Course Specification
(Bachelor)

Course Title:	Principles of Physics (2)
Course Code:	205-PHYS-3
Program:	BS in Computer Science BS in Information System BS in Computer and Network Engineering
Department:	Physics Department
College:	College of Science
Institution:	Jazan University, Jazan
Version:	2023
Last Revision Date:	11-30-2023

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A. General information about the course:

1. Course Identification

1. Credit hours: (3 H)					
2. Course type					
A.	☐ University	☒ College	☐ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Level -4 / Year 02)					
4. Course General Description: **This course provides basic concepts in the electric field, Gauss's law, electric potential, capacitance and dielectric, direct current circuits, particles in a magnetic field, Biot Savart's law, Ampere's law, and Faraday's law. It also covers the electrical conduction of metal, insulators, semiconductors and semiconductor devices.**					
5. Pre-requirements for this course (if any)**: 204 phys-4**					
6. Co-requisites for this course (if any)**: None**					
7. Course Main Objective(s):					

This course is designed to provide students with basic principles of

- **Particles in an electric field and electric field of continuous charge distributions.**
- **Electric flux and Gauss's law of various charge distributions.**
- **Electric potential, potential difference and the relation between electric field and potential.**
- **Capacitance, the combination of capacitors and energy stored in a capacitor.**
- **Direct current circuit analysis.**
- **Charged particle in a magnetic field, Biot-Savarat law, Amper's law, Faraday's law.**
- **Alternating current circuits analysis.**

- **Basic properties and characteristics of semiconductor materials and devices.**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	22	50
2	E-learning	-	-
3	Hybrid ● Traditional classroom ● E-learning	-	-
4	Distance learning	22	50

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	22
2.	**Laboratory/Studio**	22
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		44

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recall units of charge, electric field, electric potential energy and difference, electric flux, capacitance,	PLO 1.1	Lectures and discussion	Homework assignments, Midterm exams and final exam.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	electric current, and the magnetic field.			
1.2	Define all the physical quantities related to electric and magnetic fields, capacitance, flux, electric current, magnetic field, potential difference and electric energy, Biot-Savart law, Ampere's law, Faraday's law, semiconductors, and diodes.	PLO 1.2	Lectures and discussion	Homework assignments, Midterm exams and final exams.
2.0	**Skills**			
2.1	Solve problems related to Biot-Savart law, Ampere's law, Faraday's law, DC-circuits, Gauss's law, capacitance and capacitors, AC-circuit analysis, resistors, and motion of charges in magnetic fields.	PLO 2.1	Lectures and discussion	Homework assignments, Midterm exams and final exams.
2.2	Perform experiments using different analogue and digital devices and plot the characteristics of different types of devices.	PLO 2.2	Teamwork, cooperation	Check the performance, Mid and final exam
2.3	Develop communication competencies during interactive	PLO 2.3	Interactive discussion- Case study, group project, open	Project work, Written reports, written assignments, presentations

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	discussions and group assignments.		discussion - reviews	
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate skills to work in groups and take responsibility for other's safety in the lab.	PLO 3.1	Group discussion, Direct evaluation	Group discussion, Direct evaluation

C. Course Content

No	List of Topics	Contact Hours
1.	**Electric Fields:** Particles in an electric field, electric field of a continuous charge distribution, electric field lines, motion of charged particles in a uniform electric field.	**3**
2.	**Gauss's Law:** Electric flux, Gauss's law, application of Gauss's law to various charge distributions.	**4**
3	**Electric Potential:** Electric potential, potential difference, potential difference in a uniform electric field, electric potential due to point charges, and electric field from the electric potential.	**2**
4	**Capacitance and Dielectrics**: Definition of capacitance, calculation of capacitance, combinations of capacitors, energy stored in charged capacitors, capacitors with dielectrics.	**2**
5	**Direct current circuits (D.C. circuits):** Electromotive force, resistors in series and parallel, Kirchhoff's rules and RC circuits.	**2**
6	**Magnetism:** Particle in a magnetic field, the motion of a charged particle in a uniform magnetic field, the magnetic force on a current- carrying conductor, Biot–Savart law, the magnetic force between two parallel Conductors, Ampère's law, Faraday's law of induction.	**3**
7	**Alternating current circuits (A.C. circuits)**: AC sources, resistors, capacitors and inductors in AC circuits, RLC series circuits, power in AC circuit, resonance in series RLC circuits.	**3**
8	**Electronics:** Electrical conduction in metals, insulators, and semiconductors (intrinsic semiconductors and doped n-type and p-type semiconductors), semiconductor devices (junction diode, light emitting and absorbing diodes, transistors).	**3**
Total		**22**

Experimental Part

No	List of Topics	Contact Hours
1	Cathode ray oscilloscope for voltage and frequency Measurements.	2
2	Equivalent resistances for series and parallel combinations.	2
3	Kirchhoff's rules.	2
4	The capacitance of capacitors by a discharging method.	2
5	Equivalent capacitance for series and parallel combination.	2
6	Magnetic force acting on a current-carrying conductor.	2
7	Ohms law for simple A.C. inductive and capacitive circuits.	2
8	Series resonance circuit.	2
9	Forward and reverse characteristics of P-N Junction diode.	2
10	Light emitting diodes characteristics.	2
11	Bipolar junction transistor characteristics.	2
Total		22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Homework, student activities and quizzes**	**1-10**	**15**
2.	**Mid-term exam**	**7**	**15**
3.	**Final practical exam**	**12**	**20**
4	**Final exam**	**13**	**50**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	**Fundamentals of Physics; Halliday, Resnik and Walker; John Wiley and Sons Inc., 2007.**

	Electronic Devices; Thomas L. Floyd; Pearson Prentice Hall, Inc,7th Edition, 2005.
Supportive References	**Physics for Scientists and Engineers with Modern Physics; Raymond A. Serway and John W. Jewett, Jr.; Brooks/Cole CENGAGE Learning, 9th edition, 2014.**
Electronic Materials	**http://www.hazemsakeek.com/ http://matweb.com**
Other Learning Materials	

2. Required Facilities and Equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Classrooms and laboratories,**
Technology equipment (projector, smart board, software)	**Smartboard**
Other equipment (depending on the nature of the speciality)	**None**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer, and program leader	Indirect (CES), Indirect peer evaluation
Effectiveness of Students' assessment	Students, Program assessment committee	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
The extent to which CLOs have been achieved	Instructor	Direct/ Indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**DEPARTMENT BOARD**
REFERENCE NO.	**PSCI2415**
DATE	**1/10/2024**