RULES, REGULATIONS AND SYLLABI FOR TWO-YEAR M.Tech. DEGREE PROGRAMME IN STRUCTURAL & CONSTRUCTION ENGINEERING

(Approved by Board of Studies, Civil Engineering, Kakatiya University)

With effect from the academic year 2013-2014.

DEPARTMENT OF CIVIL ENGINEERING
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
WARANGAL – 506 015.
(Sponsored by Ekashila Education Society)

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
APPROVED BY BOARD OF STUDIES, CIVIL ENGINEERING,
KAKATIYA UNIVERSITY
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE :: WARANGAL-15

APPROVED BY BOARD OF STUDIES, CIVIL ENGINEERING, KAKATIYA UNIVERSITY, WARANGAL.

ACADEMIC REGULATIONS FOR TWO-YEAR M.TECH. DEGREE PROGRAMMES

1.0 MINIMUM QUALIFICATION FOR ADMISSION

Candidates seeking admission to 1st year of Four semester M.E Degree program shall have passed B.E./B.Tech./AMIE or any other equivalent exam in Civil Engineering with at least 50% aggregate marks recognized by the Kakatiya University.

2.0 CONFERMENT OF THE DEGREE

The degree of Master of Engineering in a specified Branch of Engineering will be conferred on a candidate who has fulfilled the following conditions.

2.1 The candidate, after admission to the first year of the four semester M.E degree program, has to pursue a regular course of study for two academic years and

2.2 The candidate must have satisfied the academic requirements of the specified field of specialization in each semester/year hereinafter prescribed.

3.0 THE PROGRAMMES OF STUDY

The programs of study prescribed for the degree of Master of Engineering shall provide for specialization in the following branch.

3.1 Structural & Construction Engineering

4.0 REGULAR PROGRAMME OF STUDY

A candidate will be deemed to have pursued a regular program of study as a full time student provided he/she satisfied the following condition:

4.1 The candidate must not have enrolled as a student in any other degree or diploma program recognized by the Government or Kakatiya University.

5.0 ATTENDANCE REQUIREMENTS

5.1 Attendance requirements of a semester shall be deemed to have been satisfied provided:

5.1.1 The candidate puts in a minimum attendance of 75 per cent in each course of instruction prescribed for the semester.

NOTE: The attendance in case of practicals shall be counted on the basis of the contact hours provided in the scheme of instruction and not on the sessions of engagement. The attendance at the mid-session tests and University examinations shall not be considered in the computation of the percentage of attendance.
5.2 A candidate, who failed to satisfy the above requirements of attendance shall be detained and will not be permitted to appear at the University examinations of that course. A maximum of 10% of attendance can be condoned, on medical grounds, by the Principal with a prior intimation for all the courses of that semester.

5.3 The candidate, who has been detained for failure to satisfy the requirements of attendance, shall be required to re-register and repeat those courses of the semester when they are next offered.

6.0 DURATION OF A SEMESTER

6.1 Each semester of the M.E. degree Programme shall consist of 72 days of instruction, excluding the period of mid-session tests and the University examinations.

7.0 REGISTRATION

7.1 All the students are required to get themselves registered for the course work by paying the prescribed tuition fee before the start of course work of each semester failing which they shall not be allowed to attend the course work prescribed for that semester.

7.2 Candidates detained due to shortage of attendance are to register within 7 days of commencement of class work of the next academic session by paying the tuition fee before the commencement of semester failing which they shall not be allowed to attend the course work prescribed for that semester.

7.3 Registration shall be the sole responsibility of the student.

8.0 EVALUATION

8.1 The performance of the student in every semester thereafter shall be evaluated course-wise as detailed in the scheme of instruction and evaluation.

