Course Description of Thermodynamics

The course is presented through the teacher preparing Programme.

This is a core course in the programme.

The Curriculum and Instruction Department is responsible for the programme.

The physics Department is responsible for teaching the course.

The course is targeted to be presented for second Year for physics section students.

Date of accrediting the course description ( )

Basic Data

(1) Course Title: Thermodynamics
(2) Course Code No.: 217 ph
(3) Credit Hours: four credit hours
   Lectures: 2 credit hours
   laboratory: 2 credit hours
   Total hours: 4 credit hours

Professional Data

1) General goals of the course

The course is designed to help student-teachers achieve the following goals:

The students will be trained on applications of conversation of energy with in the context of thermodynamics.

2) Operational learning objectives of the course

By the end of this course, student teachers are expected to achieve the following objectives:

A) Knowledge and Comprehension:

The student have to recognize the following:

1- Systems, state variables and thermo dynamical processess.
2- Work, internal energy and first law of thermodynamics and its applications in different processes.
3- Concepts of enthalpy, surface energy and transformation of heat into work and the associated applications.
4- Second law of thermodynamics, concept of entropy and the associated processes

B) Cognitive Skills: (ب) المهارات العقلية:
- Demonstrate competence in the practice of teaching as defined within the Entry-Level Standards.
- Promote the maintenance of a safe science classroom, including the appropriate use and storage of scientific equipment, and safe storage, use, and disposal of materials;

C) Practical Skills: (ج) المهارات العملية:
- Locate resources, design and conduct inquiry-based open-ended investigations in physics, interpret findings, communicate results, and make judgments based on evidence.
- Demonstrate competence in the practice of teaching through investigative experiences and by demonstrating the application of the scientific process and assessing student learning through multiple processes.
- Acquire hands on practical skills.
- Biological and engineering applications.

D) Enabling Skills: (د) المهارات العامة والمنقولة:
- Construct new knowledge for themselves through research, reading and discussion, and reflect in an informed way on the role of science in human affairs.
- Create and maintain an educational environment in which conceptual understanding will occur for all science students.

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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Lectures</th>
<th>Laboratory</th>
<th>Total</th>
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<tbody>
<tr>
<td>First</td>
<td>Thermodynamics systems and static variables.</td>
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<td>Second</td>
<td>Types of thermodynamics processes.</td>
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<td>Thermodynamics equilibrium.</td>
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<tr>
<td>Third</td>
<td>Work in thermodynamics.</td>
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<td>Internal energy of a gas.</td>
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<tr>
<td>Fourth</td>
<td>Point and path functions.</td>
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<td>Fifth</td>
<td>First law of thermodynamics and conversation of energy.</td>
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<td>Sixth</td>
<td>Applications of the first law in different processes.</td>
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<td>Seventh</td>
<td>Enthapy.</td>
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<tr>
<td>Eighth</td>
<td>Surface energy.</td>
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<td>Ninth</td>
<td>Transformation of heat into work and thermal efficiency.</td>
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<td>Tenth</td>
<td>Heat engines.</td>
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<td>Eleventh</td>
<td>Carnot cycle and refrigerator</td>
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<td>Twelfth</td>
<td>Second law of thermodynamics</td>
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<td>Thirteenth</td>
<td>Entrophy in reversible and irreversible processes.</td>
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<td>Thermodynamics function..</td>
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Activities, tasks and assignments:

- Solves and discusses problem sets.
- Computer aided and web based assignments and assessment.
- Lecture.
- Laboratory experiments.
- Problems and essay assignments.

Assessment and Evaluation tools:

- Semester activities including classroom interactions and Quizzes.
- Mid – term exam
- Lab performance evaluation.
- Oral exam.
- Final exam.

Summative Evaluation table

<table>
<thead>
<tr>
<th>First Assessment</th>
<th>Midterm exam</th>
<th>Seventh Week</th>
<th>Score</th>
<th>Assessment Weight</th>
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<td>1. Midterm exam</td>
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<td>2. Final written exam</td>
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<td>3. Final oral exam</td>
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النسبة المئوية لكل تقييم

1. امتحان نصف الفصل الدراسي
2. امتحان نهاية الفصل الدراسي
3. الامتحان الشفوي
4. اعمال السنة

المجموع %100
References:

Students’ Textbooks

1. Students’ Textbooks
2. Lecturer’s References
3. Websites

Resources

- Computer simulation programs and slides.
- Transparences.
- Manual of solved problems (answer and solutions)
- Textbooks:
  1. ‘Heat Thermodynamics’
     Zemansky & dittman, McGrwe – Hill Company.
  2. "Physics Principles with applications", d.c Giancoli,USA.
     "University Physics" F.W Sears, M.W Zemasky and H.D Young, Wesley Series in Physics

Course coordinator:

Head of the Department:

Date: