Course specification

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

1. course Data:

<table>
<thead>
<tr>
<th>Course code: PHY (407)</th>
<th>Course title: Plasma physics &amp; Computational physics</th>
<th>Academic year/level: 2010-2011 4th year (first term)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialization: Special physics</td>
<td>No. of instructional units:</td>
<td></td>
</tr>
<tr>
<td>lecture 4hrs/week</td>
<td>tutorial 1hrs/week</td>
<td>practical 4hrs/week</td>
</tr>
</tbody>
</table>

2. course Aim

- The course introduces the basic principle of plasma physics with emphasis of plasma sources, fusion research and space plasma physics.

3. Intended learning outcome

a) Knowledge and understanding

A1: Define the plasma interaction with the magnetic field of Sun's surface.
A2: Describe the transmission of electromagnetic waves through plasma.
A3: Recognize the Characteristics of plasma.
A4: Define the minimization and vibration techniques.

b) Intellectual skills

B1: Use the student's skills and creative thought needed to meet new trends in plasma.
B2: Discuss Monte Carlo method.
## 4. course content

- Plasma concept and terminology.
- Orbit theory.
- Random number generator
- Kinetic theory.
- Fluid theory.
- Monte Carlo method.
- Plasma confinement.
- Astrophysical plasma.
- Minimization and vibrational techniques- Eigenvalue problem .
- Computational plasma physics
- Boundary value problem- Few-body problems.

<table>
<thead>
<tr>
<th>5. Teaching and learning methods</th>
<th>5.1. Teaching will be by lectures, exercises .</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.2. All learning outcomes are delivered through lectures.</td>
</tr>
<tr>
<td></td>
<td>5.3. All lectures and worked examples are given from the lecturer private notes.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>6. teaching and learning methods for students with special needs</th>
<th>1- Over head projector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2- appropriate teaching accommodation and Computers</td>
</tr>
<tr>
<td></td>
<td>3- Laboratory with computer terminal.</td>
</tr>
</tbody>
</table>

| 7. Student | 7-1. Semester Work. |
# Quality Assurance Project

Damanhour University  
Faculty of Science

**Assessment**

| Assessment          | 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.

7.4. 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: Practical final  Week: 12  
Assessment 4: Written final  Week: 14

**c) Weighing of Assessment:**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Term Examination</td>
<td>10</td>
</tr>
<tr>
<td>Final-Term Examination</td>
<td>200</td>
</tr>
<tr>
<td>Practical Examination</td>
<td>30</td>
</tr>
<tr>
<td>Semester Work</td>
<td>10</td>
</tr>
</tbody>
</table>

Total: 250

**8. List of Textbooks**

----------
<table>
<thead>
<tr>
<th>and References:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Course Notes</td>
<td>Lecturer private notes</td>
</tr>
</tbody>
</table>
| b) Required Books (Textbooks) | 1- "Introduction to Plasma Phys. And Controlled fusion" by F. Chen, Plenum Press.  
2- "Introduction to Plasma Theory" by D.R. Nicholson, Wiley publisher.  
3- "Waves in dusty space plasmas" by F. Verheest, Kluwer pub. |
| c) Recommended Books | -------- |
| d) Periodicals, web sites,…,etc | 1- WWW.Plasmas.org  
2- WWW.Plasma physics course |

Course Instructor: Dr /Aymn el Okapy

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