هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	General Physics
Course Code:	**101PHYS**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 4
2. Course type **a.** University ☐ College ☑ Department ☐ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 2nd level/1st year
4. Pre-requisites for this course (if any)**: NIL**
5. Co-requisites for this course (if any)**:NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**45**	**% 60**
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other (lab)**	**30**	**% 40**

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**45**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	**-----**
4	**Others** (specify)	**----**
	Total	**75**

B. Course Objectives and Learning Outcomes

1. Course Description

The course provides Principles of dimensions and units, vectors, motion in one dimension, projectile motion, Newton's laws of motion, work, power and energy. The course covers concepts of linear momentum, collisions, pressure, buoyant force, Archimedes' principle, electric current, resistance, Ohm's law, speed of sound and Doppler Effect. Some practical experiments are included to demonstrate the principles involved.

2. Course Main Objective

This course is designed to provide students with:

- Principles of dimensions and units, vectors, motion in one dimension, projectile motion, work, power and energy.
- Concepts of linear momentum and collisions, pressure, buoyant force, electric current, and resistivity, speed of sound and Doppler Effect.
- Applications of Newton's laws of motion, Archimedes' principle and Ohm's law.
- Skills to solve problems regarding the physical principles.
- Physical experiments to be performed and analyzed.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**State** units of physical quantities, vector quantity, scalar quantity, Newton laws, conservation law of mechanical energy, conservation law of linear momentum. Pascal law, Archimedes's principal, Ohm's law, Doppler effect.	**PLO 1.1**
1.2	**Define** vector quantity, scalar quantity, meter, kilogram, second, position, displacement, distance, velocity, acceleration, force, mass, weight, work, kinetic energy, potential energy, mechanical energy, power, momentum, pressure, density, buoyant force, electric current, current density, resistivity, audible wave, infrasonic wave, ultrasonic wave.	**PLO 1.2**
2	**Skills :**	
2.1	**Calculate** dimension of physical quantity, velocity, acceleration, maximum height, range, force, weight, work, energy, power, momentum, pressure, density, appearance weight, resistance, current, potential difference, speed of sound, sound frequency.	**PLO 2.1**
2.2	**Perform** experiments using different analog and digital devices and plot the characteristics of different types of devices	**PLO2.3**
2.3	**Develop** communication competencies during interactive discussion, group assignments.	**PLO 2.4**
3	**Values:**	
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments	**PLO3.1**
3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	**PLO3.3**

C. Course Content

Theoretical Part

No	List of Topics	Contact Hours
1	Dimensions and units (dimensional analysis and conversion of units).	4.5
2	Vectors (addition, subtraction, multiplication and components of a vector).	4.5
3	Motion in one dimension (one dimensional motion with constant acceleration).	4.5
4	Newton's laws of motion and solve problems regarding their applications.	4.5
5	Motion in two dimensions (projectile motion).	1.5
6	The work, the power and the energy.	4.5
7	Linear momentum and collisions.	4.5
8	Pressure, buoyant force and Archimedes' principle.	4.5
9	Electric current, Ohm's law and specific resistance.	4.5
10	Speed of sound in solids, speed of sound in fluids and Doppler's effect.	4.5
Total		42

Experimental Part:

No	List of Topics	Contact Hours
1	Density of shaped regular solids by accurate measurements	**2**
2	Composition of Forces.	**2**
3	Force and Acceleration –Newton's second law.	**2**
4	Projectile Motion.	**2**
5	Centripetal force experiment.	**2**
6	Determination of acceleration of gravity by Hooks Law and Simple Pendulum.	**2**
7	Density of water using Archimedes' Principle.	**2**
8	Surface tension of water by using metallic ring and capillary tube.	**2**
9	Viscosity of a liquid	**2**
10	Ohm's Law.	**2**
11	Velocity of Sound in Air.	**2**
Total		**22**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**State** units of physical quantities, vector quantity, scalar quantity, Newton laws, conservation law of mechanical energy, conservation law of linear momentum. Pascal law, Archimedes's principal, Ohm's law, Doppler effect.	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
1.2	**Define** vector quantity, scalar quantity, meter, kilogram, second, position, displacement, distance, velocity, acceleration, force, mass, weight, work, kinetic energy, potential energy, mechanical energy, power, momentum, pressure, density, buoyant force, electric current, current density, resistivity, audible wave, infrasonic wave, ultrasonic wave.	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations- Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.0	**Skills**		
2.1	**Calculate** dimension of physical quantity, velocity, acceleration, maximum height, range, force, weight, work, energy, power, momentum, pressure, density, appearance weight,	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	resistance, current, potential difference, speed of sound, sound frequency.	illustration – Problem based learning	**Indirect**: student survey
2.2	**Perform** experiments using different analog and digital devices and plot the characteristics of different types of devices	Hands on lab demonstrations-guided discussion – guided discovery	**Direct** (formative and summative):Evaluation of assignments, Step-by-step checkpoint assessment of experiment, In lab interactive questioning, quizzes, written exams **Indirect:** student survey
2.3	**Develop** competencies in critical thinking, communication and writing lab reports.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
3.0	**Values**		
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey
3.2	**Show** awareness of safety for own and others when dealing with lab equipment	Case study-interactive demonstration-guided discussion	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home work	2	2.5
2	Written test	3	2.5
3	Mid-term exam	6	10
4	Home work	8	2.5
5	Written test	9	2.5
6	Mid-term exam	12	10
7	Final practical exam	14	20
8	Final exam	15	50

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice : At least 16 office hours for each teacher available for student consultations and academic advice

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	**Physics for Scientists& Engineers with Modern Physics; 7th edition, Serway, Saunders Golden Sunburst Series, 2007.**
Essential References Materials	**1-University Physics; H. Young and R. Freedman, Addison-Wesley Publishing Company, Inc., 11th edition, 2004.** 2- **Fundamentals of Physics; Halliday, Resnik and Walker, John Wiley and Sons Inc., 2007.**
Electronic Materials	**http://www.wikipedia.org/** **https://spie.org/** **http://hyperphysics.phy-astr.gsu.edu/**
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

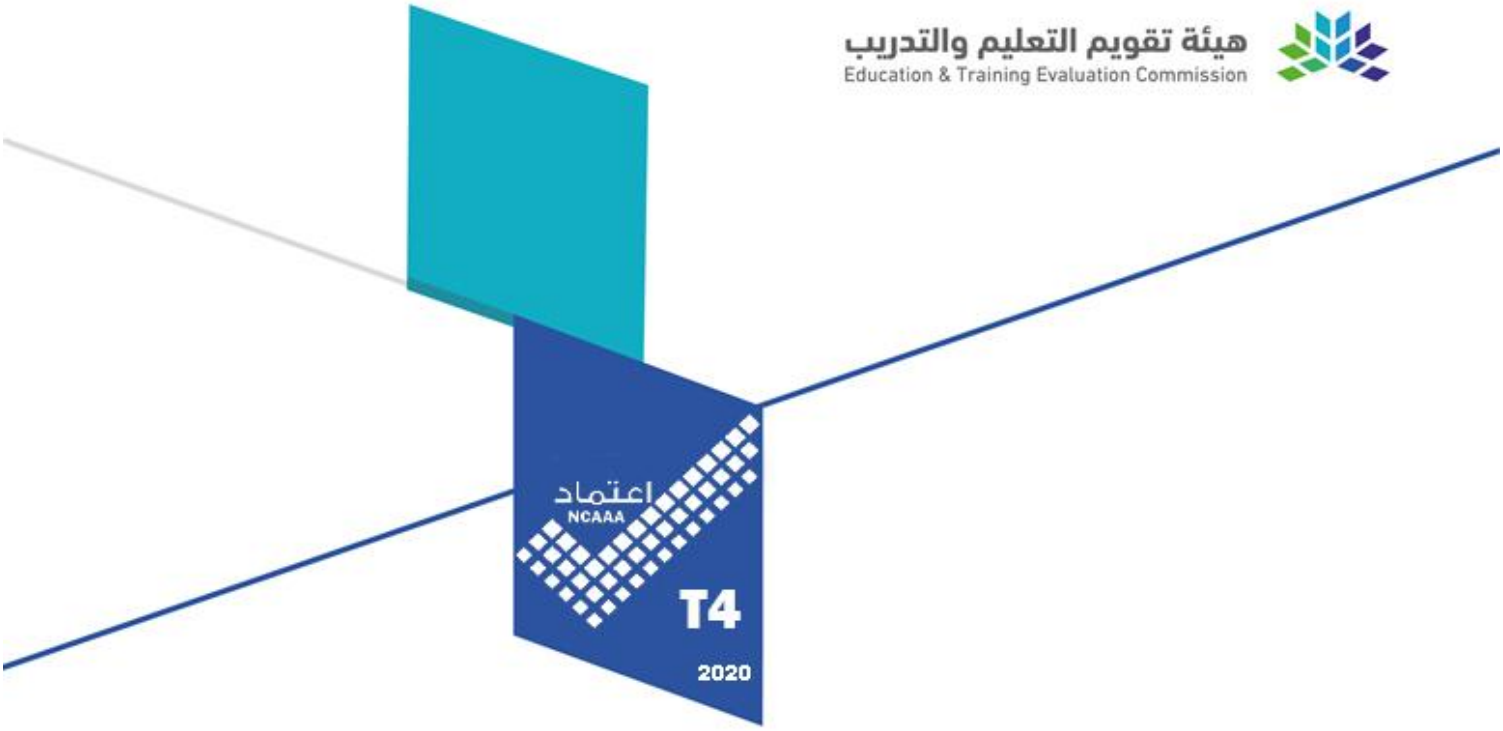
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department council
Reference No.	8
Date	16/4/1442

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**General Physics (Engineering)**	
Course Code:	**101PHYS**	
Program:	**Engineering**	
Department:	**Physics**	
College:	**Faculty of Engineering**	
Institution:	**Jazan University**	

Table of Contents

A. Course Identification

1. Credit hours: 4
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 2 / Year 1 at Engineering College
4. Pre-requisites for this course (if any)**: Nill**
5. Co-requisites for this course (if any)**: Nill**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	45	60%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**	30	40%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**45**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	**-**
4	**Others** (specify)	**-**
	Total	**75**

B. Course Objectives and Learning Outcomes

1. Course Description

The course is a fundamental course in mechanics, properties of matter, sound. As an application to the theoretical part, there is an experimental part contains several experiments.

2. Course Main Objective

The course is designed to provide students with:

- The basic physics of units & measurements, dimensional analysis of physical quantities, vectors, rigid body kinematics and dynamics, rotational motion, elasticity, gravitation, oscillatory motion and sound waves
- Acquaint students with sufficient knowledge and understanding of physics behind various phenomena and scientific/Engineering applications
- Mathematical ability in simple derivation and manipulation of physical formulae.
- Problem-solving skills in related fields of physics
- Lab measurements, recording, data analysis and reporting

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Define** basic measurements and vector analysis in Physics	
1.2	**Describe** the principles of kinematics, gravitation, elasticity, harmonic motion and sound waves	
1.3	**Discuss** the velocity, acceleration, momentum in linear and rotation motion including the Newton's law of universal gravitation	
1.4	**Explain** elastic properties of solids, simple harmonic motion and sound waves	
2	**Skills :**	
2.1	**Calculate, Estimate and Determine** the values of the different physical quantities as, for example, velocity, acceleration, momentum, energy, moduli, amplitude, frequency,…etc.	
2.2	**Perform** experiments to justify and prove different phenomena related to this course	
2.3	**Develop** communication competencies during interactive discussion, group assignments, essays or web-based activities	
3	**Values:**	
3.1	**Demonstrate** work effectively as part of a team in the group assignment and laboratory works	

C. Course Content

No	List of Topics	Contact Hours
1	**Physics and measurements :** - Standard of length, mass and time Dimensional analysis	6
2	**Vectors:** - Coordinate system. - Vector and scalar quantities. - Some properties of vectors. - Components of vector. - Unit vector. - Dot product. Cross product.	6
3	**Particle kinematics and dynamics:** - Position velocity and speed. - Instantaneous velocity and speed. - Acceleration - Energy conservation. Linear momentum.	6
4	**Rotational motion:** - Parameters of rotational motion. Relation between angular and linear parameters.	6
5	**Gravitation:** - Universal gravitation.	3

	- Free fall. Acceleration and gravitational force.	
...	**Elasticity:** - Young's Modulus - Shear Modulus Bulk Modulus	3
4	**Simple harmonic motion:** - Motion of an object attached to a spring. The pendulum.	6
5	**Sound waves** - Sound waves parameters - Standing waves - Resonance in the columns of air	6
...		
Total		42

Practical Parts:

No.	Lab activities/experiment title	Contact Hours
1	Lab preparation	2
2	Experiment 1: Sources of errors and plotting graphs	2
3	Experiment 2: Accurate Measurements	2
4	Experiment 3: Composition of Forces	2
5	Experiment 4: Projectile Motion	2
6	Experiment 5: Free Fall	2
7	Experiment 6: Hook's Law	2
8	Experiment 7: Simple Pendulum	2
9	Experiment 8: Vibrating Spring	2
10	Experiment 9: Velocity of Sound in Air	2
11	Experiment 10: Meld's Experiment	2
Total		**22**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Define** basic measurements and vector analysis in Physics	Lectures and discussion	Homework assignments, Midterm exams and final exam
1.2	**Describe** the principles of kinematics, gravitation, elasticity, harmonic motion and sound waves	Lectures and discussion	Homework assignments, Midterm exams and final exam
1.3	**Discuss** the velocity, acceleration,	Lectures and	Homework

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	momentum in linear and rotation motion including the Newton's law of universal gravitation	discussion	assignments, Midterm exams and final exam
1.4	**Explain** elastic properties of solids, simple harmonic motion and sound waves	Lectures and discussion	Homework assignments, Midterm exams and final exam
2.0	**Skills :**		
2.1	**Calculate , Estimate and Determine** the values of the different physical quantities as, for example, velocity, acceleration, momentum, energy, moduli, amplitude, frequency,…etc.	Examples and problems in lectures and discussion	Homework assignments, Midterm exams and final exam
2.2	**Perform** experiments to justify and prove different phenomena related to this course	Team work, cooperation	Check the performance, Mid and final exam
2.3	**Develop** communication competencies during interactive discussion, group assignments, essays or web-based activities	Interactive discussion, Case study, group assignment	Project work, Written reports, written assignments, presentations
3.0	**Competence**		
3.1	**Demonstrate** work effectively as part of a team in the group assignment and laboratory works	Group discussion, Direct evaluation	Group discussion Direct evaluation

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework/assignment 1**	4	5
2	**First Mid-term exam**	6	10
3	**Homework/assignment 2**	5	5
4	**Homework/assignment 3**	8	5
5	**Homework/assignment 4**	10	5
5	**Second Mid-term exam**	11	10
6	**Lab report and final practical exam**	14	10
7	**Final Exam**	15	50
	Total		100

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Instructor of the course will be available to help the students for further discussion related to the course during office hours.
- Each student is assigned to an academic advisor (staff/ faculty member) who will be available for academic advise/ guidance and counseling during office hours for about 2h per week.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Physics for Scientists& Engineers with Modern Physics; 9th edition, Raymond A. Serway and John W. Jewett, Brooks/Cole, 2014
Essential References Materials	• University Physics; Young and Freedman, pearson, Addison Wesley, 11th edition, 2004. Fundamentals of Physics; Halliday, Resnik and Walker, John Wiley and Sons Inc., 2007
Electronic Materials	• **http://www.physicsclassroom.com/** • **http://www.wikipedia.org/** • **http://de.physnet.net/PhysNet/education.html** **http://www.hazemsakeek.com/**
Other Learning Materials	-

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• A classroom for a group of 50 students equipped with LCD projector, smart board and/or white board. A laboratory for a group of 25 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer lab for 25 students
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Laboratory equipments / apparatus for experiments related course..

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students	Indirect (Survey form)
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect (LO's assessment)
Quality of learning resources	Students, Faculty members	Indirect

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students	Indirect (Survey form)
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect (LO's assessment)
Quality of learning resources	Students, Faculty members	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Department council**
Reference No.	**8**
Date	**16/4/1442**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Physics for Health Specialties**
Course Code:	**105 PHYS-4**
Program:	**All Health Programs at Jazan University**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 4
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 2
4. Pre-requisites for this course (if any)**:** English Language Courses (105 Eng)
5. Co-requisites for this course (if any)**: NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**50**	**67%**
2	**Blended**	**5**	**6%**
3	**E-learning**		
4	**Distance learning**		
5	**Other**	**20**	**27%**

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**42**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	**-**
4	**Others** (specify)	**3**
	Total	**75**

B. Course Objectives and Learning Outcomes

1. Course Description

This course covers the fundamental knowledge of: general laws of motion, heat, fluids, electricity and magnetism, sound, light, and radiation.

2. Course Main Objective

This course has been designed to provide the students by the following concepts:

- Basics of general laws of motion.
- Basics of heat and thermodynamics and its application in metabolism.
- The Role of fluid, gravity in the circulation, blood pressure measurements, viscosity, viscous drag forces, centrifugation, surface Tension, and Surfactant in the Lungs.
- Electricity and magnetism and its applications in medical field.
- Fundamentals of Sound and light and its applications ion health sciences
- X-rays and its applications in medicine.

Harmful Effects of Radiation, Radiation in Medicine, Radiation Detection and Measurements.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Describe** manometer, sphygmomanometer, centrifuge, nerve cell and blood circulatory system	
1.2	**Define** Laws of motion, gravitational forces, the concepts of fluids, the electric potential, current, resistance and capacitance, pacemaker, electricity of axon (resistance & capacitance), Archimedes' principle, Bernoulli equation, types of fluid flow, Laplace law, surface tension, viscous drag force, centrifugation, half-life, radioactivity, absorbed dose, radiation exposure, and radiation units	
1.3		
2	**Skills :**	
2.1	**Solve** problems related to buoyant force, continuity equation, flow rate, Bernoulli equation, Laplace law, viscous drag force, half-life of radioactive material, radioactivity, absorbed dose and biological equivalent dose.	
2.2	**Perform experiments** about Determination of acceleration due to gravity, power of concave mirror and convex lenses, velocity of sound in air, critical angle and refractive index of acrylic substance, Verification of Archimedes principle, Determination of velocity of a fluid by Stokes method, Verification of Ohm's law and law of connection of resistors, Determination of capacitance by discharging capacitor method, Determination of surface tension coefficient of a liquid and Determination of a specific heat capacity of a material.	
2.3	**Develop** competencies in critical thinking, communication and writing lab reports.	
2...		
3	**Values:**	
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	
3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	
3.3		

C. Course Content
Theoretical part

No	List of Topics	Contact Hours
1	**General Laws of Motion**: Measurements, and Units, Density, Newton's laws, Gravitational Force, Weight, Friction , Torques, Equilibrium of Rigid Body, Center of Gravity, Levers and Mechanical Advantage.	6
2	**Heat:** Temperature Scales, Mechanical Work, The First Law of Thermodynamics, Human Metabolism, Heat Capacity, Phase Change, and Heat Transfer (Conduction, Convection and Radiation).	6
3	**Fluids:** Archimedes Principle, Equation of Continuity and Streamline Flow, Bernoulli's Equation, The Role of Gravity in the Circulation, Blood Pressure Measurements, Viscosity, Viscous Drag Forces, Centrifugation,	9

	Surface Tension, Laplace's Law, and Surfactant in the Lungs	
4	**Electricity and Magnetism:** Electric Current, Resistance, Series and Parallel Resistors, Circuit Containing Resistance and Capacitance (Pace Maker), Resistance and Capacitance of an Axon, Magnetic Fields, Magnetic Force on a Moving Charge, and Magnetic Resonance Imaging (MRI).	6
5	**Sound:** The Nature and Speed of Sound, The Intensity of Sound Waves, Auditory Response, and Ultrasound	3
6	**Light:** The Index of Refraction, Reflection of Light, Refraction of Light, Total Internal Reflection, Mirrors and Lenses, Power of Lens, Human Eye and Optical Defects of the Eye.	6
7	**Radiations:** X-Rays, Nuclear Structure, Radioactivity, Half-Life, Radioactive Decays, Radiation Units, Harmful Effects of Radiation, Radiation in Medicine, Radiation Detection and Measurements.	6
Total		**42**

Experimental part

No.	List of Topics	Contact Hours
1	Density measurements using Vernier Calipers and Micrometer	**2**
2	Acceleration due to gravity	**2**
3	Power of concave mirror	**2**
4	Power of convex lens	**2**
5	Velocity of sound in air	**2**
6	Determination of critical angle and refractive index of acrylic substance	**2**
7	Verification of Archimedes principle	**2**
8	Determination of velocity of a fluid by Stokes method	**2**
9	Verification of Ohm's law and law of connection of resistors	**2**
10	Determination of capacitance by discharging capacitor method	**2**
11	Determination of surface tension coefficient of a liquid	**2**
12	Determination of a specific heat capacity of a material	**2**
	Total	**24**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Describe** manometer, sphygmomanometer, centrifuge, nerve cell and blood circulatory system	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations- Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
1.2	**Define** Laws of motion, gravitational forces, the concepts of fluids, the electric potential, current, resistance and	Lectures, blackboard and visualization, brain storming, group and	**Direct** (formative and summative): In class interactive

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	capacitance, pacemaker, electricity of axon (resistance & capacitance), Archimedes' principle, Bernoulli equation, types of fluid flow, Laplace law, surface tension, viscous drag force, centrifugation, half-life, radioactivity, absorbed dose, radiation exposure, and radiation units	interactive discussion, Interactive illustration	questioning, quizzes, written exams **Indirect**: student survey
…			
2.0	**Skills**		
2.1	**Solve** problems related to buoyant force, continuity equation, flow rate, Bernoulli equation, Laplace law, viscous drag force, half-life of radioactive material, radioactivity, absorbed dose and biological equivalent dose.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.2	**Perform experiments** about Determination of acceleration due to gravity, power of concave mirror and convex lenses, velocity of sound in air, critical angle and refractive index of acrylic substance, Verification of Archimedes principle, Determination of velocity of a fluid by Stokes method, Verification of Ohm's law and law of connection of resistors, Determination of capacitance by discharging capacitor method, Determination of surface tension coefficient of a liquid and Determination of a specific heat capacity of a material.	Hands on lab demonstrations- guided discussion – guided discovery	**Direct** (formative and summative):Evaluation of assignments, Step-by-step checkpoint assessment of experiment, In lab interactive questioning, quizzes, written exams **Indirect:** student survey
…	**Develop** competencies in critical thinking, communication and writing lab reports.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
3.0	**Values**		
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey
3.2	**Show** awareness of safety for own and others when dealing with lab	Case study-interactive	**Direct** (formative and summative): In lab

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	equipment's	demonstration- guided discussion	interactive questioning **Indirect**: student survey

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Quiz**	**4th**	**5**
2	**Midterm Exam**	**8th**	**20**
3	**Students activities and assignments**	**10th**	**5**
4	**Laboratory work**	**14th**	**20**
5	**Final Exam**	**16th**	**50**

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students is assigned to a staff member who will be available for help and academic guidance office hours at specific 2h on daily basis.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	**Physics, 3rd Edition, by Joseph W. Kane and Morton M. Sternheim, John Wiley and Sons, New York, 1988.**
Essential References Materials	▪ **Physics in Biology and Medicine, Paul D, Elsevier NC, 3rd Edition, 2008.** ▪ **Medical Physics, by John R. Cameron and James G. Skofronick. A Wiley-Interscience Publication, John Wiley and Sons, New York 1978.** ▪ **College Physics, Raymond A Serway, Chris Vuille and Jery S Faughn, Eight edition.**
Electronic Materials	**http://www.wikipedia.org/**
Other Learning Materials	

2. Facilities Required

Item	Resources

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**- 1 Lecture room(s) for groups of 30 students.** **- 1 Laboratory for group of 25 students.**
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show- smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Physics 2**
Course Code:	**203PHYS**
Program:	**All Engineering Programs**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 4
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 2/year 1 at Engineering College
4. Pre-requisites for this course (if any)**:** 101PHYS
5. Co-requisites for this course (if any)**:** NIL

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	60%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other	30	40%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	30
3	Tutorial	
4	Others (specify)	
	Total	**75**

B. Course Objectives and Learning Outcomes

1. Course Description

This course provides fundamental physics in fluid mechanics, thermodynamics, electrostatics, electric current and magnetic field. The course covers static and dynamic fluids, work, heat, energy transfer, heat engines and laws of thermodynamics, Coulomb's law, Gauss' law, resistance, electric current, potential, electric energy, capacitor and magnetic field. A set of lab experiments related to this course also provided.

