Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

PHYS103: General Physics for Engineering and Computer Science

Revised February 2008-02-03 by Dr. Ayman S. Kordi
# Course Specification

<table>
<thead>
<tr>
<th>Institution</th>
<th>King Saud University</th>
</tr>
</thead>
<tbody>
<tr>
<td>College/Department</td>
<td>College of Science / Physics and Astronomy Department</td>
</tr>
</tbody>
</table>

## A Course Identification and General Information

1. **Course title and code:** General Physics for Engineering and Computer Science (PHYS103)

2. **Credit hours** | 4.0 |

3. **Program(s) in which the course is offered.**
   (If general elective available in many programs indicate this rather than list programs)

   **Engineering and Computer Science programs**

4. **Name of faculty member responsible for the course**
   Dr. Ayman Kordi

5. **Level/year at which this course is offered**
   First year

6. **Pre-requisites for this course (if any)**
   NON

7. **Co-requisites for this course (if any)**
   NON

8. **Location if not on main campus**
   NOT APPLICABLE
B  Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

- To provide the student with the basics concepts and principles of Mechanics, which relevant to their further studies.
- To strengthen understanding of the concepts and principles of Mechanics through lectures, laboratory experiments and assessment tools.
- To give students a structured process for solving problems in Mechanics
- To enable students to appreciate the basic principles of mechanics such as velocity & acceleration, forces, Newton’s law of motion, work, energy, and power.
- To enable student to solve physics problem in a structured process.

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

- Electronic materials and computer based programs will be utilized to support the lecture course material.
- The course material was posted on the coordinator web site http://faculty.ksu.edu.sa/akordi/Pages/fast2.aspx, that could be accessed by the students enrolled in the course.
- The lab experiments were reviewed, to enable students to deal with different type of basic instruments and take precise measurements

C. Course Description  (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

<table>
<thead>
<tr>
<th>1 Topics to be Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
</tr>
<tr>
<td>Physics and Measurement</td>
</tr>
<tr>
<td>Motion in One Dimension</td>
</tr>
<tr>
<td>Vectors</td>
</tr>
<tr>
<td>Motion in Two Dimensions</td>
</tr>
<tr>
<td>The Law of Motion</td>
</tr>
<tr>
<td>Circular Motion and Other Applications of Newton’s Laws</td>
</tr>
<tr>
<td>Energy and Energy Transfer</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Potential Energy</td>
</tr>
<tr>
<td>Linear Momentum and Collisions</td>
</tr>
<tr>
<td>Rotation of a Rigid Object About a Fixed Axis</td>
</tr>
</tbody>
</table>

2 Course components (total contact hours per semester):

| Lecture: 45 | Tutorial: NON | Practical: 20 | Other: NON |

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

4 hours weekly for the homework and pre-laboratory reports assignments.

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

(i) Description of the knowledge to be acquired

- Known the Standards of Length, Mass and Time, Dimensional analysis, and Conservation of Units
- Explain the Motion in One and Two Dimension: Position, Velocity and Speed, Instantaneous Velocity and Speed, Acceleration, One Dimensional Motion with Constant Acceleration, Freely Falling Objects, Projectile Motion, Uniform Circular Motion, Tangential and Radial Acceleration.
• Known the Linear Momentum and Collisions: Linear Momentum and Its Conservation, Impulse and Momentum, Collisions in One Dimension, Two Dimensional Collisions.
• Verification of Hook’s Law in elasticity.
• Verification of Boyle’s law and determination of the atmospheric pressure.
• Determination of the coefficient of viscosity of a liquid by Stock’s method.
• Determination of the resultant force of two, three plane forces, by the force-table and by analytical method.
• Determination of the speed of sound by closed-end tube.
• Determination of Young’s Modulus by Searl’s method.
• Determination of the specific heat of a metal by the method of mixing.
• Determination of the relation between the applied work and kinetic energy by the air track method.
• Determination of g by free fall.

