Course specification

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

1. course Data:

<table>
<thead>
<tr>
<th>Course code:</th>
<th>Course title:</th>
<th>Academic year/level:</th>
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<tbody>
<tr>
<td>PHY (406)</td>
<td>Superconductivity and special course</td>
<td>2010-2011</td>
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<td></td>
<td></td>
<td>4th year (second term)</td>
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<tr>
<th>Specialization:</th>
<th>No. of instructional units:</th>
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<tr>
<td>Special physics</td>
<td>lecture 4hrs/week, tutorial 1hrs/week, practical 3hrs/week</td>
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2. course Aim

- The course introduces the fundamentals of superconductors and its applications.

3. Intended learning outcome

a) Knowledge and understanding

- A1: Define the superconductivity phenomena.
- A2: Explain the fundamentals of BCS theory of superconductivity.
- A3: Recognize the Meissner effect and isotop effect.

b) Intellectual skills

- B1: Discuss the properties of superconductors.
- B2: Show the difference between superconductor and normal metals.
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| **c) Professional skills** | C1: Dissect the properties of superconductors.  
| | C2: prepare the difference between laser type 1 and type 2 superconductors.  
| | C3: Examine the physical knowledge to analyze a suitable technique to solve problems.  
| | C4: 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 to improve **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** | - Thermodynamics of the superconducting transition.  
| | - London equation  
| | - Coherence length.  
| | - BCS theory of superconductivity  
| | - Flux quantization  
| | - Type 2 superconductors |
### 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.

### 6. Teaching and learning methods for students with special needs

1. Overhead projector
2. Appropriate teaching accommodation and computers
3. Laboratory with computer terminal.

### 7. Student Assessment

7.1. Semester Work
7.2. Mid-Term Examination
| Procedures used | 7-3. Practical Examination  
7-4. Final Term Examination |
|-----------------|----------------------------------|
| 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. |
| 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 |
| Weighing of Assessment | Mid-Term Examination: 10  
Final-Term Examination: 200  
Practical Examination: 30  
Semester Work: 10  
Total: 250 |

8. List of Textbooks and References:  
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a) Course Notes  
Lecturer private notes
### Required Books

(Textbooks)

1. "Superconductivity" Charles P. Poole, Jr., Horacio A. Farach, Richard J. Creswick
   *Academic Press, Boston, second edition 2007*


### Recommended Books

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### Periodicals, web sites, etc

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**Course Instructor:**

**Head of Department**

**Date:**

Prof. Dr. El. M. Elmaghrby