2. Course Main Objective

This course is designed to provide students with:

- Fundamental of fluid mechanics including static and dynamic fluids.
- Principles of thermodynamics including work and heat, laws of thermodynamics, energy transfer, and heat engines.
- Basic of electrostatics including Coulomb's law, electric field, Gauss's law, electric potential and capacitor.
- Electric current, resistance, electric power and magnetic field.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Describe** fundamental knowledge of fluid mechanics and laws of thermodynamics	
1.2	**Define** basic of electricity and magnetism	
1.3	**Explain** fluid mechanics including the Pascal's law, buoyant force, continuity equation, Bernoulli's equation and thermodynamic laws, heat in thermodynamic processes, heat transfer mechanisms and heat engines. Electrostatics, current, resistance and magnetic field.	
2	**Skills :**	
2.1	**Solve** problems in fluid statics, fluid dynamics, thermodynamic laws, temperature scales, heat transfer mechanisms and heat engines. Electrostatics, current, resistance and magnetic field.	
2.2	**Formulate** fluid statics, fluid flow, application of Gauss's law to various charge distributions, current, magnetic field	
2.3	**Conduct** experiments related to the fluids, thermodynamics, electricity and magnetic	
2.4	**Develop** communications skills and various related topics of the course.	
3	**Values:**	
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	
3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	

C. Course Content

Theoretical part

No	List of Topics	Contact Hours
1	**Fluid Mechanics** • Pressure • Variation of pressure with depth (including Pascal's law) • Buoyant forces and Archimedes' principle • Continuity equation • Bernoulli's equation • Applications of fluid dynamics	10
2	**Thermodynamics** • Temperature and temperature scales • Work and heat in thermodynamic processes • The first law of thermodynamics • Energy transfer mechanisms in thermal processes • Heat engines and the second law of thermodynamics	9
3	**Electrostatics** • Coulomb's law • Electric field • Gauss's law and electric flux • Electric potential	12

	• Capacitors	
4	**Current and Resistors** • Electric current • Resistance • Electric power • Resistors in series and parallel	8
5	**Magnetic Field** • Ampere's law • Faraday's law	6
Total		**45**

Experimental part

No.	List of Topics	Contact Hours
1	Lab preparation	4
2	Experiment 1: Measuring the Surface Tension of Water Using Metallic Ring	2
3	Experiment 2: Measuring the Surface Tension of Water Using Capillary Tube	2
4	Experiment 3: Viscosity of a Liquid	2
5	Experiment 4: Ohm's Law: Resistors in Series Combination	2
6	Experiment 5: Ohm's Law: Resistors in Parallel Combination	2
7	Experiment 6: Determination of the Specific Resistance of a Wire Using Meter Bridge	2
8	Experiment 7: Determination of the internal resistance of a battery and deducing its electromotive force.	2
9	Experiment 8: Determination of the magnetic fields due to a long wire, a circular coil, and a solenoid	2
10	Experiment 9: RC circuits: Discharging a capacitor	2
11	Lab review	4
12	Final Lab Exam	2
	Total	**28**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Describe** fundamental knowledge of fluid mechanics and laws of thermodynamics	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations- Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
1.2	**Define** basic of electricity and magnetism	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			survey
1.3	**Explain** fluid mechanics including the Pascal's law, buoyant force, continuity equation, Bernoulli's equation and thermodynamic laws, heat in thermodynamic processes, heat transfer mechanisms and heat engines. Electrostatics, current, resistance and magnetic field.	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations- Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.0	**Skills**		
2.1	**Solve** problems in fluid statics, fluid dynamics, thermodynamic laws, temperature scales, heat transfer mechanisms and heat engines. Electrostatics, current, resistance and magnetic field.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.2	**Formulate** fluid statics, fluid flow, application of Gauss's law to various charge distributions, current and magnetic field.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
2.3	**Conduct** experiments related to the fluids, thermodynamics, electricity and magnetic	Hands on lab demonstrations, guided discussion – guided discovery	**Direct** (formative and summative): Evaluation of assignments, step-by-step checkpoint assessment of experiment, in lab interactive questioning, quizzes, written exams **Indirect:** student survey
2.4	**Develop** communications skills and various related topics of the course.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
3.0	**Values**		
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	Case study- interactive demonstration- guided discussion	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz	6 & 12	5
2	Midterm Exams	7 & 13	30
3	Students activities and assignments	3, 6, 10, 12	5
4	Final Laboratory Exam	15	20
5	Final Theory Exam	16	40

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Instructor of the course will be available to help the students for further discussion related to the course during office hours.
- Each student is assigned to an academic advisor (staff/ faculty member) who will be available for academic advice/ guidance and counseling during office hours for about 2h per week.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Raymond A. Serway and John W. Jewett, Jr., Physics for Scientists& Engineers with Modern Physics, 9th edition, Brooks/Cole, 2014
Essential References Materials	Raymond A. Serway, Jerry S. Faughn, Chris Vuille, College Physics, 8th Edition, Brooks/Cole, 2009
Electronic Materials	• http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html • http://www.physicsclassroom.com/ • http://de.physnet.net/PhysNet/education.html
Other Learning Materials	-

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• A classroom for a group of 40 students equipped with LCD projector, smart board and/or white board. • A laboratory for a group of 25 students
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Laboratory equipments / apparatus for the listed experiments.

G. Course Quality Evaluation

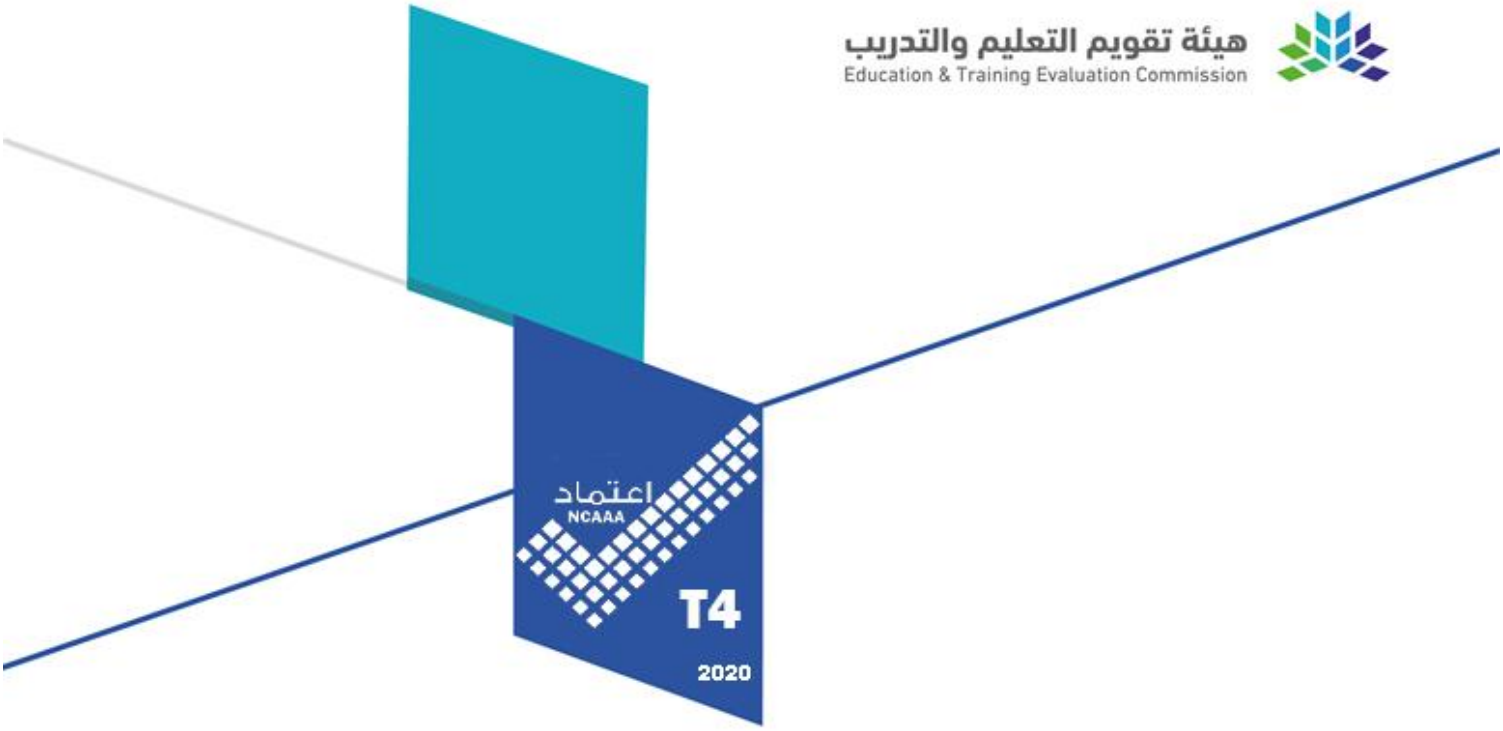
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Department council**
Reference No.	**8**
Date	**16/4/1442**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Principles of Physics (2)
Course Code:	205-PHYS-3
Program:	BS in Computer Science BS in Information Systems BS in Computer and Network Engineering
Department:	Physics Department
College:	College of Science
Institution:	Jazan University, Jazan

Table of Contents

A. Course Identification

1. Credit hours: 3 CH
2. Course type **a.** University ☐ College ☑ Department ☐ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level -4 / Year 02
4. Pre-requisites for this course (if any)**: 204 phys-4**
5. Co-requisites for this course (if any)**: None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30	56
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**	24	44

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	24
3	**Tutorial**	--
4	**Others** (specify)	--
	Total	54

B. Course Objectives and Learning Outcomes

This course provides basic concepts in electric field, Gauss's law, electric potential, capacitance and dielectrics, direct current circuits, particle in a magnetic field, Biot-Savart law, Ampers law, Faraday's law. It also covers electrical conduction of metal, insulators and semiconductors and semiconductor devices.

2. Course Main Objective

This course is designed to provide students with basic principles of:

- Particle 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, combinations 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.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	**Recall** units of charges, electric field, electric potential energy and difference, electric flux, capacitance, electric current, 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, Ampers law, Faraday's law, semiconductors, diodes .	
2	**Skills :**	
2.1	**Solve** problems related to Biot-Savart law, Ampers law, Faraday's law, DC-circuits, Gauss's law, capacitance and capacitors, AC-circuit analysis, resistors, motion of charges in magnetic fields.	
2.2	**Perform** experiments using different analog and digital devices and plot the characteristics of different types of devices	
2.3	**Develop** communication competencies during interactive discussion, group assignments	
3	**Values:**	
3.1	**Demonstrate** skills to work in groups, also take responsibility for other's safety in lab.	

C. Course Content

No	List of Topics	Contact Hours
1	**Electric Fields:** Particle in an electric field, electric field of a continuous charge distributions, 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.	3
3	**Electric Potential**: Electric potential, potential difference, potential difference in a uniform electric field, electric potential due to point charges, electric field from the electric potential.	3
4	**Capacitance and Dielectrics**: Definition of capacitance, calculating capacitance, combinations of capacitors, energy stored in charged capacitor, capacitors with dielectrics.	3
5	**Direct current circuits (D.C. circuits):** Electromotive force, resisters in series and parallel, Kirchhoff's rules and RC circuits.	3
6	**Magnetism:** Particle in a magnetic field, motion of a charged particle in a uniform magnetic field, magnetic force on a current- carrying conductor, Biot–Savart law, magnetic force between two parallel Conductors, Ampère's law, Faraday's law of induction.	4
7	**Alternating current circuits (A.C. circuits)**: AC sources, resistors, capacitors and inductors in AC circuit, RLC series circuits, power in AC circuit, resonance in series RLC circuit.	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).	4
	Total	30

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	Capacitance of capacitors by 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 a 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
	Review	2
Total		24

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Recall** units of charges, electric field, electric potential energy and difference, electric flux, capacitance, electric current, magnetic field. semiconductors.	Lectures and discussion	Homework assignments, Midterm exams and final exam.
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, diodes.	Lectures and discussion	Homework assignments, Midterm exams and final exam.
2.0	**Skills**		
2.1	**Solve** problems related to Biot-Savart law, Ampers law, Faraday's law, DC-circuits, Gauss's law, capacitance and capacitors, AC-circuit analysis, resistors, motion of charges in magnetic fields.	Lectures and discussion	Homework assignments, Midterm exams and final exam.
2.2	**Perform** experiments using different analog and digital devices and plot the characteristics of different types of devices.	Team work, cooperation	Check the performance, Mid and final exam
2.3	**Develop** communication competencies	Interactive discussion-	Project work,

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	during interactive discussion, group assignments.	Case study, group project, open discussion - reviews	Written reports, written assignments, presentations
3.0	**Values**		
3.1	**Demonstrate** skills to work in groups, also take responsibility for other's safety in lab.	Group discussion Direct evaluation	Group discussion Direct evaluation

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home work	2	2.5
2	Written test	3	2.5
3	Mid-term exam	6	10
4	Home work	8	2.5
5	Written test	9	2.5
6	Mid-term exam	12	10
7	Final practical exam	14	20
8	Final exam	16	50

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:
At least 12 office hours for each teacher available for student consultations and academic advice

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Physics for Scientists and Engineers with Modern Physics; Raymond A. Serway and John W. Jewett, Jr.; Brooks/Cole CENGAGE Learning, 9th edition, 2014.
Essential References Materials	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. .
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and laboratories,
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching / learning process	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/ Indirect
Quality of learning resources	Students, Faculty members	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Council of Physics Department**
Reference No.	**23/7/40/1442**
Date	**7/3/2021**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Geometrical Optics**
Course Code:	**211PHYS**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours:3
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 4/ Year 2
4. Pre-requisites for this course (if any)**: NIL**
5. Co-requisites for this course (if any)**: NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**28**	**47%**
2	**Blended**	**6**	**10%**
3	**E-learning**		
4	**Distance learning**		
5	**Other**	**26**	**43%**

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**30**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	**0**
4	**Others** (specify) Preparations for various assignments, Quizzes, exams and office hours	**40**
	Total	**100**

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to provide students with the basic principal of geometrical optics covering reflection and refraction by a plane and spherical surfaces, prisms, optical fibers, lenses as well as the optical instruments; like camera, human eyes, telescopes and microscopes.
The laboratory explores geometrical optics through some experiments in refraction, prism, converging and diverging lenses, convex and concave mirrors and some optical instruments.

2. Course Main Objective

This course is designed to provide students with:

- The concept of light
- The foundations of Geometrical optical
- The principal of elementary optical systems
- The concept of image in optical instruments
- The laboratory work and hands-on activities in geometrical optics.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Recall** nature of light, index of refraction, reflection, refraction law through plan and spherical surface, optical fibers, and dispersion of light through a prism, thin lenses, human eye and the optical instruments.	**PLO1.1**
1.2	**Describe** the Principle of Reversibility, Fermat's Principle, Huygens principle, lens maker's equation, the total internal reflection, dispersion of light through a prism, image obtained by optical system, the function of the human eye and some optical instruments.	**PLO1.1**
2	**Skills :**	
2.1	**Solve** various problems related to the light, reflection and refraction at spherical and plane surfaces, prisms, thin lenses, mirrors, the human eye and the optical instruments.	**PLO2.1**
2.2	**Demonstrate** the ability to use ray tracing in studying geometrical optics.	**PLO2.2**
2.3	**Perform** laboratory experiments in geometrical optics and document their results, using correct procedures and protocols and analyze the obtained data.	**PLO2.3**
2.4	**Develop** competencies in critical thinking, analyzing the obtained data, communication and writing lab reports.	**PLO2.4**
3	**Values:**	
3.1	**Develop** ability to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	**PLO3.1**
3.2	**Demonstrate** awareness of safety for own and others competencies during lab work.	**PLO3.3**
3.3		
3...		

C. Course Content

Theoretical Part

No	List of Topics	Contact Hours
1	**Highlights on the optics developments and propagation of light.**	**2**
2	**Speed of light and methods of determination of it.**	**2**
3	**Reflection and refraction of light.**	**2**
4	**Total and Internal reflection of light.**	**2**
5	**Fiber optics and their applications.**	**2**
6	**Prisms and light dispersion.**	**4**
7	**Thin lenses and the formation of images.**	**4**
8	**Spherical Mirrors**	**2**
9	**Human eye and vision defects.**	**3**
10	**Optical Instruments (camera, light microscope and telescope).**	**3**
11	**Homework correction, review, and various exams**	**4**
Total		**30**

Experimental Part:

No	List of Topics	Contact Hours
1	**Color Addition**	**2**
2	**Snell's Law (by trapezoid)**	**2**
3	**Refractive Index and Critical angle of Glass**	**2**
4	**Convex mirror**	**2**
5	**Concave mirror**	**2**
6	**The focal Length for a convex (converging) lens**	**2**
7	**The Focal Length for a Concave Lens**	**2**
8	**The equivalent focal length of two convex lenses**	**2**
9	**The refractive index of prism using the spectrometer**	**2**
10	**Microscope.**	**2**
11	**Lab Introduction, review, and various exams**	**10**
Total		**30**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Recall** nature of light, index of refraction, reflection, refraction law through plan and spherical surface, optical fibers, and dispersion of light through a prism, thin lenses, human eye and the optical instruments.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustrations.	**Direct**: In class interactive questioning, In class quizzes Homework assignment, Mid-term Final exam **Indirect**: student survey
1.2	**Describe** the Principle of Reversibility, Fermat's Principle, The Huygens principle, lens maker's equation, the total internal reflection, dispersion of light through a prism, image obtained by optical system, the function of the human eye and some optical instruments.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustrations	**Direct**: In class interactive questioning, In class quizzes Homework assignment, Mid-term Final exam **Indirect**: student survey
2.0	**Skills**		
2.1	**Solve** various problems related to the light, reflection and refraction at spherical and plane surfaces, prisms, thin lenses, mirrors, the human eye and the optical instruments.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustrations, individual problem solving.	**Direct**: In class interactive questioning, In class quizzes Homework assignment, Mid-term

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Final exam **Indirect**: student survey
2.2	**Demonstrate** the ability to use ray tracing in studying geometrical optics.	Lectures, blackboard and visualization, group and interactive discussion, Interactive illustrations, Individual ray tracing.	**Direct**: In class interactive questioning, Homework assignment, Mid-term Final exam **Indirect**: student survey
2.3	**Perform** laboratory experiments in geometrical optics and document their results, using correct procedures and protocols and analyze the obtained data.	Hands on experiment, interactive discussion, discussion, Report	**Direct**: Assignments, Step-by-step checkpoint assessment of experiment, Final Practical Exam **Indirect**: student survey
2.4	**Develop** competencies in critical thinking, analyzing the obtained data, communication and writing lab reports.	Open dialogue, individual presentation, writing lab report.	**Direct**: Lab report, Observation, questioning, individual discussion, checking lab report. **Indirect**: student survey
3.0	**Values**		
3.1	**Develop** ability to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	Group discussion, group lab work	**Direct**: Observation, questioning, individual discussion **Indirect**: student survey
3.2	**Demonstrate** awareness of safety for own and others competencies during lab work.	Interactive discussion-Case study, group assignment, open discussion - reviews	**Direct**: Observation, questioning, discussion- lab report **Indirect**: student survey
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	1st Homework assignment	3	2 (2%)
2	Lecture Quiz 1	4	2 (2%)
3	2nd Homework assignment	5	2 (2%)
4	First Mid-term exam	7	9 (9%)
5	3rd Homework assignment	9	2 (2%)

#	Assessment task*	Week Due	Percentage of Total Assessment Score
6	Lecture Quiz 2	10	2 (2%)
7	4th Homework assignment	12	2(2%)
8	Second mid-term exam	14	9 (9%)
9	Lab Report, communication and lab competence	14	10 (10%)
10	Final practical exam	15	12 (10%)
11	Final Exam	16	50 (50%)

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students is assigned to a staff member who will be available for help and academic guidance office hours at specific 2h on daily basis.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Introduction to Optics (3rd Edition), Pedrotti, Frank L; Pedrotti, Leno M; Pedrotti, Leno S, 2006.
Essential References Materials	• Modern Optics; Robert D. Guenther, John Wiley &Sons. Inc., 1990. • Optics (4th Edition) Hecht, Eugene. 2001.
Electronic Materials	https://en.wikipedia.org/wiki/Geometrical_optics https://www.cliffsnotes.com/study-guides/physics/light/geometrical-optics https://ocw.mit.edu/courses/mechanical-engineering/2-71-optics-spring-2014/lecture-notes/MIT2_71S14_lec2_notes.pdf https://icecube.wisc.edu/~karle/courses/phys202/202lecture22_Ch35.pdf https://phys.libretexts.org/Bookshelves/College_Physics/Book%3A_College_Physics_(OpenStax)/25%3A_Geometric_Optics
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**Class room for 30 students** **Geometrical Optics Laboratory for 15 students**
Technology Resources (AV, data show, Smart Board, software, etc.)	**Data show- smart board, Blackboard**

Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**Library**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	**Students, Peer and program leader**	**Indirect (CES)- Indirect peer evaluation**
Assessment	**Students, Program assessment committee**	**Direct/ Indirect**
Extent of achievement of course learning outcomes	**Students and Instructor**	**Direct/Indirect**
Quality of learning resources	**Students, Faculty members**	**Indirect**
Effectiveness of teaching	**Students, Peer and program leader**	**Indirect (CES)- Indirect peer evaluation**

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Council of Physics Department**
Reference No.	**8**
Date	**16/4/1442**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Waves and Vibrations
Course Code:	212 PHYS
Program:	Physics (undergraduate)
Department:	Physics
College:	Science
Institution:	Jazan University

Table of Contents

A. Course Identification

1. Credit hours: 2
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 4/Year 2
4. Pre-requisites for this course (if any)**: 251 PHYS**
5. Co-requisites for this course (if any)**:NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**24**	**80%**
2	**Blended**	**6**	**20%**
3	**E-learning**		
4	**Distance learning**		
5	**Other (lab)**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**30**
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	--
	Total	**30**

B. Course Objectives and Learning Outcomes

1. Course Description

The course provides fundamental concepts of vibrations and waves including oscillatory motion, wave motion, sound waves, and superposition of standing waves.

2. Course Main Objective

This course is designed to provide students with:

- ✓ The physics of simple harmonic motion (SHM)
- ✓ Basic analysis of damped oscillations
- ✓ Basics and adequate analysis of wave motion and sound waves
- ✓ Physics of waves interference
- ✓ Representation of superposition of standing waves

3. Course Learning Outcomes

CLOs	Aligned PLOs

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1.	**Define** the simple harmonic motion, Uniform Circular Motion, the underdamped, critically damped, overdamped, and forced oscillations, transverse wave, longitudinal wave, reflection and transmission coefficients of travelling waves, Traveling Wave, superposition of sinusoidal waves, Sound Levels, Doppler effect, interference, Standing Waves, harmonics, Resonance, Beats	**PLO1.1**
1.2	**Discuss** the interference of sinusoidal waves, the origin of standing Waves, Energy of the Simple Harmonic Oscillator, Damped Oscillations, Forced Oscillations, reflection and transmission coefficients of travelling waves, differences between, transverse and longitudinal waves, principle of superposition to two sinusoidal waves, concepts of nodes and anti-nodes and how boundary conditions lead to normal modes, harmonics beating phenomenon,	**PLO1.2**
2	**Skills :**	
2.1	**Solve** various problems related to Oscillatory Motion, Wave Motion, Sound Waves, Superposition and Standing Waves.	**PLO2.1**
2.2	**Derive** the equation of motion of a block-spring system, simple pendulum, physical pendulum, torsional pendulum, and the linear wave equation, derive the velocity and acceleration of SHM and the kinetic, potential and total energy of a mechanical system undergoing SHM, Rate of Energy Transfer by Sinusoidal Waves on Strings, expression for the speed of sound, Intensity of Periodic Sound Waves, expression of Standing Waves	**PLO2.2**
2.3		
2.4	**Develop** communication competencies during interactive discussion, group assignments, essays or web-based activities	**PLO2.4**
3	**Values:**	
3.1	**Show** ability to handle activities among group and bear individual responsibility	**PLO3.1**

