

## **211099, Preliminary Physics / Tentative Content**

**Providing Department :** Basic Sciences & Mathematics, Faculty of Science

**Module Coordinator(s) :** Dr. Zuheir El-bayyari

**Level :** 1

**Credit :** 3 credit hours

**Prerequisite :** None

**Lecturer :** Dr. Zuheir El-bayyari

### **Aims:**

This module is non credited course, it is offered to the student who does not study physics in high school. The module will introduce the student to the basic language and ideas of physics. The main objective of this preliminary physics is to prepare the student to do the credited physics course 211104. and to develop the scientific thinking through solving problems.

### **Teaching Method :**

Duration: 16 weeks in first semester, 48 hours in total

Lectures: 45 hours in total, 3 per week (including two 1-hour midterm exams)

Tutorials: 13 in total, 1 per week.

### **Learning Outcomes:**

At the end of this course the student is expected to gain understanding some of the basic laws that govern our world. Studying physics as a basic science is not particularly easy, but we believe it is rewarding, particularly for students planning further training in related sciences. This will be accomplished by understanding principles of motion of a particle, mechanical energy, Newton's Laws of Motion, Work Energy and Power, Elastic Properties of Materials, Heat, Temperature and the Behaviour of Gases, Electric Forces , Fields and Potentials, Direct current.

### **Assessment of Learning Outcomes**

The learning outcomes are assessed by two tests, a variety of assignments during the semester and a final examination.

### **Mode of Assessment:**

Two 1-hour midterm exams (20 % each); assignments (10 %); Final 2-hours examination (50%).

### **Syllabus:**

- **Vectors :** Coordinates systems and frames of reference, vectors and scalars, some properties of vectors, components of a vector and unit vectors[3 hours].
- **Motion in a Straight Line:** Displacement, Average velocity, Instantaneous velocity, average acceleration, instantaneous acceleration, one dimensional motion with a constant acceleration, applications [3 hours].
- **Newton's Laws of Motion:** The concept of force, Newton's first law, Newton's second law, weight, Newton's third law, some applications of Newton's laws [4 hours].
- **Work and Energy:** work done by a constant force, work and kinetic energy, applications [3 hours].
- **Elastic Properties of Materials:** General aspects of stress and strain, Young's modulus, elastic limit, shear modulus, bulk modulus, some applications [3 hours].
- **Heat, Temperature and the Behaviour of Gases :** Temperature scales, molecular masses, pressure, the ideal gas law, temperature and molecular energies, diffusion [3 hours].
- **Thermal Properties of Matter:** Thermal expansion, heat capacity, molar heat capacity, specific heat capacity, latent heat of fusion, latent heat of vaporization, phase changes, heat conduction [ 3 hours ].

- **Charge and Matter:** Introduction to electrostatics, Insulators and conductors, definition of average and instantaneous electric current, Coulomb's law, and electrical forces with some applications [3 hours].
- **Electric Field :** Definition, properties of electric field, electric field lines, motion of a charged particle in a uniform electric field [3 hours].
- **Gauss's Law :** Electric flux, Gauss's law, applications of Gauss's law to electrostatics [3 hours].
- **Electric Potential:** Basic definition, potential difference between two points and electric potential, potential difference in a uniform electric field, applications to electrostatics [3 hours].
- **Capacitance:** Definition of capacitance, capacitors networks, energy stored in a capacitor [3 hours].
- **Current and Resistance:** Electric current, resistance and Ohm's law, electrical energy and power [ 3 hours].
- **Direct current Circuits:** Electromotive force, resistors networks, Kirchhoff's laws [4 hours].

**Course Time Table:**

Week	Date	Subject
1	08-10-2006	Vectors
2	15-10-2006	Motion in Straight Line
3	22-10-2006	Newton's laws of Motion
4	29-10-2006	Newton's laws of Motion
5	05-11-2006	Work, Energy and Power
6	12-11-2006	Elastic Properties of Materials
7	19-11-2006	Heat, Temperature
8	26-11-2006	Behaviour of Gases
	30-11-2006	<i>Last day for the first exam, time table will be announced by the Faculty of Science.</i>
9	03-12-2006	Thermal Properties of Matter
10	10-12-2006	Charge and Matter
11	17-12-2006	Electric Field
12	24-12-2006	Gauss's Law
13	31-12-2006	Electric Potential
14	07-01-2007	Capacitance
	09-01-2007	<i>Last day for the second exam, time table will be announced by the Faculty of Science.</i>
15	14-01-2007	Current and Resistance
16	21-01-2007	Direct Current Circuits.
	28/01-07/02/2007	Final Exam

**Attendance Policy :**

Lecture attendance is mandatory. The course notes and the textbook are not comprehensive, and additional material will be covered in lectures. The student is responsible for all material covered in lectures.

**Expected Workload:**

On average the student should expect to spend about 9 hours per week on this module.

**Important Dates :**

1. 1<sup>st</sup> and 2<sup>nd</sup> exams dates will be announced by the faculty of science for all sections.
2. Report Submission: Three weeks before the final exam date.
3. Final Exam : announced by the admission and registration office, please always check !!.

**Feedback:**

Concerns or complaints should be expressed directly and immediately to the course lecturer. At the end of the course, the students will fill a course evaluation form, evaluating the course contents, its teaching, the learning, assessment methods, and the lecturer. Analysis of the student's feedback will be useful to improve the quality of teaching and learning processes and related activities.

**Textbooks and Supporting Material:**

**Recommended texts:**

- 1- Joseph W. Kane and Morton M. Sternheim **Physics**, Third edition, John Wiley & Sons, 1988. (ISBN : 0-471-63845-5).

The above book does not cover exactly the material in this module in details. It is useful for a short and quick review of the material and for practicing on a short problems and questions solving. Therefore; for a more detailed material, discussions and improvements of your study on the module, refer to the following supporting references:

**Supplementary texts:**

- 1- Raymond A. Serway, **Physics for Scientists and Engineers**, 4<sup>th</sup> edition, Saunders Golden Sunburst Series, 1990.
- 2- D. Halliday and R. Resnick **Fundamentals of Physics**, 6<sup>th</sup> edition , 2002 (ISBN:0471228575).
- 3- H. D. Young and R. A. Freedman **University Physics**, 9<sup>th</sup> edition, Addison – Wesley, 1996. (ISBN:0-201-57157-9).
- 4- H. D. Young, R. A. Freedman, T. R. Sandin, And A. Lewis Ford, **Sears and Zemansky's University Physics**, 10<sup>th</sup> edition, 2000. (ISBN: 0-201-60322-5).

**Instructor:**

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