instability. (03)

NON-LINEAR EQUATIONS: Bisection, Fixed-point iteration and Newton-Raphson methods, Order of convergence. (03)

LINEAR SYSTEMS AND EIGEN-VALUES: Gauss-elimination method (using Pivoting strategies) and Gauss-Seidel Iteration method. Rayleig’s power method for eigen-values and eigen-vectors. (03)

INTERPOLATION: Lagrange’s formula with error, Divided difference, Newton’s divided difference formula. (03)

NUMERICAL INTEGRATION: Newton-Cote’s quadrature formula (with error) and Gauss-Legendre quadrature formula. (03)

DIFFERENTIAL EQUATIONS: Solution of initial value problem using Taylor Series, Euler’s and Runge-Kutta (up to fourth order) methods. (03)

SECTION – B

RANDOM VARIABLES: Definition, Probability distribution, Distribution functions, pdf and cdf, Expectation and Variance. (03)

SPECIAL PROBABILITY DISTRIBUTIONS: Binomial, Poisson, Geometric, Uniform, Normal and Exponential distributions. (03)

SAMPLING DISTRIBUTIONS: Population and samples, Concept of sampling distributions, Sampling distribution of mean, Chi-square, t and F distributions (pdf only). Tests of Hypotheses: Basic ideas, Important tests based on normal, Chi-square, t and F distribution. (03)

CURVE FITTING: Method of least squares, Fitting of simple curves using this method, Regression and Correlation: (Two variables case only) (03)

BOOKS:
1. Numerical Methods, Dr. B.S. Grewal, Khanna Publishers
2. Introductory Methos of Numerical Analysis, S.S. Shastri, PHI
4. Probability and Statistics for Engineers, Miller & Freund, Pearson
COURSE NAME : DESIGN OF STEEL STRUCTURES-II
COURSE NO. : CIV. 602
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

SECTION – A

DESIGN OF ROUND TUBULAR STRUCTURES (05)
Introduction, round tubular sections, permissible stresses, tube columns and compression members, tube tension members, tubular roof trusses, Design of tubular beams, Design of tubular purlins.

DESIGN OF STEEL FOOT BRIDGE (08)
Introduction, design of flooring, cross girders, analysis of N- type truss, design of various members of truss, design of joints, design of bearings.

DESIGN OF COMPLETE INDUSTRIAL BUILDING WITH DESIGN OF (08)
Gantry Girder
Column bracket.
Mill bent with constant moment of inertia
Lateral and longitudinal bracing for column bent etc.

SECTION – B

DESIGN OF A SINGLE TRACK THROUGH TYPE RAILWAY BRIDGE WITH LATTICE GIRDERS HAVING PARALLEL CHORDS (15)
Design of stringers
Design of cross girders
Design of connection between stringer and cross girder
Design of main girders
Design of bottom lateral bracing and top lateral bracing
Design of portal bracing and sway bracing
Design of bearings

BOOKS:
3. Raz S A “Structural Design in Steel” New Age International (P) Ltd., New Delhi, 2002

COURSE NAME : QUANTITY SURVEY
COURSE NO. : CIV. 603
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with atleast 2 questions from each part.

SECTION – A

ESTIMATES (08)
Method of building estimates, types, site plan index plan, layout plan, plinth area, floor area, Technical sanction, administrative approval, estimate of buildings, roads, earthwork, R.C.C. works, sloped roof, roof truss, masonry platform, complete set of estimate
ANALYSIS OF RATES
For earthwork, concrete work, D.P.C., stone masonry, plastering, pointing, roadwork

SECTION- B

SPECIFICATIONS
For different classes of building and Civil engineering works.

TYPES OF CONTRACTS
Tenders, tender form, submission and opening of tenders, measurement book, muster roll, piecework agreement and work order

ACCOUNTS
Division of accounts, cash, receipt of money, cash book, temporary advance, imprest, accounting procedure, arbitration, arbitration act.

BOOKS:
3. P.W.D. Accounts : Chief Engineer, B & R, Punjab

COURSE NAME : ENVIRONMENTAL ENGG.- II
COURSE NO. : CIV. 604
L T P : 3 1 3
EXTERNAL: 100
SESSIONAL: 50
Note: The examiner shall set 8 questions i.e 4 from each part and students shall be required to attempt a total of 5 questions with atleast 2 questions from each part.

SECTION – A

INTRODUCTION
Terms & definitions, systems of sanitation and their merits and demerits, system of sewerage, choice of sewerage system and suitability to Indian conditions.

DESIGN OF SEWER
Quantity of sanitary and storm sewage flow, forms of sewers. Conditions of flow in Sewers, sewers of equivalent section, self cleansing and limiting velocity, hydraulic formulae for flow of sewerage in sewers and their design.

CONSTRUCTION & MAINTENANCE OF SEWERS
Sewer appurtenances, Materials for sewers. Laying of sewers, joints in sewers, testing of sewers pipes. Maintenance, operation and precaution before entering a sewer.

HOUSE DRAINAGE
Principles of House drainage, traps, Inspection chamber Indian and European type W.C. Flushing cisterns, soil-waste and anti-syphorage pipes, plumbing system.

SECTION - B

CHARACTERISTICS & TESTING OF SEWAGE
Composition of sewage, sampling, physical & chemical analysis of sewerage, biological decomposition of sewage, kinetics of organic waste stabilization.

TREATMENT OF SEWAGE
Unit processes of waste water treatment, screens, grit-chambers, detritus tank, skimming tank, grease traps, sedimentation, chemical treatment, aerobic biological treatment, trickling filter (LRTF & HRTF), activated sludge processes, anaerobic treatment, units-sludge digesters and biogas plant.
LOW COST WASTE WATER TREATMENT UNITS

Oxidation's Ponds, Lagoons, ditches, septic tanks and imhoff tanks, Theory, design, advantages & disadvantages.

BOOKS :

1. Waste Water Engineering : Metcalf and Eddy Inc. TMH.

ENVIRONMENTAL ENGG: - II (practical)
CIV- 654

EXTERNAL: 40
SESSIONAL: 60

1. Determination of DO.
2. Determination of BOD.
3. Determination of COD.
4. Determination of Sulphates.
5. Determination of Nitrite and Nitrate nitrogen.
7. Determination of phosphorus (total and available).
8. Determination of SVI (including MLSS and MLVSS estimations).

COURSE NAME : FOUNDATION ENGINEERING
COURSE NO. : CIV. 605
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e 4 from each part and students shall be required to attempt a total of 5 questions with atleast 2 questions from each part.

SECTION – A

STABILITY OF SLOPES
Necessity, causes of failure of slopes. Stability analysis of infinite and finite slopes in sand and clay. Taylor’s stability number and its utility.

SHALLOW FOUNDATION

STRESS DISTRIBUTION

MACHINE FOUNDATIONS
Theory of vibrations, foundations subjected to vibrations, determination of dynamic properties of soil. Dynamic analysis of block foundations.

SECTION – B
SOIL INVESTIGATION
Object of soil investigation for new and existing structures. Depth of exploration for different structures. Spacing of bore holes. Methods of soil exploration and relative merits and demerits.

PILE FOUNDATION-I

PILE FOUNDATION-II
Determination of point resistance and frictional resistance of a single pile by static formula. Piles in clay, safe load on a friction and point bearing pile. Pile in sand spacing of piles in a group, factors affecting capacity of a pile group. Efficiency of pile group bearing capacity of a pile group in clay. Settlement of pile groups in clay and sand Negative skin friction.

CAISSONS AND WELLS

BOOKS:

STEEL DRAWING –II
COURSE NO. : CIV- 606
L T P : 0 0 4
EXTERNAL: 50
SESSIONAL: 150

DETAILED WORKING DRAWINGS FOR (USING AUTOCAD)
(i) Industrial Building
(ii) Railway Bridge
(iii) Foot Bridge

SEMINAR AND DEPARTEMNTAL INSTRUCTIONS
CIV- 607
Visits to various Civil Engineering sites, Construction sites, technical films, library, corporate activities, participation in seminars, industries etc.
SEVENTH SEMESTER

COURSE NAME : HYDROLOGY AND DAMS
COURSE NO. : CIV. 701
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION- A

PRECIPITATION:
Importance of hydrological data in water resources planning. The hydrologic cycle, Mechanics of precipitation, types and causes, measurement by rain gauges, gauge net works. Hyetograph, averaging depth of precipitation over the basin, mass-rainfall curves, intensity duration frequency curves, depth area-duration curves.

INTERCEPTION, EVAPORATION AND INFILTRATION

RUNOFF
Factors affecting runoff, runoff hydrography, unit hydrograph theory, S-curve hydrograph, Synder’s S synthetic unit hydrograph, Principles of flood routing through a reservoir by I.S.D. method (description only).

PEAK FLOWS
Estimation of Peak flow-rational formula, use of unit hydrograph, frequency analysis, Gumble’s method, design flood and its hydrograph.

SECTION- B

INTRODUCTION TO DAMS
Choice of type of dam, site selection, investigation, foundation treatment.

GRAVITY DAMS
Non-over flow and over flow section, forces acting, stability factors, stresses on the faces of dam. Design of profile by the method of zoning. Elementary profile of a dam, Creagers profiles neglecting velocity of approach, profile taking velocity of approach into account, upstream lip and approach ramp. Discharge characteristics of spillways. General principles of design of spillways - Ogee, Chute, side channel and siphon.

EARTHEN DAMS
Components of earthen Dams and their functions; Phreatic line determination by analytical and graphical methods. Seepage determination and control.

ARCH AND BUTTRESS DAMS
Classification of arch dams constant, radius, constant angle and variable radius types, cylinder theory, Expression relating central angle and cross-sectional area of arch. Types of buttress dams, Advantages of buttress dams.

BOOKS:
3. Earth Dams : Bharat Singh, Nem Chand and Bros., Roorkee
6. Applied Hydrology : Linsley, Kohler, Paul H., Tata Mc Grawhill,
COURSE NAME : STRUCTURAL ANALYSIS- III
COURSE NO. : CIV. 702
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION- A

BASIC CONCEPTS OF STRUCTURAL ANALYSIS (05)
Actions and Displacements, equilibrium, compatibility, static and kinematic indeterminacy, principle of superposition, flexibility and stiffness matrices, Equivalent joint loads.

FUNDAMENTALS OF FLEXIBILITY METHOD (06)
Flexibility methods, Joint displacements, Member end actions and support reactions, flexibility of prismatic member, formalization of flexibility method.

SECTION- B

FUNDAMENTALS OF STIFFNESS METHOD (08)
Stiffness method, stiffness of prismatic members, formalization of stiffness method
Global stiffness matrix, partitioning of global stiffness matrix.

DIRECT STIFFNESS METHOD (08)
Complete member stiffness matrix, formulation of joint stiffness matrix, formation of load vector, rearrangement of stiffness and load arrays, Analysis of continuous beams, Rigid frames and pin jointed frames.
Comparison between stiffness and flexibility methods.

INTRODUCTION TO FINITE ELEMENT METHOD (04)

BOOKS:

1. Matrix Methods in structure analysis: Pundit & Gupta, TMH
Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION- A

INTRODUCTION TO RAILWAY ENGINEERING (03)
History of Railways, Development of Indian Railway, Organisation of Indian Railway, Important Statistics of Indian Railways.

RAILWAY GAUGES (03)
Definition, Gauges on World Railways, Choice of Gauge, Uniformity of Gauge, Loading Gauge, Construction Gauge.

RAILWAY TRACK (04)
Requirements of a Good Track, Track Specifications on Indian Railways, Detailed Cross-Section of Single/Double Track on Indian Railways.

COMPONENTS OF RAILWAY TRACKS (03)
Rails, Sleepers, Ballast, Subgrade and Formation, Track Fixtures & Fastenings, Coning of Wheels, Tilting of Rails, Adzing of Sleepers, Rail Joints, Creep of Rails.

GEOMETRIC DESIGN OF RAILWAY TRACK (04)
Alignment, Gradients, Horizontal Curve, Super-elevation, Equilibrium Cant, Cant Deficiency, Transition Curves.

POINTS AND CROSSINGS (03)
Functions, Working and Design of Turnout, Various types of Track Junctions and their layouts, Level-crossing.

RAILWAY STATIONS & YARDS (03)
Site Selection, Classification & Layout of Stations, Marshalling Yard, Locomotive Yard, Equipment at Railway Stations.

SIGNALLING AND INTERLOCKING (04)
Objectives, Classification of Signals, Types of Signals in Stations and Yards, Automatic Signalling, Principal of Interlocking.

MODERNIZATION OF RAILWAY TRACKS (03)
High Speed Tracks, Improvement in existing track for high speed, Ballastless Track, MAGLEV Track.

SECTION- B

INTRODUCTION TO AIRPORT ENGINEERING (03)
Air Transport Scenario in India and Stages of Development, National and International Organisations.

AIRPORT PLANNING (03)
Aircraft Characteristics, Factors for Site Selection, Airport Classification, General Layout of an Airport.

OBSTRUCTIONS AND ZONING LAWS (04)
Imaginary Surfaces, Approach Zones and Turning Zones.
RUNWAY ORIENTATION AND DESIGN
Wind Rose Diagram, Basic Runway Length, Corrections, Geometric Design Elements, Runway Configuration, Aircraft Parking System.

TAXIWAY DESIGN
Main Taxiway, Exit Taxiway, Separation Clearance, Holding Aprons.

VISUAL AIDS
Marking and Lighting of Runway, Taxiway, Landing Direction Indicator, and Wind Direction Indicator, IFR/VFR.

BOOKS:
SECTION- A

METHODS OF IRRIGATION (06)
Advantages and disadvantages of irrigation, water requirements of crops, factors affecting water requirement, consumptive use of water, water depth or delta and crop relation, Duty of water, relation between delta, duty and base period, Soil crop relation-ship and soil fertility, sprinkler irrigation advantages & limitations. Planning and design of sprinkler irrigation, drip irrigation advantages & limitations, suitability.

CANAL IRRIGATION (04)
Classifications of canals, canal alignment, Inundation canals, Bandhara irrigation, advantages and disadvantages, Silt theories-Kennedy's theory, Lacey's theory, Drawbacks in Kennedy's & Lacey's theories, comparison of Lacey's and Kennedy's theories, Design of unlined canals based on Kennedy & Lacey's theories, suspended and bed loads.

LINED CANALS (03)
Types of lining, selection of type of lining, Economics of lining, maintenance of lined canals, silt removal, strengthening of channel banks, measurement of discharge in channels, design of lined canals, methods of providing drainage behind lining.

LOSSES IN CANALS, WATER LOGGING AND DRAINAGE (04)
Losses in canals-Evaporation and seepage, water logging, causes and ill effects of water logging-anti water logging measures. Drainage of land, classification of drains - surface and subsurface drains, Design considerations for surface drains, Advantages and maintenance of tile drains.

SECTION- B

INVESTIGATION AND PREPRRATION OF IRRIGATION PROJECTS (04)
Classification of project, Project preparation-investigations, Design of works and drawings, concept of multi-purpose projects, Major, Medium and minor projects, planning of an irrigation project, Economics & financing of irrigation works. Documentation of project report.

TUBE - WELL IRRIGATION (04)
Types of tube - wells - strainer type, cavity type and slotted type. Type of strainers, Aquifer, porosity, uniformity coefficient, specific yield & specific retention, coefficients of permeability, transmissibility and storage. Yield or discharge of a tube well, Assumptions, Theim & Duputi’s formulae. Interference of tube wells with canal or adjoining tube-wells, optimum capacity, Duty and delta of a tube well. Rehabilitation of tube well.

RIVER TRAINING WORK: (04)
Objectives, classification of river-training works, Design of Guide Banks. Groynes or spurs - Their design and classification ISI. Recommendations of Approach embankments and afflux embankments, pitched Islands, Alficial cut-off objects and design Considerations River control - objectives and methods.

BOOKS:
3. Irrigation Engg. & Hydrauloc Structure Varshney, Gupta & Gupta

SOFTWARE LAB
CIV- 705

EXTERNAL:  50
SESSIONAL: 150
Analysis and Design of various Civil Engineering Problems using Software like STAAD PRO, AUTO CIVIL, NISA CIVIL, Etc.

EIGHTH SEMESTER

COURSE NAME : MAINTENANCE OF BUILDINGS
COURSE NO. : CIV. 801
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION- A

PRINCIPLES OF MAINTENANCE
Importance of maintenance, deterioration and durability, factors affecting decision to carryout maintenance, maintenance and GNP, agencies causing deterioration, effect of deterioration agencies on materials.

DESIGN AND ECONOMIC CONSIDERATION IN MAINTENANCE
Factors to reduce maintenance at design stage, consideration of maintenance aspects in preparing tender document and specifications, sources of error in design which enhances maintenance and its importance at design stage. Economic consideration in maintenance: physical life, functional life, economic life of different types of buildings, discounting technique for assessment of economic life.

MAINTENANCE MANAGEMENT
Definition, organization structure, work force for maintenance, communication needs, building inspections, maintenance budget and estimates, property inspections and reports, specification for maintenance jobs, health and safety in maintenance, maintenance manual and their importance.

MATERIALS FOR MAINTENANCE
Compatibility of repair materials, durability and maintenance, types of materials, their specification and application, criteria for selection of material, use of commercial available materials in maintenance.

SECTION- B

INVESTIGATION AND DIAGNOSIS FOR REPAIR OF STRUCTURES
Basic approach to investigations, physical inspection, material tests, non-destructive testing for diagnosis, estimation of actual loads and environmental effects, study of design and construction practices used in original construction, retrospective analysis, and confirmation and repair steps.

MAINTENANCE PROBLEMS AND ROOT CAUSES
Classification of defects, need for diagnosis, type of defects in building elements and building materials defect location, symptoms and causes.

REMEDIAL MEASURES FOR BUILDING DEFECTS
Preventive maintenance and special precautions – considerations, preventive maintenance for floors, joints, wet areas, water supply and sanitary systems, termite control, common repair techniques, common methods of crack repair.
- Repair of existing damp proofing systems in roofs, floors and wet areas.
- Protection, repair and maintenance of RCC elements.
- Repair of finishes.
- Repair of building joints.
- Repair of water supply and sanitary systems, under ground and overhead tanks.
- Common strengthening techniques.
MAINTENANCE OF MULTISTOREY BUILDINGS
(04)
Special features for maintenance of multi-storeyed buildings, including fire protection system, elevators, booster pumps, generator sets.

MAINTENANCE OF SERVICES
(06)
Leakage detection techniques in pipes, cleaning of pipes, replacement of pipes, clogging of sewer pipes, cleaning and their repairs, special precaution required in sewer pipe maintenance, maintenance of septic tanks, maintenance of AC and electrical system in buildings.

BOOKS:
3. Repair and Rehabilitation of Concrete Structures, ACI Compilation 10.
4. Gahlot & Sharma, CBS, Publications
8. W.H. Ransom; Building Failures: Diagnosis and Avoidance, New Age Publications (P) Limited

COURSE NAME : IRRIGATION ENGINEERING -II
COURSE NO. : CIV. 802
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION A  
lectures

THEORIES OF SEEPAGE
(02)
Seepage force and exit gradient, salient features of Bligh’s Creep theory, Lane’s weighted Creep theory and Khosla’s theory, Determination of uplift. Pressures and floor thickness.

DESIGN OF WEIRS
(03)
Weirs versus barrage, design considerations with respect to surface flow, hydraulic jump and seepage flow. Design of barrage or weir.

ENERGY DISSIPATION DEVICES
(03)
Use of hydraulic jump in energy dissipation, Factors affecting design, Types of energy dissipators and their hydraulic design.

DIVERSION HEAD WORKS
(02)
Functions and investigations: component parts of a diversion head work and their design considerations, silt control devices.

SECTION - B

DISTRIBUTORY REGULATORS
(02)
Offtake alignment, cross-regulators – their functions and design, Distributory head regulators, their design, canal escape.

CANAL FALLS
(03)
Necessity and location, types of falls and their description, selection of type of falls, Principles of design, Design of Sarda type, straight glacis and Inglis or baffle wall falls.

CROSS-DRAINAGE WORKS
(03)
Definitions, choice of type, Hydraulic design consideration, Aqueducts their types and design, siphon aqueducts – their types and design considerations, super passages, canal siphons and level crossing.

CANAL OUTLETS
(03)
Essential requirements, classifications, criteria for outlet behaviours, flexibility, proportionality, sensitivity, sensitiveness, etc. Details and design of non-modular, semi-modular and modular outlets.

BOOKS:

4. I.S. Codes.

COURSE NAME : CONSTRUCTION PLANNING & MANAGEMENT
COURSE NO. : CIV. 803
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e. 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION- A

WORKS MANAGEMENT

INTRODUCTION
Need for project planning and management, Engineer’s role in Construction economy, Value engineering, Time value of money.
Construction schedule activity and events, Bar Chart, Milestone Chart, Uses and Drawbacks - evolution of networks

PERT PROGRAMME (EVOLUTION AND REVIEW TECHNIQUE)
Brief History of Evolution of PERT, Salient features, construction of PERT network, multiple time estimates and network analysis, earlier events time, latest even time, forward pass and backward pass, event slack, concept of critical path and its identification, data reduction. Application of statistics to probability of achieving a target data, suitability of PERT for research projects.