C. Course Content

Theoretical Part

No	List of Topics	Contact Hours
1	**Oscillatory Motion:** Motion of an Object Attached to a Spring, Analysis Model: Particle in Simple Harmonic Motion, Energy of the Simple Harmonic Oscillator, Comparing Simple Harmonic Motion with Uniform Circular Motion, The Pendulum, Damped Oscillations, Forced Oscillations.	**8**
2	**Wave Motion:** Propagation of a Disturbance, Analysis Model: Traveling Wave, The Speed of Waves on Strings, Reflection and Transmission, Rate of Energy Transfer by Sinusoidal Waves on Strings, The Linear Wave Equation.	**6**
3	**Sound Waves**: Pressure Variations in Sound Waves, Speed of Sound Waves, Intensity of Periodic Sound Waves, The Doppler Effect.	**4**
4	**Superposition and Standing Waves:** Analysis Model: Waves in Interference, Standing Waves, Analysis Model: Waves Under Boundary Conditions, Resonance, Standing Waves in Air Columns, Standing Waves in Rods and Membranes, Beats: Interference in Time.	**8**

6	**Introduction, review, and various exams**	**4**
Total		**30**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Define** the simple harmonic motion, Uniform Circular Motion, the underdamped, critically damped, overdamped, and forced oscillations, transverse wave, longitudinal wave, reflection and transmission coefficients of travelling waves, Traveling Wave, superposition of sinusoidal waves, Sound Levels, Doppler effect, interference, Standing Waves, harmonics, Resonance, Beats	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
1.2	**Discuss** the interference of sinusoidal waves, the origin of standing Waves, Energy of the Simple Harmonic Oscillator, Damped Oscillations, Forced Oscillations, reflection and transmission coefficients of travelling waves, differences between, transverse and longitudinal waves, principle of superposition to two sinusoidal waves, concepts of nodes and anti-nodes and how boundary conditions lead to normal modes, harmonics beating phenomenon,	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.0	**Skills**		
2.1	**Solve** various problems related to Oscillatory Motion, Wave Motion, Sound Waves, Superposition and Standing Waves.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.2	**Derive** the equation of motion of a block-spring system, simple pendulum, physical pendulum, torsional pendulum, and the linear wave equation, derive the velocity and acceleration of SHM and the kinetic,	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	potential and total energy of a mechanical system undergoing SHM, Rate of Energy Transfer by Sinusoidal Waves on Strings, expression for the speed of sound, Intensity of Periodic Sound Waves, expression of Standing Waves	– Problem based learning	
2.4	**Develop** communication competencies during interactive discussion, group assignments, essays or web-based activities	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): **Indirect**: student survey
3.0	**Values**		
3.1	**Show** ability to handle activities among group and bear individual responsibility	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): **Indirect**: student survey

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework assignment** - interactive discussion, group assignments and bear individual.	2	4 (4%)
2	**Quiz 1**	3	2 (2%)
3	**Homework assignment** - interactive discussion, group assignments and bear individual.	7	4 (4%)
4	**First Mid-term exam**	8	15 (2%)
5	**Homework assignment** - interactive discussion, group assignments and bear individual.	9	4 (4%)
6	**Quiz 2**	11	2 (2%)
7	**Homework assignment** - interactive discussion, group assignments and bear individual.	12	4 (4%)
8	**Second mid-term exam**	14	15 (20%)
9	**Final Exam**	16	50 (50%)

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students is assigned to a staff member who will be available for help and academic guidance office hours at specific 2h on daily basis.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Physics for Scientists and Engineers, Raymond A. Serway, John W. Jewett, 9th Edition, 2014.
Essential References Materials	• Fundamentals of Physics; Halliday, Resnik and Walker, John Wiley and Sons Inc., • Vibrations and Waves (The M.I.T. Introductory Physics Series), A.P. French, W.W. Norton & Company; 1st Edition (January 17, 1971)
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1 Lecture room(s) for groups of 25 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show- smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation

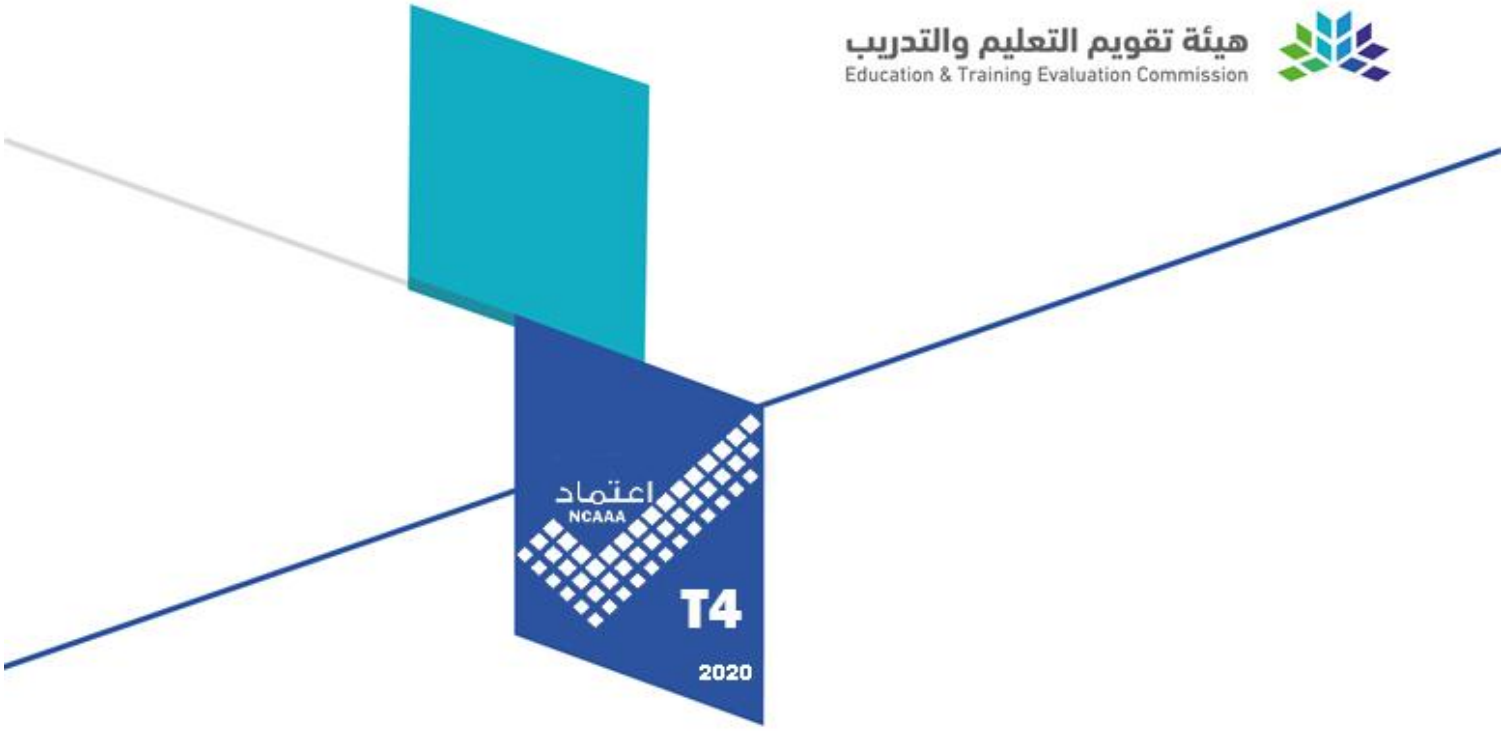
Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department Council

Reference No.	8
Date	16/4/1442

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Properties of Matter and Heat
Course Code:	**221PHYS**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 4
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level3/Year 2
4. Pre-requisites for this course (if any)**: NIL**
5. Co-requisites for this course (if any)**:NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**45**	**55%**
2	**Blended**	**6**	**7%**
3	**E-learning**		
4	**Distance learning**		
5	**Other (lab)**	**30**	**37%**

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**45**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	**--**
4	**Others** (specify)	
	Total	**75**

B. Course Objectives and Learning Outcomes

1. Course Description

This course provides an introduction of basic properties of solids and liquids, including some properties of gases. In addition, we'll take a brief look at surface tension, viscosity, and diffusion. The course covers an introduction of thermal physics, including the study of temperature, heat, and how they affect matter. Within normal temperature ranges, a gas acts like a large collection of non-interacting point particles, called an ideal gas. Such gases will be studied on either a macroscopic or microscopic scale. Concepts of internal heat, specific heat and latent heat will be introduced. Some of the processes of energy transfer between a system and its surroundings will be discussed.

2. Course Main Objective

This course is designed to provide students with:

- An introduction of states of matter
- The concept of Hooke's law and solid deformation
- Archimedes' Principle and floating condition
- An introduction to fluid dynamics
- Introducing some concepts such as surface tension, viscosity and transport phenomena.
- The fundamental of thermometers and the effect of heat on solid and liquid.

Macroscopic and microscopic description of ideal gas.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Define** states of matter, stress, strain, elasticity modulus, density, specific gravity, pressure, Buoyant force, ideal fluid, surface tension, cohesive and adhesive forces, contact angle , viscosity coefficient, Reynold's number, diffusion and osmosis, ideal gas, Avogadro's number and number of moles, ideal gas law, the internal energy of a monatomic gas, heat, specific heat, calorimeter, latent heat and phase change, thermal conduction and thermal conductivity, thermal convection, and thermal radiation.	**PLO1.1**
1.2	**State** Pascal's principle, Archemides's principle, continuity equation, Bernoulli's equation, Poiseuille's Law, Zeroth law of thermodynamics, and stefan's law	**PLO1.1**
1.3	**Describe** variation of pressure with depth, pressure measurement devices, motion of fluids, origin of surface tension, capillary action, ideal fluid and viscous fluid flow, transport phenomena: diffusion and osmosis, Fick's law of diffusion, Stoke's law, ideal gas behavior, assumptions of the kinetic theory of gases, principle of calorimetry, heat flow, phase change and latent heat, heat transfer mechanisms, Stefan's law.	**PLO1.1**
2	**Skills :**	
2.1	**Derive** the relation between pressure and depth, the continuity and Bernoulli's equations, terminal speed of a body moving in a viscous medium, and expressions for pressure and temperature of an ideal gas using kinetic theory of gases.	**PLO2.2**
2.2	**Calculate** stress, strain, elasticity modulus, density, specific gravity, pressure inside fluids, variables of hydraulic lifts, buoyant force, continuity and Bernoulli's equation parameters, surface tension, liquid rising in capillary tube, temperatures in different scales, thermal expansion of solids and liquids, ideal gas parameters, internal energy of a monatomic gas, root-mean-square speed of a gas, specific heat, latent heat, rate of energy transfer.	**PLO2.1**
2.3	**Perform** laboratory experiments included in this course.	**PLO2.3**
2.4	**Develop** communication competencies during interactive discussion, group assignments.	**PLO 2.4**
3	**Values:**	
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments	**PLO3.1**
3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	**PLO3.3**

C. Course Content

Theoretical Part

No	List of Topics	Contact Hours
1	**1. Solids and Fluids:** ● States of Matter ● The Deformation of Solids ● Density and Pressure ● Variation of Pressure with Depth ● Pressure Measurements ● Buoyant Forces and Archimedes's Principle ● Fluids in Motion ● Surface Tension, Capillary Action, and Viscous Fluid Flow ● Transport Phenomena	**15**
2	**2. Thermal Physics:** ● Temperature and the Zeroth Law of Thermodynamics ● Thermometers and Temperature Scales ● Thermal Expansion of Solids and Liquids ● Macroscopic Description of an Ideal Gas ● The Kinetic Theory of Gases	**15**
3	**3. Energy in Thermal Processes:** ● Heat and Internal Energy ● Specific Heat ● Calorimetry ● Latent Heat and Phase Change ● Energy Transfer	**12**
Total		**42**

Experimental Part:

No	List of Topics	Contact Hours
1	Determination of the torsion constant of a torsion axle	**2**
2	Determination of the moment of inertia of bodies using torsion axle.	**2**
3	Determination of the acceleration due to gravity using the compound pendulum	**2**
4	Determination of Young's modulus for a wire	**2**
5	Determination of the speed of sound in Liquids	**2**
6	Verification of Boyle's law	**2**
7	Determination of the thermal conductivity coefficient for a solid	**2**
8	Determination of the linear thermal expansion coefficient of a Solid	**2**
9	Determination of the specific heat of a solid by the method of mixtures	**2**
10	Determination of the electrical equivalent of heat	**2**
Total		**20**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Define** states of matter, stress, strain, elasticity modulus, density, specific gravity, pressure, Buoyant force, ideal fluid, surface tension, cohesive and adhesive forces, contact angle , viscosity coefficient, Reynold's number, diffusion and osmosis, ideal gas, Avogadro's number and number of moles, ideal gas law, the internal energy of a monatomic gas, heat, specific heat, calorimeter, latent heat and phase change, thermal conduction and thermal conductivity, thermal convection, and thermal radiation.	Lectures and group discussion in the class, E-Learning (Blackboard)	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
1.2	**State** Pascal's principle, Archemides's principle, continuity equation, Bernoulli's equation, Poiseuille's Law, Zeroth law of thermodynamics, and Stefan's law	Lectures and group discussion in the class, E-Learning (Blackboard)	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
1.3	**Describe** variation of pressure with depth, pressure measurement devices, motion of fluids, origin of surface tension, capillary action, ideal fluid and viscous fluid flow, transport phenomena: diffusion and osmosis, Fick's law of diffusion, Stoke's law, ideal gas behavior, assumptions of the kinetic theory of gases, principle of calorimetry, heat flow, phase change and latent heat, heat transfer mechanisms, Stefan's law.	Lectures and group discussion in the class, E-Learning (Blackboard)	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.0	**Skills**		

2.1	**Derive** the relation between pressure and depth, the continuity and Bernoulli's equations, terminal speed of a body moving in a viscous medium, and expressions for pressure and temperature of an ideal gas using kinetic theory of gases.	Lectures and group discussion in the class, E-Learning (Blackboard)	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.2	**Calculate** stress, strain, elasticity modulus, density, specific gravity, pressure inside fluids, variables of hydraulic lifts, buoyant force, continuity and Bernoulli's equation parameters, surface tension, liquid rising in capillary tube, temperatures in different scales, thermal expansion of solids and liquids, ideal gas parameters, internal energy of a monatomic gas, root-mean-square speed of a gas, specific heat, latent heat, rate of energy transfer.	Lectures and group discussion in the class, E-Learning (Blackboard)	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.3	**Perform** laboratory experiments included in this course.	Audiovisual demonstrations of laboratory equipment and performing actual experiments.	**Direct** (formative and summative):Evaluation of assignments, Step-by-step checkpoint assessment of experiment, In lab interactive questioning, quizzes, written exams **Indirect:** student survey
2.4	**Develop** communication competencies during interactive discussion, group assignments.	Interactive discussion- Case study, group project, open discussion - reviews	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
3.0	**Values**		
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey

3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	Case study- interactive demonstration- guided discussion	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework assignment 1**	**2**	**5**
2	**Lecture Quiz 1**	**4**	**2**
3	**1st Mid-term exam**	**6**	**8**
4	**Homework assignment 2**	**10**	**5**
5	**Lecture Quiz 2**	**11**	**2**
6	**2nd Mid-term exam**	**12**	**8**
7	**Laboratory exam**	**14**	**20**
8	**Final Exam**	**16**	**50 (50%)**

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Course Instructor available in the selected office hours for consultations (at least one hour every day).

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	College Physics 7th edition, R. A. Serway, J. S. Faughn and C.Vuille, Brooks/Cole Publishing Co. 2005.
Essential References Materials	1. Physics for Scientists and Engineers with Modern Physics; 7th edition, Serway, Saunders Golden Sunburst Series, 2007. 2. Fundamentals of Physics; Halliday, Resnik and Walker , John Wiley and Sons Inc., 2007.
Electronic Materials	http://www.wikipedia.org/ http://www.hazemsakeek.com/ http://matweb.com
Other Learning Materials	

2. Facilities Required

Item	Resources

Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Class Room
Technology Resources (AV, data show, Smart Board, software, etc.)	Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Properties of Matter and Heat Laboratory

G. Course Quality Evaluation

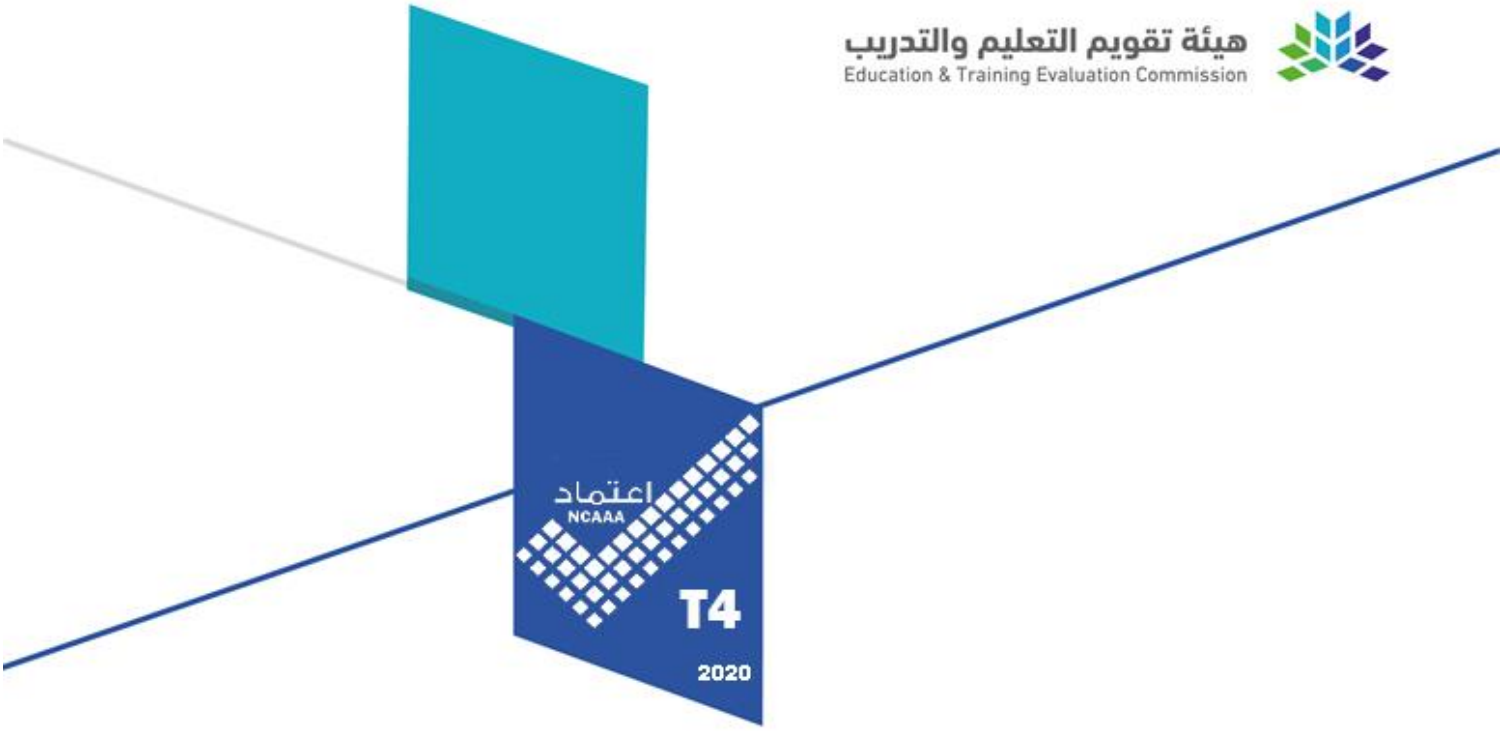
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peers and Program Leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Department council**
Reference No.	**8**
Date	**16/4/1442**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Thermodynamic**
Course Code:	**222Phys**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours:
2. Course type **a.** University ☐ College ☐ Department ☒ Others ☐ **b.** Required ☒ Elective ☐
3. Level/year at which this course is offered: Level 4 / Year 2
4. Pre-requisites for this course (if any)**: 221PHYS**
5. Co-requisites for this course (if any)**: NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**36**	**80%**
2	**Blended**	**9**	**20%**
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**42**
2	**Laboratory/Studio**	**--**
3	**Tutorial**	**3**
4	**Others** (specify)	
	Total	**45**

B. Course Objectives and Learning Outcomes

1. Course Description

The course is dealing with the basic properties of steam and gases. The course discusses different processes in thermodynamics and their applications**.** It gives details of thermodynamic laws and their applications. The course focuses also on Carnot engine and its efficiency as well as other engine types. Some details on entropy, Gibbs free energy, Clapeyron equation and their calculations are given.

2. Course Main Objective

This course is designed to provide students with:

- Concepts of a system, heat, work, Process, a cycle, internal energy, enthalpy and entropy.
- Fundamentals of water vapour, steam tables and perfect gasses.
- Applications of the first law of thermodynamics, general law of ideal gases and the second law of thermodynamics.
- Skills to solve problems regarding the physical principles included.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Define** various concepts of a system, heat, work, processes, cycle, internal energy, enthalpy, entropy, and matter phases.	**PLO1.1**
1.2	**Identify** various thermodynamic processes and their related formulae, laws of thermodynamics, system properties, Enthalpy of a system, entropy of processes, and Carnot engine efficiency	**PLO1.1**
1.3	**Discuss** the general law of ideal gas, internal energy, laws of thermodynamics, enthalpy, various processes in thermodynamics, Carnot engine, entropy, water phases and Gibbs free energy	**PLO1.2**
2	**Skills :**	
2.1	**Solve** problems related to various thermodynamic processes, work & heat in thermodynamic cycles, system enthalpy, entropy, and efficiency of heat engines as well other systems	**PLO2.1**
2.2	**Derive** the important expressions of various systems and thermodynamic processes and their works, Carnot engine efficiency, Clapeyron equation	**PLO2.2**
2.3	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays or web-based activities	**PLO2.4**
3	**Values:**	
3.1	**Show** effective collaboration and bear individual responsibility during group work and/or assignments	**PLO3.1**

C. Course Content

No	List of Topics	Contact Hours
1	Concepts of: system, heat, work, Thermodynamic processes.	**4.5**
2	Zeroth and First law of thermodynamics	**3**
3	Calculation of work for different processes and cycles as well as the internal energy and enthalpy of gases.	**6**
4	Ideal gas state equation and real gases and problems	**4.5**
5	Applications of the first law on the ideal gas.	**4.5**
6	Derivation of specific heats and related relations for ideal gases	**4.5**
7	The second law of thermodynamics, heat engines, and refrigerators	**4.5**
8	The Carnot Engine	**3**
9	Entropy calculations for the Carnot cycle and other thermodynamic systems	**4.5**
10	Water vapor phases and state of matter, Gibbs free energy, Clapeyron equation	**3**
11	Review & tutorial	**3**
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods

1.0	**Knowledge and Understanding**		
1.1	**Define** various concepts of a system, heat, work, processes, cycle, internal energy, enthalpy, entropy, and matter phases.	Lectures, Open discussion, interactive comparisons	In class interactive questioning, Quizzes, mid-term and final exam
1.2	**Identify** various thermodynamic processes and their related formulae, laws of thermodynamics, system properties, Enthalpy of a system, entropy of processes, and Carnot engine efficiency	Lectures, applets illustrations, group discussion, visualization	In class interactive questioning, Quizzes, mid-term and final exam
1.3	**Discuss** the general law of ideal gas, internal energy, laws of thermodynamics, enthalpy, various processes in thermodynamics, Carnot engine, entropy, water phases and Gibbs free energy	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustrations	In class interactive questioning, group assignments, Quizzes, mid-term and final exam
2.0	**Skills**		
2.1	**Solve** problems related to various thermodynamic processes, work & heat in thermodynamic cycles, system enthalpy, entropy, and efficiency of heat engines as well other systems	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations- Student contribution	Project work, Group discussion, Mid-term exams and final exam
2.2	**Derive** the important expressions of various systems and thermodynamic processes and their works, Carnot engine efficiency, Clapeyron equation	Lectures, visualization, brain storming, Individual and group practices	HW assignments, In class inspection for formative assessment – mid and final exams
2.3	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays or web-based activities	Interactive discussion-Case study, group project, open discussion - reviews	Case study, assignments, discussion
3.0	**Values**		
3.1	**Show** effective collaboration and bear individual responsibility during group work and/or assignments	Individual and group practices-Brain storming – free related small web-based topics	Case study, assignments, discussion

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework assignment- Contribution in interactive discussion- Group work**	**3**	**3** (3%)
2	**Lecture Quiz 1**	**4**	**5** (5%)
3	**First Mid-term exam**	**6**	**15** (15%)