(ii) Teaching strategies to be used to develop that knowledge

• In-class lecturing where the previous knowledge is linked to the current and future topics
• Homework assignments
• Tutorial discussions
• Laboratory practice (conducting experiments and writing reports)

(iii) Methods of assessment of knowledge acquired
- In class short MCQs quizzes
- Major and final exams
- Evaluation of lab reports

**b. Cognitive Skills**

(i) Cognitive skills to be developed

- Solve problems on classical mechanics in a structured process.
- Ability to deal with standard instruments

(ii) Teaching strategies to be used to develop these cognitive skills

- Homework assignments
- Problem solving in the tutorial
- Case studies related to the course topics and relevant national industries

(iii) Methods of assessment of students cognitive skills

- Two Midterm exams.
- Homework assignments.
- Class activities.
- Laboratory assignments.
- Laboratory exam.
- Final exam.

**c. Interpersonal Skills and Responsibility**

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- Work independently and as part of a team.
- Manage resources, time and other members of the group
- Communicate results of work to others

(ii) Teaching strategies to be used to develop these skills and abilities

- Conducting group experiments and writing group reports
- Solving problems in groups during tutorial

(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility

- Laboratory exams
- Assessment of the laboratory reports
- Grading homework assignments
d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

- Use the computer for analysing and processing the experimental data
- Use computational tools
- Report writing

(ii) Teaching strategies to be used to develop these skills

- Writing laboratory reports
- Incorporating the use and utilization of computer in the course requirements

(iii) Methods of assessment of students numerical and communication skills

- Evaluating the laboratory written reports

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- Not applicable

(ii) Teaching strategies to be used to develop these skills

Not applicable

(iii) Methods of assessment of students psychomotor skills

Not applicable

5. Schedule of Assessment Tasks for Students During the Semester

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Assessment task (eg. essay, test, group project, examination etc.)</th>
<th>Week due</th>
<th>Proportion of Final Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Class activates (in class quizzes, and homework)</td>
<td>weekly</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>Major exams I</td>
<td>6</td>
<td>10%</td>
</tr>
</tbody>
</table>
Major exams II | 12 | 10%
---|---|---
Final exam | 16 | 50%
Lab activates | weekly | 25%

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)
   - Office hours 6 hr/week

E Learning Resources

1. Required Text(s)
   - Physics for Scientists and Engineers, Serway Jewett, 6th Edition, THOMSON BROOKS/COLE

2. Essential References

3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)
   - University Physics, Young and Freedmann, 11th Edition, PEARSON ADDISON WESLEY

4. Electronic Materials, Web Sites etc
   - http://faculty.ksu.edu.sa/akordi/Pages/fast2.aspx
   - Web resources Key comes with University Physics, Young and Freedmann, 11th Edition, PEARSON ADDISON WESLEY

5. Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)
   - Lecture room with at least 25 seats
   - Auditorium of a capacity of not less than 100 seats for large lecture format classes
   - Physics laboratory with at least 25 places
2. **Computing resources**

- Computer room containing at least 15 systems
- Scientific calculator for each student.

3. **Other resources (specify – eg. If specific laboratory equipment is required, list requirements or attach list)**

- Availability of equipment relevant to the course material
- Safety facilities

---

### G Course Evaluation and Improvement Processes

1. **Strategies for Obtaining Student Feedback on Effectiveness of Teaching**

   - Course evaluation by student
   - Students- faculty meetings

2. **Other Strategies for Evaluation of Teaching by the Instructor or by the Department**

   - Peer consultation on teaching
   - Departmental council discussions
   - Discussions within the group of faculty teaching the course

3. **Processes for Improvement of Teaching**

   - Conducting workshops given by experts on the teaching and learning methodologies
   - Periodical departmental revisions of its methods of teaching
   - Monitoring of teaching activates by senior faculty members

4. **Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)**

   - Providing samples of all kind of assessment in the departmental course portfolio of each course
   - Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy
   - Conducting standard exams

5. **Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.**
• The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.
• The head of department and faculty take the responsibility of implementing the proposed changes.