Course Specifications

University: Benha University  
Faculty: Benha Faculty of engineering

Programme(s) on which the course is given: Electronic Engineering.
Major or minor element of programme: Major
Department offering the programme: Electrical Engineering technology Dep.
Department offering the course: Electrical Engineering technology Dep.
Academic year / Level: Third year
Date of specification approval: 2009

A- Basic Information

Title: Electromagnetic Field Theory  
Code: E311
Credit Hours: N.A.  
Lecture: 2
Tutorial: 2  
Practical:  
Total: 4

B- Professional Information

1 - Overall aims of course
By the end of this course the, the student will gain the following; explain the principles of field theory in static and time varying field. Describe of Maxwell equations in static field and time varying field. List main principles of field theory and some of its applications. Derive problems in static and time varying field.

2- Intended learning outcomes of course (ILOs)

a. Knowledge and understanding:
- Illustrate the field theory of electric and magnetic field in both static and time varying field by applying Maxwell equations analysis:
- Define electromagnetic wave at any media.
- Mention some basic information as back ground for fourth and fifth year.
- Write Maxwell equations analysis.
- Describe Maxwell equation in static field and time varying field.
b. Intellectual skill

- Analyze Maxwell equations.
- Formulate Maxwell equation in static field and time varying field.
- Apply Maxwell equation in any media with both static field and time varying field.

c- Professional and practical skills

c.1 Perform vector analysis.
c.2 Diagnose Maxwell's equations and its application.
c.3 Perform the static field problems.
c.4 Collect field in any region.
c.5 Perform the boundary conditions between two media.
c.6 Diagnose the time varying field problems.

d- General and transferable skills

d.1 Work in a group.
d.2 Communicate and manage information with supervisor.

3- Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>No. of Hours</th>
<th>Lecture</th>
<th>Tutorial - Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>vector analysis</td>
<td>8</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Coulomb's law</td>
<td>8</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Faraday's law &amp; Ampere's law</td>
<td>14</td>
<td>8</td>
<td>3</td>
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<tr>
<td>Diversion theory</td>
<td>5</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Application of static field problems</td>
<td>5</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Gauss's law</td>
<td>6</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Application on gauss's law</td>
<td>6</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Calculation of Capacitance</td>
<td>6</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Poisson and Laplace theory</td>
<td>6</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Time varying field theory</td>
<td>6</td>
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<tr>
<td>Total</td>
<td>70</td>
<td>42</td>
<td>28</td>
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4– Teaching and learning methods
   4.1- Lectures
   4.2- Tutorials
   4.3- Internet collected information and Self-study projects

5- Student assessment methods
   5-1 Written exams (Final and Midterm), assignments and quizzes to assess knowledge and understanding, solving problems skills and interpretation capabilities of physical phenomena.
   5-2 Oral exams to assess the abilities of discussing physical concepts
   5-3 Practical exam to assess measuring and professional skills

Assessment schedule
   Quiz 1 .........................Week No. 4
   Midterm .........................Week No. 8
   Quiz 2 .........................Week No. 12
   Oral and Practical exam........Week No. 14
   Final written exam ..............Week No. 15

Weighting of assessments
   Mid-term examination 40%
   Final-term examination 60%
   Total 100%

6- List of references
   6.1- Lecture notes
   6.2- Recommended books
7- Facilities required for teaching and learning
Lecture rooms – Tutorial section rooms – computers – Virtual simulation programs

Course coordinator
Head of Department: Assoc. Prof. Ghada Amer
Date: 