4	**Homework assignment- Contribution in interactive discussion- Group work or Project**	**10**	**3** (3%)
5	**Lecture Quiz 2**	**11**	**5** (5%)
6	**Second mid-term exam**	**12**	**15** (15%)
7	**Homework assignment- Contribution in interactive discussion- Group work-essay or Project discussion**	**11**	**4** (4%)
8	**Final Exam**	**16**	**50** (50%)

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students is assigned to a staff member who will be available for help and academic guidance office hours at specific 2h on daily basis.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• **Thermodynamics, an Engineering Approach; Yunus A. Cengel and Mic A. Boles, McGraw – Hill, Inc., 2015**
Essential References Materials	• **Applied Thermodynamics for Engineering Technologists; T. D. Eastop and A. Mcconkey, 5th edition, Amazon.com, 1996.** • **Thermodynamics, Kinetic Theory and Statistical Thermodynamics; F.W.Sears and G. L Salinger, John Wiley& Sons, Inc., 1975.** • **Fundamentals of Classical Thermodynamics; J. Gordon, V. Wylen and R. Sonntag, 1985**.
Electronic Materials	**http://www.wikipedia.org/**
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Class room- if possible room for interactive discussion (round table)
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show- smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	none

G. Course Quality Evaluation

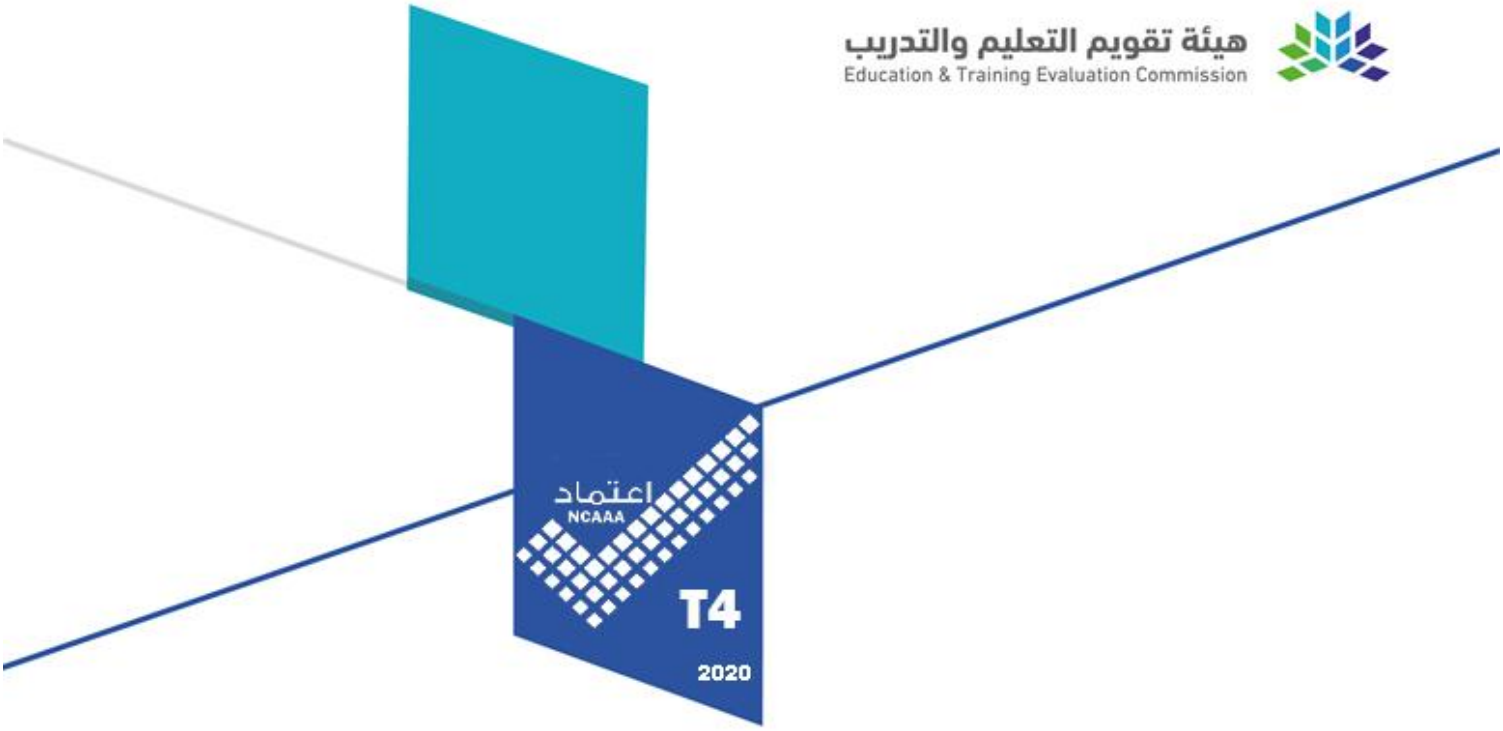
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Council of Physics Department**
Reference No.	8
Date	16/4/1442

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Electricity and Magnetism
Course Code:	**231 Phys-4**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours:
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 3/ Year 2
4. Pre-requisites for this course (if any)**: NIL**
5. Co-requisites for this course (if any)**: NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**42**	**57 %**
2	**Blended**	**8**	**10 %**
3	**E-learning**		
4	**Distance learning**		
5	**Other**	**25**	**33 %**

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**45**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	**--**
4	**Others** (specify)	**--**
	Total	**75**

B. Course Objectives and Learning Outcomes

1. Course Description

This course discusses basic concepts in some topics of electricity and magnetism. The topics includes; electrostatic charges, Coulomb's law, electric field, Gauss's law and its applications, electrostatic potential, capacitance and dielectrics, magnetic forces, magnetic field and its applications, and electromagnetic induction.

2. Course Main Objective

This course is designed to provide students with the following concepts:

- The concepts of electrostatic charges, electrostatic field, electrostatic potential, capacitance and dielectrics, magnetic forces, magnetic field, and electromagnetic induction.
- Coulomb's law, Gauss's law, Biot-Savart law, Ampere's law, Faraday's law and Lenz's law.
- Solving problems relating to the above topics.
- Laboratory experiments to understand the related concepts.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Define**: conductors, electric force, electric field, electric dipole, electric flux, electric potential, electrical potential energy and Equipotential surfaces, capacitance, Dielectric materials, magnetic field and magnetic flux.	**PLO 1.1**
1.2	**State:** Coulomb's law, Gauss's law of electric field, Gauss's law of magnetic field Biot-Savart law, Ampere's law, Faraday's law and Lenz's law.	**PLO 1.1**
1.3	**Describe** electric field of discrete and continuous charge distribution, electric potential of a group of charges and continuous charge distribution, equipotential surfaces, capacitance and dielectrics, electric dipole in a uniform electric field, types of capacitors, combinations and energy stored in capacitors, magnetic forces, magnetic fields and sources, a magnetic materials, electromagnetic induction and their applications, motional emf, Maxwell's equations.	**PLO 1.2**
2	**Skills :**	
2.1	**Solve**: problems relating to: electric forces, electric fields, electric potentials, capacitance and dielectrics, magnetic forces, magnetic fields and electromagnetic induction.	**PLO2.1**
2.2	**Derive** expressions for: the electric fields due to continuous charge distribution, the electric field inside and outside a charged sphere, capacitance of different types of capacitors, the torque induced in a current loop in a uniform magnetic field, the magnetic field in current carrying wires inside and outside, the mutual magnetic forces due two parallel wires,	**PLO2.2**
2.3	**Perform:** some experiments to justify and prove different phenomena related to the course contents.	**PLO2.3**
2.4	**Develop** competencies in communication, critical thinking and reporting during lab work.	**PLO2.4**
3	**Values:**	

CLOs		Aligned PLOs
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	**PLO3.1**
3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	**PLO3.3**

C. Course Content

Part I: Theory Part:

No	List of Topics	Contact Hours
1	**Electric Fields**: Properties of electric charges, Coulomb's law, electric field, electric field of a continuous charge distribution, electric field lines, motion of charged particles in a uniform electric field.	9
2	**Gauss's Law:** Electric flux, Gauss's law, application of Gauss's law to various charge distributions, Conductors in electrostatic equilibrium.	6
3	- **Electric Potential:** Potential difference and electric potential, potential difference in a uniform electric field, electric potential and potential energy due to point charges, obtaining the value of electric field from the electric potential, electric potential due to continuous charge distributions.	6
4	- **Capacitance and Dielectrics:** Definition of capacitance, calculating capacitance, combinations of capacitors, energy stored in charged capacitor, capacitors with dielectrics, an atomic description of dielectrics.	6
5	- **Magnetic Fields:** magnetic fields and forces, magnetic forces acting on a current carrying conductor, torque in a current loop in a uniform magnetic field, motion of charged particle in a uniform magnetic field.	3
6	- **Sources of the Magnetic Field:** Biot–Savart law, magnetic forces between two parallel conductors, Ampere's law, magnetic field of a solenoid, magnetic flux, Gauss's law in magnetism, magnetism in matter.	9
7	**Faraday's Law:** Faraday's law of induction, motional emf, Lenz law, generators and motors, Maxwell's equations.	6
Total		45

Experimental Part:

No	List of Topics	Contact Hours
1	Determination of the specific resistance of a wire using Meter Bridge .	2
2	Determination of the specific resistance of a conducting wire using Ohm's law.	2
3	Determination of the internal resistance of a battery using potentiometer .	2
4	Determination of the internal resistance of a voltmeter.	2
5	Determination of a low resistance using a standard resistance.	2
6	Determination of the capacitance of unknown capacitors by discharging method	2
7	Capacitance of capacitors in series and parallel combinations .	2
8	Magnetic force acting on a current carrying conductor.	2
9	Magnetic field of a current carrying solenoid.	2
10	Determination the horizontal component of earth's magnetic field using tangent galvanometer.	2

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Define**: conductors, electric force, electric field, electric dipole, electric flux, electric potential, electrical potential energy and Equipotential surfaces, capacitance, magnetic field and magnetic flux.	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations-Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written midterms exams and final exams **Indirect:** student survey
1.2	**State:** Coulomb's law, Gauss's law, Biot-Savart law, Ampere's law, Faraday's law and Lenz's law.	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations-Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written midterms exams and final exams. **Indirect:** student survey
1.3	**Describe** electric field of discrete and continuous charge distribution, electric potential of a group of charges and continuous charge distribution, equipotential surfaces, capacitance and dielectrics, electric dipole in a uniform electric field, types of capacitors, combinations and energy stored in capacitors, magnetic forces, magnetic fields and sources, a magnetic materials, electromagnetic induction and their applications, motional emf, Maxwell's equations.	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations-Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written midterms exams and final exams **Indirect:** student survey
2.0	**Skills**		
2.1	**Solve**: problems relating to: electric forces, electric fields, electric potentials, capacitance and dielectrics, magnetic forces, magnetic fields and electromagnetic induction.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written midterm exams and final exams **Indirect**: student survey
2.2	**Derive** expressions for: the electric fields due to continuous charge distribution, the electric field inside	Lectures, blackboard and visualization, brain storming, group and	**Direct** (formative and summative): In class interactive

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	and outside a charged sphere, capacitance of different types of capacitors, the torque induced in a current loop in a uniform magnetic field, the magnetic field in current carrying wires inside and outside, the mutual magnetic forces due two parallel wires,	interactive discussion, Interactive illustration – Problem based learning	questioning, quizzes, written midterm exams and final exams **Indirect**: student survey
2.3	**Perform:** some experiments to justify and prove different phenomena related to the course contents.	Hands on lab demonstrations- guided discussion – guided discovery	**Direct** (formative and summative): Evaluation of assignments, Step-by-step check of experiment assessment lab. interactive questioning, quizzes, written midterm exams and final exams **Indirect:** student survey
2.4	**Develop** competencies in communication, critical thinking and reporting during lab work.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning.	**Direct** (formative and summative): In class interactive questioning, quizzes, written midterm exams and final exams **Indirect:** student survey
3.0	**Values**		
3.1	**Demonstrate** abilities to work in groups and bear individual responsibility during lab work, interactive discussion and group assignments.	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey
3.2	**Show** awareness of safety for own and others when dealing with lab equipment's	Case study- interactive demonstration- guided discussion	**Direct** (formative and summative): In lab interactive questioning **Indirect**: student survey
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework assignment- Contribution in interactive discussion**	**2**	**2 (2%)**
2	**Quiz 1**	**3**	**2 (2%)**
3	**First Mid-term exam**	**7**	**10 (10%)**

