Course specification

University/Academy: Damanhour
Faculty/Institute: Science
Department: Physics

1. course Data:

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<tr>
<td>Specialization:</td>
<td>No. of instructional units:</td>
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<tr>
<td>Math. &amp; physics</td>
<td>lecture 2hrs/week tutorial 1 practical</td>
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<tr>
<td>Chem. &amp; physics</td>
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2. course Aim

- The course introduces the students to the principles of the special theory of relativity.
- The course introduces the principles of the electrodynamics and its application.

3. Intended learning outcome

a) Knowledge and understanding

A1: Define Maxwell's equation.
A2: Recognize the difference between Galilean and Lorentz transformations
A3: Describe the length contraction time dilation. liquids, diffusion and osmotic phenomenon.

b) Intellectual skills

B1: Analyze scientific problems logically.
B2: Show the difference between Galilean and Lorentz transformations.
### B3: Apply the laws governing the electrodynamics.

### c) Professional skills

C1: Conduct the physical knowledge to analyze a suitable technique to solve problems.

C2: Dissect some physical problems helping in understanding the course parts.

### d) General skills

D1: Use of technology tools: - use the internet/electronic resources to obtain subject specific information,. - use a number of computer packages to present information.

D2: The ability to work in groups: work with other as a part of a team to collect data and/or to produce reports and presentations.

D3: Write reports improving Self-learning: - study independently, set realistic targets and plan work and time to met targets within deadlines.

D4: Write reports and Problem solving: - Regular problem exercises and example will give students the chance to develop their theoretical understanding and problem.

D5: The ability to communicate: Students will have write reports and give oral presentation.

### 4. course content

- Maxwell's equation.
- Frame of references- Galilean transformations.
- Electromagnetic waves in free space.
- Michelson & Morley Exp- Lorentz trans .
- Elementary electrodynamics and application.
- Electric and magnetic dipoles and electromagnetism.
- Length contraction and time dilation - transformation of velocity and acceleration.
- Gauge transformations.
- Boundary value problems in electrodynamics.
- Relativistic mass- total energy and potential energy

| 5. Teaching and learning methods | 5.1. Teaching will be by lectures, exercises.  
5.2. All learning outcomes are delivered through lectures. 
5.3. All lectures and worked examples are given from the lecturer private notes. 
Instructional Methods include:  
- Direct Instruction: lecture, reading, in class research, problem sets, presentations, and guest speakers  
- Instructional Materials: textbook; primary and secondary materials, experts from the field, and electronic media  
- Team Teaching which will include business, university, and community based partners  
- Community based applied concept projects  
- Self-directed, cooperative, and collaborative learning projects  
- Student oral presentations |

| 6. teaching and learning methods for students with special needs | 1- Over head projector  
2- appropriate teaching accommodation and Computers  
3- Laboratory with computer terminal. |

| 7. Student Assessment | 7-1. Semester Work.  
7-2. Mid-Term Examination. |
### 7-3. Final Term Examination

| a) Procedures used: | 7.1. Research and presentation to assess skills of presenting data and discussion.  
7.2. Mid-Term Examination To accesses ability to continue in course  
7.3. Written exam. To accesses ability to remember & understand scientific background. |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| b) Schedule:        | Assessment 1: Semesterwork Week: 4-8  
Assessment 2: Mid-term Week: 10  
Assessment 3: Written final Week: 14 |
| c) Weighing of Assessment: | Mid-Term Examination: ---  
Final-Term Examination: 100  
Semester Work: --- |
|                      | Total: 100 |

### 8. List of Textbooks and References:

a) Course Notes  
Lecturer private notes

b) Required Books (Textbooks)

4. Physics, Part-I, E.Gettys, J.Keller  
5. Book 4 in the Light and Matter series of free introductory physics textbooks
## c) Recommended Books

1. Copyright c2002-2004 Benjamin Crowell All rights reserved. rev. April 1, 2006
2. *Feynman Lectures on Physics* Volumes 1,2,3 - Feynman, Leighton and Sands

## d) Periodicals, websites, etc

- [electrodynam.com/rc/](http://electrodynam.com/rc/)
- [www.plasma.uu.se/CED/Book/](http://www.plasma.uu.se/CED/Book/)
- [electron6.phys.utk.edu/phys594/Tools/e&m/summary/electrodynamics.htm](http://electron6.phys.utk.edu/phys594/Tools/e&m/summary/electrodynamics.htm)
- [hyperphysics.phy-astr.gsu.edu/Hbase/forces/qed.html](http://hyperphysics.phy-astr.gsu.edu/Hbase/forces/qed.html)
- [www.radiophys.univer.kharkov.ua/electrodyn/](http://www.radiophys.univer.kharkov.ua/electrodyn/)
- [encyclopedia.farlex.com/Quantum+electro-dynamics](http://encyclopedia.farlex.com/Quantum+electro-dynamics)
- [www.google.com](http://www.google.com)
- [www.rapidshare.com](http://www.rapidshare.com)
- [www.megashare.com](http://www.megashare.com)

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**Course Instructor:** Dr. Ayman El Okapy

**Head of Department:** Prof. Dr. El. M. Elmaghrby

**Date:** -----/-----/-----