Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Department of Basic and Applied Science

University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology

Program: B.Sc. Mechanical Engineering

Form No. (12)
Course Specification

1- Course Data

Course Code: **BA 113**	Course Title: **Physics I**		Academic Year/Level: **1st** year / **1st** semester
Specialization: **All Programs**	No. of Instructional Units	Lecture	Practical
	3 credits	**2 hrs.**	**2hrs.**

2- Course Aim

1- To introduce the basic physical concepts of electricity, magnetism.
2- To introduce the applications of these physical concepts to engineering problems.
3- To expand upon and reinforce these concepts in the laboratory.

3- Intended Learning Outcome (ILO's)

a- Knowledge and Understanding	K1) Concepts and theories of mathematics and sciences, appropriate to the discipline. Introduce Coulomb's Law as the law of electric force Explain the concept of charge configuration and introduce Gauss's Law Explain the concept of electric potential energy Introduce the concept of the total energy of a charge configuration. Explain the concept of capacitance. Discuss different types of capacitors Introduce the concept of polarization, dielectic, and dielectric breakdown Explain the concept of electric current and emf. Introduce concepts of nodes and loops. Describe the magnetic force on charges, currents, and the magnetic torque. Explain Biot-Savart's law to obtain the magnetic field due to a line segment. Explain Ampere's law K2) Basics of information and communication technology (ICT) Define electric charge as a fundamental property of matter.(K2) List different methods of charging. Introduce Coulomb's Law as the law of electric force Explain the concept of charge configuration and introduce Gauss's Law Explain the concept of electric potential energy Introduce the concept of the total energy of a charge configuration. Explain the concept of capacitance. Discuss different types of capacitors Introduce the concept of polarization, dielectic, and dielectric breakdown Explain the concept of electric current and emf. Introduce concepts of nodes and loops. Explain Kirchoff's laws

	Describe the magnetic force on charges, currents, and the magnetic torque. Explain Biot-Savart's law to obtain the magnetic field due to a line segment. Explain Ampere's law • Explain Faraday's law of induction.(K2) List methods of induction.
b- Intellectual Skills	I2) Select appropriate solutions for engineering problems based on analytical thinking. Apply the student's knowledge of vectors for solving electric force problems. Illustrate the concept of symmetry in solving electric field problems. Compare the concepts of gravitational potential energy and electric potential energy. Analyze factors affecting the value of capacitance Relate knowledge of dielectric with natural phenomenon such as lightning and sparks Apply mathematical and computational methods (Cramer's rule). Apply mathematical and computational methods (Cross product). Apply the law for various current configurations Compare between Ampere's law and Gauss's law
c- Professional Skills	P5) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results. Compare between different types of capacitors. Compare between the DC potential used in various applications. Interpret lab data.(P5) Interpret lab data Relate AC current with Faraday's law.
d- General Skills	

4- Course Content

Lecture		
Wk	Hrs	Description
1	2	Electrostatics.
2	2	Coulomb's law.
3	2	Gauss's law.
4	2	Electric potential energy.
5	2	Capacitance and capacitors.
6	2	Polarization and dielectrics.
7	2	7^{th} week exam
8	2	Electric current, resistors and emfs.
9	2	Kirchhoff's rules.
10	2	Magnetic field, magnetic forces.
11	2	Biot-Savart's law.
12	2	12^{th} week exam
13	2	Ampere's law.
14	2	Faraday's law of induction.
15	2	Revision.
16	2	Final Exam

5-Teaching and Learning Methods

1. Lectures
2. Tutorials
3. Lab work

6-Teaching and Learning Methods for Students with Special Needs

1. Consulting with lecturer during office hours.
2. Consulting with teaching assistant during office hours.
3. An academic supervisor is appointed for handicapped students. Constant follow ups are done for handicapped students after each assessment to evaluate their academic level of achievement.

7- Student Assessment

a- Procedures used:	1. Written examinations to assess the intended learning outcomes. 2. Continuous assessment (reports, discussions, projects,……) to assess the Intellectual skills.
b- Schedule:	Assessment 1: 7th Week Written Exam Assessment 2: 12th Week Written Exam Assessment 3: Continuous Assessments Assessment 4: 16th Week Final Written Exam
c- Weighing of Assessment:	7th Week Examination : 30 % 12th Week Examination: 10 % Final-term Examination: 40 % Oral Examination : 0 % Practical Examination : 10 % Semester Work : 10 % Total : 100%

8- List of References:

a- Course Notes	No notes
b- Required Books (Textbooks)	Physics for Scientists and Engineers with Modern Physics. John W. Jewett, Jr., Raymond A. Serway
c- Recommended Books	
d- Periodicals, Web Sites, ..., etc.	

Course coordinator: **Program Manager:**