Course specification

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

1. Course Data:

<table>
<thead>
<tr>
<th>Course code: PHY (309)</th>
<th>Course title: Statistical physics and Use of computer in physics</th>
<th>Academic year/level: 2009-2010 3rd year (first term)</th>
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<tbody>
<tr>
<td>Specialization: Special physics</td>
<td>No. of instructional units: lecture 3hrs/week tutorial 2hrs/week</td>
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2. Course Aim

- The aim of this course is to provide a unified survey of the statistical physics and thermodynamic physics of gases, including a same treatment of quantum mechanics. Besides, it give fuller insight into the meaning of entropy.

- The course introduces the students to principles of transducers, their applications in computerizing physics data collected in the laboratory and analysis of these data.

3. Intended learning outcome

a) Knowledge and understanding

A1: Recognize the different types of transducers.
A2: Understand the general and special purpose interface cards.
A3: Describe the role of statistical concepts in understanding macroscopic system.
A4: Understanding of some of the research topics in solid state and nuclear physics, including applications.

b) Intellectual skills

B1: Developing the student skills in using interfaces to computers.
B2: Developing the student skills in using the graphical and statistical
analysis of the collected data.

B3: Apply Boltzman distribution for the probability of finding a system in particular quantum state.

c) Professional skills

C1: Use of computers programs in graphical and statistical analysis of the collected data.

C2: Use of transducers and interface cards as input/ output controllers.

C3: Using physical knowledge to design problems.

C4: Solve some physical problems helping in understanding the course parts.

d) General skills

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

D2: Working with others: work with other as a part of a team to collect data and/or to produce reports and presentations.

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

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

D5: Communication: Students will have write reports and give oral presentation.

4. course content

- Introduction – Transducers.
- Thermodynamic laws (Review).
- Partition function.
- Light/ Kinetical displacement- types of interfaces to computers.
- Manwell Boltzman distribution- Fermi-Dirac distribution.
- General and special purpose interface cards.
| Quality Assurance Project  
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Faculty of Science |
|---|
| - Use of transducers and interface cards as input/output controllers  
- Bose Einstein distribution- Application of some simple models  
- Use of computers programs in graphical and statistical analysis of the collected data.  
- Problems solving |
| **5. Teaching and learning methods** |
| 4.1. Teaching will be by lectures, exercises.  
4.2. All learning outcomes are delivered through lectures.  
4.3. 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** |
| Data show – computer – blackboard – Student oral presentations |
| **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. 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 4: Written final   Week: 14  |

| c) **Weighing of Assessment:** | Mid-Term Examination: 25  
|                               | Final-Term Examination: 100  
|                               | Semester Work: 25  
|                               | **Total: 150**  |

8. **List of Textbooks and References:**

<table>
<thead>
<tr>
<th>a) <strong>Course Notes</strong></th>
<th>Lecturer private notes</th>
</tr>
</thead>
</table>

| (Textbooks) | 2. F. Mandl, Statistical physics, Jhon Wiley & Sons Ltd (1983).  
4. Physics, Part-I, E.Gettys, J.Keller  
5. Book 4 in the Light and Matter series of free introductory physics textbooks  
6. Copyright c2002-2004 Benjamin Crowell All rights reserved. rev. April 1, 2006  
7. Feynman Lectures on Physics Volumes 1,2,3 - Feynman, Leighton and Sands |
|---|---|
2. Electronics" by J.M Calvert and J.Mc Cauland, Joha Willy and sons. |
| d) Periodicals, web sites,…,etc | http://electron9.phys.utk.edu/optics421/modules/m5/Interferometers.htm  
http://www.appliedelectronics.com/  
http://www.appliednn.com/  
http://hyperphysics.phy-astr.gsu.edu/Hbase/phyopt/michel.html  
http://physics.bu.edu/py106/Notes.html |

**Course Instructor:** Dr /Shaker Ibrahim  
**Head of Department:** Prof. Dr. El. M. Elmaghrby  

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