Basic Data

(1) Course Title: Electrodynamics (2) Course Code No.: 416 ph
(3) Credit Hours: Three credit hours

Lectures: 2 credit hours
Tut. practice: 1 credit hour
Total hours: 3 credit hours

Professional Data

1) General goals of the course
The course is designed to help student-teachers achieve the following goals:
- The students have to know how emission of electromagnetic radiation together with other physical phenomena could be described in terms of Maxwell's equations

2) Operational learning objectives of the course
By the end of this course, student teachers are expected to achieve the following objectives:
A) Knowledge and Comprehension:
The students have to be acquainted with:

- a.1 Maxwell's equations and their solutions.
- a.2 Gauge invariance, and Lorentz condition.
- a.3 Microscope Maxwell's equations and plane wave nonconductivity medium.
- a.4 Polarization and emission of electromagnetic radiation.
- a.5 Oscillatory electric dipole and radiation field.
B) Cognitive Skills:
(ب) المهارات العقلية:
b.1 Develop an understanding and appreciation for the nature of scientific inquiry
b.2 Apply mathematics, including statistics and calculus and introductory differential equations, to investigations in physics and the analysis of data.
b.3 Locate resources, design and conduct inquiry-based open-ended investigations in physics, interpret findings, communicate results, and make judgments based on evidence.

C) Practical Skills:
(ج) المهارات العملية:
c.1 the appropriate use and storage of scientific equipment.
c.2 safe storage, use, and disposal of materials.

D) Enabling Skills:
(د) المهارات العامة والمنقولة:
d.1 Relate the concepts of physics to contemporary, historical, technological, and societal issues; in particular.
d.2 Relate concepts of physics to current controversies and other issues.
d.3 Construct new knowledge for themselves through research, reading and discussion, and reflect in an informed way on the role of physics in human affairs
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assigned hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lectures</td>
</tr>
<tr>
<td>First</td>
<td>Maxwell's equations and their solutions</td>
<td>2</td>
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<tr>
<td>Second</td>
<td>Maxwell's equations and their solutions</td>
<td>2</td>
</tr>
<tr>
<td>Third</td>
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<tr>
<td>Fourth</td>
<td>Gauge invariance.</td>
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<tr>
<td>Fifth</td>
<td>Lorentz condition.</td>
<td>2</td>
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<tr>
<td>Sixth</td>
<td>equation of potential.</td>
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<tr>
<td>Seventh</td>
<td>Microscopic Maxwell's equations.</td>
<td>2</td>
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<tr>
<td>Eighth</td>
<td>General wave equation.</td>
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<tr>
<td>Ninth</td>
<td>plane wave in nonconductivity medium.</td>
<td>2</td>
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<tr>
<td>Tenth</td>
<td>Polarization and boundary conditions for emission of electromagnetic radiation</td>
<td>2</td>
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<tr>
<td>Eleventh</td>
<td>Polarization and boundary conditions for emission of electromagnetic radiation</td>
<td>2</td>
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<tr>
<td>Twelfth</td>
<td>Oscillatory electric dipole and radiation field</td>
<td>2</td>
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<tr>
<td>Thirteenth</td>
<td>Oscillatory electric dipole and radiation field.</td>
<td>2</td>
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Activities, tasks and assignments:

- Lectures
- Laboratory experiments.
- Demonstrations
- report writing
- brainstorming
- discussions
- Problems and essay assignments.
Assessment and Evaluation tools:

- Semester activities including classroom interactions and Quizzes.
- Oral exam.
- Final exam.
- Lab performance evaluation

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Summative Evaluation table

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Final exam</th>
<th>Fifteenth Week</th>
<th>نهاية الفصل الدراسي</th>
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<tbody>
<tr>
<td>1. Midterm exam</td>
<td>%80</td>
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<td>2. امتحان نهاية الفصل الدراسي</td>
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<td>3. Final oral exam</td>
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<td>3. الاختبار الشفوي</td>
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<td>4. assignments</td>
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<td>4. أعمال السنة</td>
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<td><strong>%100</strong></td>
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<td><strong>المجموع</strong></td>
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</table>

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References:

Introduction to electrodynamics by David J. Griffiths Prentice Hall Int

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Educational Resources

- Computer simulation programs and slides.
- Transparencies.
- Manual of solved problems (answer and solutions)
- Text books.

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Course coordinator:

Head of the Department:

Date: