<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>L-T-P-Credits</th>
<th>Year of Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE464</td>
<td>REINFORCED SOIL STRUCTURES AND GEO - - SYNTHETICS</td>
<td>3-0-0-3</td>
<td>2016</td>
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</table>

Prerequisite: CE305 Geotechnical Engineering - II

Course objectives:
- To understand the history and mechanism of reinforced soil
- To know the various types of geosynthetics, their functions and applications.
- To enable the design of reinforced soil retaining structures.

Syllabus:

Expected Outcomes:
The students will
i. Understand the history and mechanism of reinforced soil
ii. Become aware about situations where geosynthetics can be used.
iii. Know about various types of geosynthetics and their functions
iv. Be able to do dimple design of reinforced soil retaining walls and reinforced earth beds.

Text Books / References:

<table>
<thead>
<tr>
<th>Module</th>
<th>Contents</th>
<th>Hours</th>
<th>Sem. Exam Marks %</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Introduction -history –ancient and modern structures- Types of geosynthetics, advantages, disadvantages. Functions of geosynthetics and application areas where these functions are</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>PART</td>
<td>Module &amp; Topics</td>
<td>Maximum Marks</td>
<td></td>
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<td>------</td>
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<tr>
<td>A</td>
<td>Module I &amp; II</td>
<td>15</td>
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<tr>
<td>B</td>
<td>Module III &amp; IV</td>
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<tr>
<td>C</td>
<td>Module V &amp; VI</td>
<td>20</td>
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<tr>
<td>Total</td>
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**Note:**
1. Each part should have at least one question from each module.
2. Each question can have a maximum of 4 subdivisions (a, b, c, d).

**FIRST INTERNAL EXAMINATION**

<table>
<thead>
<tr>
<th>PART</th>
<th>Module &amp; Topics</th>
<th>Maximum Marks</th>
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</thead>
<tbody>
<tr>
<td>III</td>
<td>Mechanism of reinforcement action - Equivalent Confining Stress Concept, Pseudo Cohesion Concept, Concept of Expanding soil mass. – Simple problems</td>
<td>15</td>
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**SECOND INTERNAL EXAMINATION**

<table>
<thead>
<tr>
<th>PART</th>
<th>Module &amp; Topics</th>
<th>Maximum Marks</th>
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<tbody>
<tr>
<td>V</td>
<td>Bearing capacity improvement using soil reinforcement – Binquet and Lee’s analysis – Assumptions, failure mechanisms. Simple problems in bearing capacity. Geosynthetics for short term stability of embankments on soft soils. Natural geotextiles, Advantages and disadvantages, functions, erosion control- types of erosion control products, installation methods.</td>
<td>20</td>
</tr>
<tr>
<td>VI</td>
<td>Prefabricated vertical drains along with design principles and installation method Concept of Geocells, Gabion Walls, encased stone columns, geocomposites, soil nailing, geotubes, geobags (only basic concepts), application in landfills.</td>
<td>20</td>
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</table>

**END SEMESTER EXAMINATION**

**QUESTION PAPER PATTERN (End semester examination)**

Maximum Marks : 100

Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note: 1. Each part should have at least one question from each module

2. Each question can have a maximum of 4 subdivisions (a, b, c, d)