CPM (CRITICAL PATH METHOD)
Definitions, network construction, Fundamental rules, assignment of duration of activities, determination of project schedule, activity time estimates earliest start and earliest finish, latest start and latest finish time, float and critical path, Interfering float -0 their significance in project control, identification of critical path.

THREE PHASE APPLICATION OF CPM
Three phases - Planning, scheduling and controlling, updating an arrow diagram, time grid diagram.

PROJECT COST ANALYSIS
Types of project costs direct and indirect cost-time relationships, cost slopes straight-line and segmented approximations, optimum cost and optimum duration, conducting a crash programme, determining the minimum total cost of a project, advantages and limitations of PCM.

SECTION- B

CONSTRUCTION ENGINEERING

PREPARATION OF CONSTRUCTION SCHEDULE FOR A CONSTRUCTION PROJECT
Project description; activities; activity relationship and duration, scheduling, resources; delivering materials; scheduling labour and equipment, Job-layout; Project control during construction; Project supervision; Construction cost control.

FACTORS AFFECTING SELECTION OF CONSTRUCTION EQUIPMENT
Types of equipment; cost of owning and operating equipment depreciation cost; obsolescence cost; investment cost; operating cost; economic lift of equipment; maintenance and repair cost.

EARTH MOVING MACHINERY
Tractor and related equipment; bulldozers; angledozes; ripers; scrappers; power shovels; dragline; slack line; clamshells hoes; trenching machines.
CONSTRUCTION EQUIPMENTS
Cement concrete plants for grading, batching, mixing, types of mixers, handling and transporting concrete, concrete pumps, placing concrete, compacting concrete, bituminous mix plants, pavers and finishers.

HOISTING AND TRANSPORTING EQUIPMENT
Hoists winches, cranes, belt conveyors, ropeways trucks and wagons, balancing the capacity of hauling units with the size of excavator.

BOOKS:
3. Construction Equipment, Planning and Application : Mahesh Verma
4. Project Planning and Control with PERT/CPM : Dr. B.C. Punmia, Luxmi Publications

COURSE NAME : SOLID WASTE MANAGEMENT
COURSE NO. : CIV. 804
L T P : 3 1 0
EXTERNAL: 100
SESSIONAL: 50

Note: The examiner shall set 8 questions i.e 4 from each part and students shall be required to attempt a total of 5 questions with atleast 2 questions from each part.

SECTION- A

INTRODUCTION
Types and sources of solid wastes, Municipal, solid waste, Industrial solid wastes and Hazardous wastes, Present scenarios of municipal and industrial waste management in India.

PROPERTIES OF SOLID WASTES
Physical and chemical composition of municipal solid wastes, waste generation rates, factors effecting waste generation rates.

MANAGEMENT OF SOLID WASTES IN INDIA
Prevalent SWM practices and deficiencies : Storage of waste at source, segregation of wastes, Primary collection of waste, transportation of waste, disposal of wastes, institutional deficiencies.

ENGINEERED SYSTEMS OF SOLID WASTE MANAGEMENT
Design specifications of primary waste collection tools, waste storage bins, transportation vehicles, route selection and provision of transfer stations.

SECTION- B

DISPOSAL OF WASTES
Site selection, rapid EIA of proposed sites, disposal technologies such as : Composting: Aerobic composting, Anaerobic composting, mechanical composting, vermin composting; advantages and limitations of composting technologies, Economics of composting.

ANAEROBIC DIGESTION
Traditional digestors such as KVIC model, Deenbandhu model, emerging technologies for waste stabilisation. Incineration: Fuel Pellets, Refuse derived fuels, mechanical incinerators; advantages and limitations of incineration.

SANITARY LANDFILLING
Method of preparing sanitary landfill site, land filling techniques, operation and maintenance of landfill sites including leachate collection and treatment, recovery of methane from landfill sites for power generation.
HAZARDOUS WASTE MANAGEMENT

BOOKS:

IRRIGATION DRAWING- II

CIV- 806
EXTERNAL:  40
SESSIONAL: 60

DESIGN AND DRAWING OF THE FOLLOWING (USING AUTOCAD)
Unlined Canals
Lined Canals
Guide Bank
Weir or Barrage
Head or cross regulator
Any one fall
A.P.M. Outlet
Syphon Aqueduct.

SEMINAR
CIV- 807

Each student shall be required to deliver presentations and submissions etc. in the class on the topics as suggested by the course teacher.