8.2 The pattern of allocation of marks for University Examinations and sessional work shall be the following.

8.2.1 Theory courses:

\begin{align*}
\text{University Examinations} & \quad 100 \\
\text{Internal Examination} & \\
\text{Mid Examinations} & \quad 25 \\
\text{Continuous evaluation of tutorials & assignments} & \quad 25
\end{align*}

8.2.2 Laboratory/Design/Seminar/Comprehensive Viva

\begin{align*}
\text{Lab} & \quad \text{Design} & \quad \text{Seminar} & \quad \text{Comprehensive Viva} \\
\text{University Examinations} & \quad 50 & -- & -- & \quad 100 \\
\text{Internal Examinations} & \quad 50 & 100 & 100 & -- \\
\end{align*}

(by Continuous Evaluation)

8.3 Internal evaluation of theory courses in each of the semesters shall be based on two mid-session tests of two hours duration. Best of the two tests shall be considered for the award of Internal marks.

8.4 Internal evaluation for other than theory courses shall, in addition to day-to-day work, be based on Viva-voce/Quiz tests/Report/Continuous evaluation.
8.5 Evaluation of the Dissertation work for final submission shall be made jointly by a departmental Research Review Committee and the supervisor on the basis of a minimum of two presentations/semester and assessment of the contribution made by the individual student. Departmental Research Review Committee will be constituted by Head of the Department.

9.0 MINIMUM REQUIREMENTS FOR PASSING A COURSE:

9.1 A candidate is deemed to have passed in a course if he/she secures:
40 percent of the marks assigned to the University examination of the course, and
9.2 40 percent of the marks assigned to the sessionals and University Examination of the course taken together.

10.0 EXAMINATIONS

10.1 Examinations for each semester will be conducted once in an academic year.
10.2 A candidate who failed in a course (theory or practical) can appear at a subsequent University examination in the same course as a supplementary candidate to fulfil the minimum requirements for securing a pass in that course. However, the sessional marks secured by the candidate in that course during the semester of study shall remain unaltered.

11.0 ELIGIBILITY FOR AWARD OF DEGREE

11.1 A candidate shall be deemed to have satisfied the requirements for the award of the M.E degree provided he/she passes in all the courses including dissertation prescribed in the scheme of instruction within a period of four consecutive years from the year of admission to the Programme.
11.2 A candidate who fails to fulfil all the requirements for the award of M.E. degree in a period of four consecutive academic years from the year of his/her admission to the M.E degree Programme shall forfeit his/her enrolment to the Programme.
11.3 Submission of dissertation work is subject to completion of course work of all the semesters.

12.0 AWARD OF DIVISION
Division is awarded as follows:
12.1 Single attempt in every exam. &
Securing 70% or more in aggregate .. 1st class with Distinction.
12.2 Securing 60% or more in aggregate .. 1st class
12.3 Securing less than 60% and more than 40% in aggregate .. Second Class

13.0 GENERAL

13.1 The award of degree to a candidate shall be withheld if:-
13.1.1 He/she has not cleared dues to the institution / Hostel and/or
13.1.2 A case of disciplinary action is pending against him/her
13.2 The marks secured in sessional evaluation and University examinations shall be shown separately in the marks sheet.
13.3 Whenever ambiguities arise in interpreting the regulations, the standing Committee of Kakatiya University shall have the power to make rules or to issue clarifications for removing such ambiguities.

13.4 The Academic Regulations should be read as a whole for purposes of any interpretation.

13.4.1 These academic regulations shall come into force from the year 2002-2003 for the batches of students who will be admitted in 2002-2003 and subsequent academic years.

13.5 The Total duration for the course shall normally be 24 calendar months. No course shall commence more than once in an academic year.

13.6 A candidate shall have to appear in overall comprehensive Viva-voce Examinations as laid down in the schemes of Examination.

13.7 A candidate who has promoted to third semester examination of Master of Engineering shall be required to register dissertation seminar and defend it through oral Examination.

13.8 A candidate who fails in the oral examination for dissertation shall have to defend it again as per recommendation of the Departmental Research Review Committee.

13.9 For each theory examination there shall be one examiner, who can be from Kakatiya University or any other institution. Theory papers set in such manner shall be subjected to moderation as per the norms of the University.

13.10 An examination board will be set up for comprehensive Viva-voce for M.E. course as per scheme of Examination. The Boards shall consist of the following.

(i) Five internal faculty including the Chairman of DRRC and
(ii) One external examiner.

