Course specification

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

<table>
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<tr>
<th>1. course Data:</th>
<th>Course code: PHY (402)</th>
<th>Course title: Semiconductors and Solid state physics</th>
<th>Academic year/level: 2010-2011 4th year (second term)</th>
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<td>Specialization:</td>
<td>Special physics, chemistry &amp; physics and Math. &amp; physics</td>
<td>No. of instructional units: lecture 2hrs/week practical 3hrs/week</td>
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2. course Aim

- The course introduces the principles of the electrical properties of solids and semiconductors.

3. Intended learning outcome

a) Knowledge and understanding

A1: Define the Electrical properties of solids.
A2: Recognize the Band theory of solids.

b) Intellectual skills

B1: Show the different types of junctions.
B2: Create theoretical dealing of the topic under investigation.

c) Professional skills

C1: Dissect the difference between Piezo-, pyro- and
ferro-electric materials.

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

d) General skills

| D1: Use of technology tools like 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: The ability to communicate improving Self-learning: - study independently, set realistic targets and plan work and time to met targets within deadlines. |
| D4: Write reports 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

- Semiconductor crystal- band gap- equation of motion
- Intrinsic carrier concentration- impurity conductivity
- Thermoelectric effect- semimetals.
- Semiconductor electronics- current flow-
- Boltzmann transport equation
- Recombination of hole, electron pairs- continuity equation
- Space group in Semiconductor.
- Dielectrics and ferroelectric
- Magnetic resonance.
- Practical physics
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

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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.

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7. **Student Assessment**

7-1. Semester Work.
7-2. Mid-Term Examination.
7-3. **Practical Examination**
7-4. 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. practical exam. To access professional and practical skills.  
7.4. written exam. To accesses ability to remember & understand scientific background. & understand scientific background.

b) Schedule: | Assessment 1: Semesterwork  Week: 4-8  
Assessment 2: Mid-term  Week: 10  
Assessment 3: Practical final  Week: 12  
Assessment 4: Written final  Week: 14

c) Weighing of Assessment: | Mid-Term Examination: 10  
Final-Term Examination: 100  
Practical Examination: 30  
Semester Work: 10  
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Total: 150

8. List of Textbooks and References: |  

a) Course Notes | Lecturer private notes

b) Required Books (Textbooks) | 1- "Introduction to solid state physics", C.Kittel, John Wiley & Sons, Inc.  
2- "Introduction to Solids", L.V. Azaroff, McGrew –
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<tr>
<th>c) Recommended Books</th>
<th>1. Feynman Lectures on Physics, Volumes 1, 2, 3 - Feynman, Leighton and Sands</th>
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<tbody>
<tr>
<td>d) Periodicals, websites, etc</td>
<td><a href="http://rugth30.phys.rug.nl/quantummechanics/">http://rugth30.phys.rug.nl/quantummechanics/</a></td>
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<td><a href="http://phys.educ.ksu.edu/">http://phys.educ.ksu.edu/</a></td>
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<td><a href="http://plato.stanford.edu/entries/qm/">http://plato.stanford.edu/entries/qm/</a></td>
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**Course Instructor:** Dr. El maghrby Mohamed El maghrby

**Head of Department:**

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

Prof. Dr. El. M. Elmaghrby