#	Assessment task*	Week Due	Percentage of Total Assessment Score
4	Homework assignment- Contribution in interactive discussion	8	2 (2%)
5	Quiz 2	9	2 (2%)
6	Second mid-term exam	11	10 (10%)
7	Homework assignment- Contribution in interactive discussion- Group work-essay or Project discussion	12	2 (2%)
8	Laboratory Exam	14	20 (20%)
9	Final Exam	16	50 (50%)

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students is assigned to a staff member who will be available for help and academic guidance office hours at specific 2hours on daily basis.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Physics for Scientists& Engineers with Modern Physics; 7th edition, Serway, Saunders Golden Sunburst Series, 2007.
Essential References Materials	- University Physics; H. Young and R. Freedman, Addison-Wesley Publishing Company, Inc., 11th edition, 2004. - Fundamentals of Physics; Halliday, Resnik and Walker, John Wiley and Sons Inc., 2007. - Electricity and magnetism, Berkeley Physics Course Volume 2, Edward M. Purcell 1990.
Electronic Materials	**http://ocw.mit.edu/courses/physics/** **http://www.physics.org/explore.asp** **http://www.wikipedia.org/**
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Class room- if possible room for interactive discussion (round table)
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show- smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Equipment to perform lab. experiments as per the Lab. manual.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Department council**
Reference No.	**8**
Date	**16/4/1442**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	Classical Mechanics
Course Code:	**251PHYS**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 3/ Year 2
4. Pre-requisites for this course (if any)**: Nill**
5. Co-requisites for this course (if any)**:Nill**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**40**	**90%**
2	**Blended**	**5**	**10%**
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**40**
2	**Laboratory/Studio**	**--**
3	**Tutorial**	**5**
4	**Others** (specify)	
	Total	**45**

B. Course Objectives and Learning Outcomes

1. Course Description

The course is designed to provide students with 1. The fundamental concepts of vectors and its basics operations 2. Newton laws of motion. 3. Application of Newton's laws in one and two dimension and in rectilinear motion 4. The concepts of work and energy and their applications in physical problems 5. The essential of the rotational motion and the rotational parameters and their analogy in linear motion 6. the physics of planetary motion and Kepler's laws.

2. Course Main Objective

This course is designed to provide students with:

The course is designed to provide students with

- The Fundamental concept of vectors and basics vectors operations
- The derivation of Newton laws of motions. 1D and 2D motion and rectilinear motion
- Understanding the concept of work and energy and their applications
- A description for the rotational motion and analogy of the rotational parameters with liner one
- Understanding for the physics of planetary motion.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Define** the scalar and vectors quantities, the position, velocity and acceleration in different coordinates, the linear and rotational motion parameters	**PLO1.1**
1.2	**State** the Newton's law of motion and Kepler's laws of planetary motion	**PLO1.1**
1.3	**Discuss** the concept of energy and momentum conservation in linear and rotational motion	**PLO1.2**
2	**Skills :**	
2.1	**Derive** Newton's laws of motion and laws of planetary motion	**PLO2.2**
2.2	**Solve** physical problems related to the motion in 1D, 2D, rectilinear, and rotational motion, in addition for the particle motion under gravitational and central forces.	**PLO2.1**
2.3	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays or web-based activities	**PLO2.4**
3	**Values:**	
3.1	**Show** effective collaboration and bear individual responsibility during group work and/or assignments	**PLO3.1**

C. Course Content

No	List of Topics	Contact Hours
1	- **Vectors**: Equality of vectors, vector addition, multiplication by a scalar, vector subtraction, commutative law, associative law, distributive law, magnitude of a vector, Scalar product, cross product, physical examples of products, triple product, derivative of a vector, position vector, velocity and acceleration	**9**
2	- **Newtonian Mechanics**: Newton laws of motion: first, second, and third law. Linear momentum, motion of a particle, rectilinear motion: uniform acceleration under a constant force. Derivation of Newton equations of motion, motion on inclined surface, forces that depend on position: the concepts of kinetic and potential energy. Motion of a body with variable mass: rocket motion	**9**
3	- **Energy:** Kinetic and potential energy, dynamic systems and the laws of conservation of energy.	**6**
4	- **Circular and Rotational Motion:** Angular displacement, angular velocity, angular acceleration, rotational kinematics: Rotational motion with constant	**9**

	angular acceleration, rotational acceleration, rotational energy, moment of inertia, angular momentum and torque.	
5	**- Newton Gravitation:** Newton's law of gravitation, Kepler's Laws: Newton's law of universal gravitation, Kepler's Laws of Planetary Motion: Kepler's First Law: The Law of Ellipses, Kepler's Second Law: Equal Areas and Conservation of Angular Momentum, Kepler's Third Law: The Harmonic Law and their mathematical derivations	**9**
6	**Review**	**3**
Total		**45**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Define** the scalar and vectors quantities, the position, velocity and acceleration in different coordinates, the linear and rotational motion parameters	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
1.2	**State** the Newton's law of motion and Kepler's laws of planetary motion	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
1.3	**Discuss** the concept of energy and momentum conservation in linear and rotational motion	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.0	**Skills :**		
2.1	**Derive** Newton's laws of motion and laws of planetary motion	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.2	**Solve** physical problems related to the motion in 1D, 2D, rectilinear, and	Lectures, blackboard and visualization, group and	**Direct** (formative and summative): In

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	rotational motion, in addition for the particle motion under gravitational and central forces.	interactive guided discussion, Interactive discussion	class interactive questioning, quizzes, written exams **Indirect**: student survey
2.3	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays or web-based activities	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
3.0			
3.1	**Show** effective collaboration and bear individual responsibility during group work and/or assignments	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): interactive questioning- group assignment **Indirect**: student survey

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework assignment- Contribution in interactive discussion- Group work or Project**	**3**	**3** (3%)
2	**Lecture Quiz 1**	**4**	**5** (5%)
3	**First Mid-term exam**	**6**	**15** (15%)
4	**Homework assignment- Contribution in interactive discussion- Group work or Project**	**10**	**3** (3%)
5	**Lecture Quiz 2**	**11**	(5%) **5**
6	**Second mid-term exam**	**12**	**15** (15%)
7	**Homework assignment- Contribution in interactive discussion- Group work-essay or Project discussion**	**11**	**4** (4%)
9	**Final Exam**	**16**	**50** (50%)

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students is assigned to a staff member who will be available for help and academic guidance office hours at specific 2h on daily basis.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Analytical Mechanics; G. R. Fowls and G. Cassiday – 7th edition, Brooks, Cole, publishing, 2004.
Essential References Materials	-Classical Mechanics; V. Barges and M. Olsson, McGraw Hill, 1995. - Classical Mechanics; T. L. Chow, John Wiley and Son Ltd, 1995.
Electronic Materials	**http://ocw.mit.edu/courses/physics/** **http://laserworld.com** **http://www.physics.org/explore.asp** **http://www.wikipedia.org/**
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Class room- if possible room for interactive discussion (round table)
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show- smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	none

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Council of Physics Department**
Reference No.	8
Date	16/4/1442

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	MATHEMATICAL PHYSICS
Course Code:	**252 PHYS**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level4/Year2
4. Pre-requisites for this course (if any)**: 201 MATH**
5. Co-requisites for this course (if any)**:NIL**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**36**	**80 %**
2	**Blended**	**6**	**13 %**
3	**E-learning**		
4	**Distance learning**		
5	**Other (lab)**	**3**	**07%**

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**40**
2	**Laboratory/Studio**	--
3	**Tutorial**	**5**
4	**Others** (specify)	--
	Total	**45**

B. Course Objectives and Learning Outcomes

1. Course Description

The objective of this course is to provide the students with necessary mathematical tools for formulating physics problems. Acquiring these tools is a must for any physics students.

2. Course Main Objective

This course is designed to ;

- Provide students with the fundamental mathematical tools to understand other physics courses.
- Develop their skills in problem solving and formulating physical problems.

Apply the knowledge they acquire in this course to other physics related situations and identify their solutions.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Define** the complex numbers, Euler formula, matrix operation, determinant, Fourier series and integrals, Gamma and beta functions.	**PLO1.1**
1.2	**Describe** the required tools and various relevant equations needed to solve a physical problem and the conditions for the validity of such equations.	**PLO1.1**
1.3	**Discuss** various concepts in complex numbers, linear algebra, Fourier analysis and gamma and beta functions.	**PLO1.2**
2	**Skills :**	
2.1	**Derive** the Euler formula, Cramer's rule, Fourier coefficients, and Gamma functions for simple cases.	**PLO2.1**
2.2	**Solve** problems related complex numbers, linear algebraic equations, Fourier Series and some special functions.	**PLO2.2**
2.3	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays or web-based activities	**PLO2.4**
2.4		
3	**Values:**	
3.1	**Develop** abilities of team work, bear individual responsibilities on assigned tasks	**PLO3.1**
3...		

C. Course Content

Theoretical Part

No	List of Topics	Contact Hours
1	**Complex numbers**: Complex plane, Complex algebra, Complex conjugate and absolute value of complex numbers, Complex equations, Graphs and physical applications of complex numbers, Elementary functions of complex numbers, and Exponential and trigonometric functions.	**9**
2	**Linear Algebra** : The fundamental operation of matrices, Relation between matrices and linear equations, Cramer's rule, Vectors, lines and planes, Linear combination, linear functions and linear operators, Eigenvalue and eigenvector of a transformations.	**12**
3	**Fourier series and Fourier integrals**: Periodic and non-periodic functions, Average value of a function, Fourier series, Complex form of Fourier series, Even and odd functions, Fourier transforms and Laplace transforms.	**15**
4	**Special functions**: The factorial function, The Gamma function and recursion relation. The Beta function and relation between the Gamma and Beta functions.	**6**
5	**Review**	**3**
Total		**45**

Experimental Part: NA

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Define** the complex numbers, Euler formula, matrix operation, determinant, Fourier series and integrals, Gamma and beta functions.	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
1.2	**Describe** the required tools and various relevant equations needed to solve a physical problem, and the conditions for the validity of such equations.	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations- Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
1.3	**Discuss** various concepts in complex numbers, linear algebra, Fourier analysis and gamma and beta functions.	Lectures, blackboard and diagram illustration, group discussion, Interactive illustrations- Student contribution	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect:** student survey
2.0	**Skills**		
2.1	**Derive** the Euler formula, Cramer's rule, Fourier coefficients, and Gamma functions for simple cases.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.2	**Solve** problems related complex numbers, linear algebraic equations, Fourier Series and some special functions.	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.3	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays or web-based activities	Lectures, blackboard and visualization, brain storming, group and interactive discussion, Interactive illustration – Problem based learning	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
3.0	**Values**		
3.1	**Develop** abilities of team work, bear	Interactive and	**Direct** (formative and

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	individual responsibilities on assigned tasks	Group discussion, expository and discovery teaching	summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework assignment- Contribution in interactive discussion**	**4**	**5 (5%)**
2	**Quiz 1**	**5**	**2 (2%)**
3	**First Mid-term exam**	**7**	**15 (15%)**
4	**Homework assignment- Contribution in interactive discussion**	**8**	**6 (6%)**
5	**Quiz 2**	**9**	**2 (2%)**
6	**Second mid-term exam**	**12**	**15 (15%)**
7	**Homework assignment- Contribution in interactive discussion- Group work-essay or Project discussion**	**13**	**5 (5%)**
8	**Final Exam**	**16**	**50 (50%)**

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Available through the department and office hours; 10 office per week are allocated for students to see faculty or teaching staff.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Mary L. Boas Mathematical Methods in the Physical Sciences; 3rd edition, John Wiley& Sons, USA, (2006).
Essential References Materials	G Arfken, H Weber and F Harris Mathematical Methods for Physicists, Academic Press (2013). C Wong Introduction to Mathematical Physics , Oxford University Press (1991)
Electronic Materials	**http://mathworld.wolfram.com/Sine.html** **http://www.wikipedia.org/**
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	COMPUTER ROOM
Technology Resources (AV, data show, Smart Board, software, etc.)	SOFTWARES , MATHEMATICA , MATLAB
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Assessment	Program assessment committee , students	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Department council**
Reference No.	**8**
Date	**16/4/1442**