The Chairman, DRRC and the external examiner will award marks.

13.11 For each dissertation examination there shall be a panel of examiners consisting of one supervisor and one external examiner.

13.12 Every student has to undergo Industrial Training for 8 weeks. However the students who are from industry/organization are exempted from undergoing industrial Training.
CIVIL ENGINEERING DEPARTMENT

The Course Structure and Scheme of Evaluation (Semester wise) for the Post - Graduate Program M.Tech. (Structural and Construction Engineering).

### SEMESTER - I

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Name of The Course</th>
<th>Periods per Week</th>
<th>Internal Examination</th>
<th>End Semester Examination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L / T</td>
<td>P / D</td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td>MECE 101</td>
<td>Numerical and Statistical Methods</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 102</td>
<td>Limit Analysis of Structures</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 103</td>
<td>Advanced Concrete Technology</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 104</td>
<td>Advanced Analysis of Structures</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 105</td>
<td>Construction Techniques and Equipment</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 106</td>
<td>Elective – I</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 107</td>
<td>Structural Engg. Lab</td>
<td>0</td>
<td>3</td>
<td>CW</td>
<td>50</td>
</tr>
<tr>
<td>MECE 108</td>
<td>Material Testing Lab</td>
<td>0</td>
<td>3</td>
<td>CW</td>
<td>50</td>
</tr>
<tr>
<td>MECE 109</td>
<td>Seminar - I</td>
<td>0</td>
<td>1</td>
<td>Presentation</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>7</td>
<td></td>
<td>500</td>
</tr>
</tbody>
</table>

* Elective - I
A. Rehabilitation of Structures
B. Total Quality Management
C. Experimental Stress Analysis
D. Management Information Systems

### SEMESTER - II

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Name of The Course</th>
<th>Periods per Week</th>
<th>Internal Examination</th>
<th>End Semester Examination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L / T</td>
<td>P / D</td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td>MECE 201</td>
<td>Theory of Elasticity and Plasticity</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 202</td>
<td>Design of Bridges</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 203</td>
<td>Seismic analysis and Design of RC Structures</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 204</td>
<td>Construction Planning and Management</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 205</td>
<td>Personal Management</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 206</td>
<td>Elective – II</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>MECE 207</td>
<td>CAD Laboratory</td>
<td>0</td>
<td>3</td>
<td>CW</td>
<td>50</td>
</tr>
<tr>
<td>MECE 208</td>
<td>Design Project</td>
<td>0</td>
<td>3</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>MECE 209</td>
<td>Comprehensive Viva</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>6</td>
<td></td>
<td>550</td>
</tr>
</tbody>
</table>

** Elective - II
A. Composite Construction Materials
B. Theory of Elastic Stability
C. Design of Special Structures
D. Legal Issues in Construction
E. Finance Management
### SEMESTER – III

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
<th>Submission of Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Training</td>
<td>08 Weeks</td>
<td></td>
</tr>
<tr>
<td>Dissertation</td>
<td>16 Weeks</td>
<td>--</td>
</tr>
</tbody>
</table>

### SEMESTER – IV

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissertation</td>
<td>24 Weeks</td>
<td>Excellent / Good / Satisfactory / Not Satisfactory</td>
</tr>
</tbody>
</table>
ME CE 101  NUMERICAL & STATISTICAL METHODS

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

1. Matrices and Linear System of Equations

2. Numerical Solution of Ordinary and Partial Differential Equations

3. Classification and Presentation of Data

4. Probability Distributions

5. Regression Analysis
   Simple Linear Regression, Evaluation of Regression, Confidence Intervals and Tests of Hypotheses, Multiple Linear Regression, Correlation and Regressional Analysis.

Suggested Reading
1. **Introduction**
   A brief review of limit state design philosophy – application to beams.

2. **Behaviour of columns**
   Rectangular and circular columns – Interaction diagrams – uniaxial bending – design for Bi-axial bending.

3. **Behaviour of RC structure in shear and torsion**
   Kani’s theory for shear – Skew bending, Theory for torsion – different modes of failure in shear – design of beams in combined shear, bending and torsion as per IS code.

4. **Limit state of serviceability**
   Calculation of total deflection – crack width.

5. **Yield line theory of slabs**
   Analysis and design of slabs at limit state of failure.

6. **Plastic Analysis of Steel Structures.**

**Suggested Reading**

1. Park and Paulay., *Reinforced Concrete Design*
MECE 103 ADVANCED CONCRETE TECHNOLOGY

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Dra3wing</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

1. **Constituents of Concrete**
   Types of Cement and their composition. Tests on various properties of aggregates.

2. **Properties of fresh Concrete**

3. **Properties of Hardened Concrete**

4. **Admixtures used in concrete**

5. **Special Concretes**

**Suggested Reading**
ME CE 104 ADVANCED ANALYSIS OF STRUCTURES

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

Matrix Methods of Structural Analysis

1. **Flexibility Method**
   Basics, Introduction, Review of matrix algebra, Force method, Basic concepts, Internal forces, external loads and redundants, Relation between internal forces and deformation, determination of redundant forces, various load conditions, relation between displacements and deformation. Application of Flexibility method to pin jointed and rigid jointed plane frames, continuous beams, stresses due to lack of fit, settlement etc.

2. **Stiffness Method**
   Relation between internal forces and displacements, relation between internal forces and internal loads, various load conditions, superposition of stiffness, transformation of stiffness matrix, stresses due to lack of fit, use of sub-matrices, Generalized derivation of stiffness matrix for flexure. Analysis of pin jointed plane frame, rigid jointed plane frames and continuous beams by stiffness method.

Finite Element Method

3. **Fundamental Concepts & Mathematical Modelling**
   Finite Element Method – Concept, Basic theory and application, Advantages and disadvantages, requirement of a model, concept of element, various element shapes, shape functions, Displacement models - Generalized co-ordinate form, Convergence and compatibility requirements.

4. **Analysis & Application**
   Formation of element stiffness matrix in plane stress and plane strain constant strain triangle (CST) elements, Rectangular, quadrilateral and Isoparametric elements. Condensation of internal degrees of freedom. Formation of overall stiffness matrix, Boundary conditions and Solution to overall problem. Applications to structural engineering problems.

Suggested Reading

3. Rajasekharan S., *Finite Element Analysis in Engineering Design*
ME CE 105  CONSTRUCTION TECHNIQUES AND EQUIPMENT

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

1. **Pre-cast and Pre-fabricated Construction**
   Importance of and suitability pre-fabrication, Classification and scope. Advantages and disadvantages of pre-fabrication. Design principles of pre-fabrication system.

2. **Modular coordination:**
   Importance of modular coordination. IS recommendations for modular planning, standardization, mass production and methods of transportation.

3. **Construction equipment**

4. **Hoisting equipment**- hoist winch, chains, and hooks, slings, various types of cranes- tower crane, mobile crane and derrick crane. Safety in crane operation.

5. **Conveying equipment**- various types of belts and conveyors.
   **Concreting equipment**: Concrete mixers, truck mixers, pneumatic Concrete placers, vibrators and Scaffolding.

**Suggested Reading**


**ME CE 106 (A) REHABILITATION OF STRUCTURES**  
(Elective – I)

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

2. Distress in Concrete / steel structures - damage - source - cause - effects - case studies.
3. Damage assessment and Evaluation models - Damage testing methods - NDT - Core samples.
6. Repair and maintenance of buildings - IS standards - Bridge repairs - Seismic strengthening.

**Suggested Reading**

1. RN Raikar, *Diagnosis and treatment of Structures in distress*
2. VK Raina, *Bridge Rehabilitation*
3. WH Ransom, *Building Failures - Diagnosis and Avoidance*
4. Kenneth and Carper, *Forensic Engineering*
ME CE 106 (B) TOTAL QUALITY MANAGEMENT
(Elective –I)

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>


Suggested Reading
MECE 106(C) EXPERIMENTAL STRESS ANALYSIS
(Elective-I)
MECE 106(D) MANAGEMENT INFORMATION SYSTEMS
(Elective-I)
### MECE 107 STRUCTURAL ENGINEERING LABORATORY

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CW</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Viva - Voce</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Study of effect of aggregate/cement ratio on strength of concrete.
3. Study of effect of fine aggregate/coarse aggregate ratio on strength.
4. Mix design methods: (a) I.S. Code method (b) ACI Code method.
5. A study of stress-strain curve of concrete for different mixes and for different rates of loading.
6. A study of correlation between cube strength, cylinder strength, split tensile strength and modulus of rupture.
7. A study of stress-strain curve for Fe-415 and High-tensile steel
8. Study of effect of cyclic loading on steel.
10. Demonstration experiments on Non-Destructive testing of concrete.

**Suggested Reading**
2. SP 23: *Hand Book of Concrete Mix Design*
3. IS 456:2000,
MECE 108 MATERIAL TESTING LABORATORY
ME CE 201  THEORY OF ELASTICITY AND PLASTICITY

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

1. **Introduction**
   State of stress at a point in three-dimensional elasticity - Principal stresses - Octahedral stresses - Strain at a point - Equilibrium and compatibility conditions - Generalized Hooke's law.

2. **Plane Cartesian Elasticity**

3. **Plane Problems in Polar Co – ordinates**
   Solution of two dimensional problem in polar coordinates - Stress distribution in radially symmetric problems - Effect of circular holes - Concentrated force acting on a beam - Stress on a circular disc.

4. **Torsion of Non - circular shafts**

5. **Theory of Plasticity**
   Yielding and various yield criteria – yield surface – Heigh Wester gard stress space subsequent yield surface – loading and unloading – Plastic stress – strain relations – Prandit’s Equations – Relation based on Tresca criteria

**Suggested Reading**
2. Kamal kumar and R.C. Ghai, *Advanced Mechanics of Materials*
MECE 202 DESIGN OF BRIDGES

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

1. **Introduction**
   Types of bridges, materials for construction, codes of practice (Railway and Highway bridges), aesthetics, loading standards (IRC, RDSO, AASHTO), recent developments, box girder bridges, historical bridges (in India and Overseas). Planning and layout of bridges, hydraulic design, geological and geo technical considerations, Design aids, computer software and expert systems.

2. **Concrete Bridges**
   Bridge deck and approach slabs, design of bridge deck systems, slab – beam systems (Guyon and Massonet, Hendry and Jaeger methods), box girder systems, analysis and design.

3. **Steel and Composite Bridges**
   Orthotropic decks, box girders, composite steel – concrete bridges, analysis and design, truss bridges.

4. **Design of Sub-Structure**
   Piers, columns and towers, analysis and design, shallow and deep foundations, caissons, abutments and retaining wall.
   Bridge Appurtenances: Expansion joints, design of joints, types and functions of bearings, design of elastomer bearings, railings, drainage system and lighting.

5. **Long span Bridges**
   Design principles of continuous box girders, curved and skew bridges, cable stayed and suspension bridges, seismic resistant design, seismic isolation and damping devices, construction techniques (cast in-situ, pre-fabricated, incremental launching, free cantilever construction), inspection, maintenance and rehabilitation, current design and construction practices.

**Suggested Reading**
MECE 203  SEISMIC ANALYSIS AND DESIGN OF STRUCTURES

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

1. **Structural Dynamics**
   Introduction; Single and Multi degrees of freedom, Damped and Undamped Systems, Free and Forced Vibrations, Natural Time Period and Frequency, Dynamic Load Factor, Response to a pulsating force, Characteristic shapes, Modal Analysis of Multidegree systems.

2. **Structures with Distributed Mass and Load**

3. **Earthquake Engineering**
   Earthquake – Causes, Types, Intensity and Magnitude, Seismic waves – Measuring Instruments, Ground motions. Indian Seismicity and Past Earthquakes, Seismic zones of India.

4. **Earthquake Resistant Design**
   Introduction; IS Code Specifications - Permissible increase in stresses, Load Factors, Design seismic coefficients, Horizontal Seismic Coefficient – Seismic Coefficient Method, Seismic Zone Factors.

5. **Earthquake Resistant Design of Common Structures**
   Multistoreyed building frames, water tanks – IS code method.

**Suggested Reading**
1. **Introduction**

2. **Networks**

3. **Applications in Construction Engineering**

4. **Construction management**

5. **Decision making in construction industry**
   Benefit cost analysis, replacement analysis, Break even analysis, Risk management in construction industry.

6. **Management information and control systems**

**Suggested Reading**
1. **Introduction**
   Classification and characteristics of composite materials – basic terminology – advantages.

2. **Stress-strain relations**

3. **Cement composites**

4. **Mechanical properties of cement composites**
   Behaviour of ferrocement, fiber reinforced concrete in tension, compression, flexure, shear, fatigue and impact, durability and corrosion.

5. **Application of cement composites**
   FRC and Ferrocement – housing – Water storage – Boats and miscellaneous structures.

**Suggested Reading**
1. Concepts Of Stability
   Equilibrium path, geometric non linearity, stability criteria

2. Buckling Of Columns
   Methods of finding critical loads, critical loads for straight columns with different end
   conditions and loading. Inelastic buckling of axial loaded columns, energy methods, prismatic
   and non prismatic columns under discrete and distributed loading

3. Buckling Of Thin Walled Members Of Open cross-section
   Torsion of thin walled bars, warping non-uniform torsion, torsional buckling under axial
   loading

4. Lateral Buckling Of Beams
   Beams under pure bending, cantilever and simply supported beams of rectangular and I-
   sections – energy methods – solutions of simple problems

5. Buckling Of Rectangular Plates
   Plates simply supported on all edges and subjected to constant compression in or two
   directions.

6. Buckling Of Shells
   Introduction to buckling of axially compressed cylindrical shells.

Suggested Reading
5. Chilver, A.H. Thin walled structures –Chatte and Windus Ltd.
MECE 206(C) DESIGN OF SPECIAL STRUCTURES

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time (Hrs.)</td>
<td>Max. Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

1. **Shells**

2. **Folded Plates**
   Structural behaviour of folded plates – equation of three shears – application of Simpson’s and Whitney’s methods – comparison of cylindrical shells with folded plates.

3. **Grid Slabs**
   I.S. code provisions – analysis and design of grid slabs.

4. **Industrial structures**
   Analysis and design portal – Gable frames – Design of Gantry Girder.

5. **Design of Self Supported Steel Chimney.**

6. **Design of Flat slabs**

**Suggested Reading**
4. Arya & Azmani., Design of Steel Structures
1. **Legal Issues to Project Design and Construction**
   Rights and Duties of Construction Manager as Planner, Decision Maker and Leader, Legal Liability.

2. **Contract Administration**

3. **Professional Liability Considerations**
   Contract Relationship and Liability, Sources of Potential Liability in Construction Industry.

4. **Construction Productivity**

5. **Preparing Bidding Documents**
   Bidding and Award, Construction Management Process During The Bidding And Award Phase, Basic Concepts and Definitions Of Management Methods, Typical Management Methods, Recommended Guidelines For Developing A Workable Management Method.

**Suggested Reading**
5. MECE 206(E) FINANCE MANAGEMENT
   (Elective–II)
<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practicals</th>
<th>Drawings</th>
<th>Mid Semester</th>
<th>End semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>CW 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Viva-Voce 50</td>
</tr>
</tbody>
</table>

1. **Introduction**  
Computer Systems, Computer specifications, peripherals, computer language and developments, concepts of programming, flow charts and algorithms.

2. **C – Language**  
C-Character set, Identifiers and Key words, Data types constants, variables, arrays, declarations, expressions, statement and symbolic constants. Data input and output, arithmetic, unary and relational operators, expressions, assignment and conditional operators, library functions and control statements.

3. **Civil Engineering Applications**  
Preparing and running complete programs in C for civil engineering problems such as analysis of beams, trusses and determinate frames, design of pipes, pavements and footings, slope stability analysis

4. **Computer Aided Design and Drafting**  
Introduction to AutoCAD. Simple exercises like line diagrams, reinforcement detailing using AutoCAD. Developments of plan using Chief Architect. Analysis and Design of concrete and Steel elements using STRAP/STAD-PRO. Exercises on construction engineering and management problems using PRIMA VERA

**Suggested Reading**  
# M.TECH. TIME TABLE

**III SEMESTER - M. Tech. (Structural & Construction Engineering)**

**CLASS WORK TIME TABLE FOR THE ACADEMIC YEAR 2005– 2006**

**Room No. SH 115**

**Class In charge: Sri S.G. Narayana Reddy**

**With effect from: 08 – 08–2005**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>CABD / CONC LAB DUTY *</td>
<td>CEA</td>
<td>ELE-II (NRDM)</td>
<td>SDRCS (MVR)</td>
<td>CPM (VRKNR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>DISSERTATION SEMINAR</td>
<td>SDRCS (MVR)</td>
<td>CPM (VRKNR)</td>
<td>CPM (VRKNR)</td>
<td>****</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>---</td>
<td>CABD / SOIL LAB DUTY *</td>
<td>CPM (VRKNR)</td>
<td>SDRCS (MVR)</td>
<td>ELE-II (NRDM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>---</td>
<td>CASD LAB DUTY *</td>
<td>ELE-II (NRDM)</td>
<td>DSS (AHD)</td>
<td>DSS (AHD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>DESIGN PROJECT</td>
<td>SDRCS (MVR)</td>
<td>CPM (VRKNR)</td>
<td>DSS (AHD)</td>
<td>DSS (AHD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DSS: Design of Special Structures
SDRCS: Seismic Analysis & Design of RC Structures
CPM: Construction Planning & Management
ELE-II: Elective-II
Design Proj: Design Project
Diss.Semin: Dissertation Seminar

*S Lab Duties for GATE Candidates only

---

In Charge
Time Table

Head
Department of Civil Engineering

PRINCIPAL
### I SEMESTER - M. Tech. (Structural & Construction Engineering)

**CLASS WORK TIME TABLE FOR THE ACADEMIC YEAR 2005– 2006**

Room No. BI-106  |  Class In charge: Sri S.G. Narayana Reddy  |  With effect from: 08 – 08–2005
---|---|---

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday</strong></td>
<td>----</td>
<td>NSM (VNC)</td>
<td>LAS (A1)</td>
<td>CEA</td>
<td>DCS (LSR)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Tuesday</strong></td>
<td>DCS (LSR)</td>
<td>DCS (LSR)</td>
<td>GIT (SGNR)</td>
<td>GIT (SGNR)</td>
<td>M.T. LAB DUTY *</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wednesday</strong></td>
<td>TEP (DHK)</td>
<td>TEP (DHK)</td>
<td>NSM (VNC)</td>
<td>NSM (VNC)</td>
<td>GIT (SGNR)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Thursday</strong></td>
<td>LAS (A1)</td>
<td>LAS (A1)</td>
<td>DCS (LSR)</td>
<td>GIT (SGNR)</td>
<td>CONCRETE LAB (A1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Friday</strong></td>
<td>LAS (A1)</td>
<td>NSM (VNC)</td>
<td>TEP (DHK)</td>
<td>TEP (DHK)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Saturday</strong></td>
<td>---</td>
<td>---</td>
<td>----</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

- **NSM**: Numerical & Statistical Methods: Dr. V. Narasimha Charyulu (VNC)
- **TEP**: Theory of Elasticity & Plasticity: Sri D. Hari Krishna (DHK)
- **LAS**: Limit Analysis of Structures: Sri A1
- **DCS**: Design of Composite Structures: Sri L. Sudheer Reddy (LSR)
- **GIT**: Ground Improvement Techniques: Sri S.G.Narayana Reddy (SGNR)
- **CONC. LAB**: Concrete Lab: Sri. A1
- **SEMINAR-I**: Dissertation Seminar

* Lab Duties for GATE Candidates only

---

**In Charge**  
**Time Table**  
**Head**  
**Department of Civil Engineering**  
**PRINCIPAL**