Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2025

Course description form

1- Course name	Nuclear Physics
2- Course code	Ph401
3- Semester/Year	yearly
4- Date this description was prepared	2024-2025
5- Available attendance forms	Lectures are delivered to students in person according to the schedule announced in the department
٦- Number of study hours (total)/number of units (total)	**Hours ١٥٠ (3 theoretical hours and 2 practical hours per week (٥ * 30 weeks)**
7- Name of the course administrator (if more than one name is mentioned	

١. Course objectives

1- The student knows the nature of the nucleus and nuclear force and studies its properties 2- The student should know the behavior and nature of the nucleus. 3- The student gets to know the types of nuclear radiation 4- Study of nuclear reactions and the types and forms of these reactions. 5- The student understands the different uses of nuclear rays. ٦- The student understands the different uses of nuclear rays	Objectives of the study subject

١. Teaching and learning strategies

1. In-person lectures in classrooms. **2. Discussion method, surprise exams, and methods of refining skills.** **3 Asking intellectual questions or holding a competition between students, stimulating**	The strategy

creative thinking and answering clearly and quickly to the problems presented.	

Course structure .١ .١

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Quarterly and daily attendance exams	In-person lectures	1- Static properties For the nucleus, such as: mass, charge, and size of the nucleus And the kinetic properties of the nucleus 2-Definitions (isotopes, isobars, isomers, isotones) Symmetry property	Know some concepts Basic to the nucleus	9 Hours	١, ٢, ٣
Quarterly and daily attendance exams	In-person lectures	1- Binding energy 2-Average binding energy 3-Calculating separation energies 4 Line of stability and abundance Natural	To learn about installation nucleus	9 Hours	٤, ٥, 6
Quarterly and daily attendance exams	In-person lectures	1-Liquid drop model 2-Nuclear shell model 3-other nuclear models	Distinguish between models Nuclear	9 Hours	٧, ٨, ٩
Quarterly and daily attendance exams	In-person lectures	1 - Types of nuclear reactions 2-Cross-sectional area and its types 3-Fission and fusion reactions	Recognizing the meaning of radioactivity and nuclear decay patterns	١٢ Hours	١٠, ١١, ١٢, ١٣
Quarterly and daily attendance exams	In-person lectures	Nuclear reactors Fissile 1-The working principle of the reactor -2-parts of the	Learn about energy production Nuclear reactors	3 Hours	٢٠

		reactor			
Quarterly and daily attendance exams	**In-person lectures**	**Particles accelerators Charged**	**How to speed up the particles Charged**	**3 Hours**	٢١
Quarterly and daily attendance exams	**In-person lectures**	**Types of radiation doses 1- Risk factor 2- Recommendations regarding limits and periods of exposure to workers In the field of radiation.**	**Identify the types of potions radiation resulting from exposure to radiation**	**Hours ٦**	٢٢ +٢٣
Quarterly and daily attendance exams	**In-person lectures**	Introduction to particle physics Primary	Particle identification Primary	**6 Hours**	٢٤+٢٥

٢. ١. Learning and teaching resources	
Main references (sources)	
Recommended supporting books and references (scientific journals).	الفيزياء النووية أ. م. د مناف عبد حسن المثالي في الفيزياء غيداء محمد زعرين
Electronic references, Internet sites	

Course description form

1- Course name	Electromagnetic wave
2- Course code	PH403
3- Semester/Year	yearly
4- Date this description was prepared	2024-2025
5- Available attendance forms	Lectures are delivered to students in person according to the schedule announced in the department
٦- Number of study hours (total)/number of units (total)	**٩٠ hours**
7- Name of the course administrator (if more than one name is mentioned	

١. Course objectives

1. Introducing students to the subject of electromagnetic physics and giving students a basic overview of the electrostatic field in conductive and insulating media and explaining the importance of the electric and magnetic field and how to benefit from them and avoid the dangers resulting from them and their role in understanding the principles of modern physics and its daily uses and how to employ this knowledge in facing daily life developments in the field of education, family, society **2. