Uka Tarsadia University

M. Tech
040130210 Theory of Elasticity
Semester - II
EFFECTIVE FROM June-2013
A. **Prerequisite:** Study the different types of theorem related to structures

B. **Aim and Objective:** Students can solve the problems using in different types of methods

C. **Subject Code:** 040130210  
**Subject:** Theory of Elasticity

D. **Total:** 65 Hrs.  
[**Lecture:** 4  
**Tutorial:** 1  
**Practical:** 0]

E. **Detailed Syllabus:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Topic Name</th>
<th>Weightage (%)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Introduction</strong></td>
<td>25</td>
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<tr>
<td></td>
<td>Forces, stresses and strains (Three dimensional) plane stress and plane strain problem, cauchy’s strain displacement relations, generalised Hook’s law - navier’s equilibrium conditions - compatibility - Boundary conditions - Beltrami - Michell compatibility equations.</td>
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<td>2.</td>
<td><strong>Airy’s stress function-Saint Venant’s principle</strong></td>
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<td>Airy’s stress function-Saint Venant’s principle- boundary value problems in two-dimensional and three dimensional elasticity -Two dimensional stress - strain problems in Cartesian co-ordinates. Solution of simply supported and Cantilever beams by polynomials.</td>
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<td>3.</td>
<td><strong>Polar Co-ordinates</strong></td>
<td>25</td>
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<td>Prandtl’s theory of torsion-Membrane analogy, Edge Dislocation - Biharmonic equations-Stresses in circular disc - uniqueness of solution- Betti and Maxwell’s reciprocity Theorems-concentrated load action on vortex of wedge (Mitchell’s Problem)-concentrated load action on the free surface of a plate (Filament’s problem) - stress concentration due to circular hole in stressed plate (Kirsch’s problem).</td>
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<td>4.</td>
<td><strong>Introduction to plasticity</strong></td>
<td>25</td>
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F. **Modes of Transaction (i.e. Delivery)**

1. Lectures /discussion method shall be fruitful. It should be supplemented with various appropriate audio-visual aids.
2. Activity assignment or presentation shall be given to students.
G. Teachers Activities/Practicum
The following activities should be carried out by the teachers:
1. Demonstration of various studies of Bridge models.
2. Conduction of presentation for the practical approach.

H. Student Activities/Practicum
The following activities may be carried out by the students:
1. Study of various assignment and analysis of the structures.

I. Text Books

J. Reference Books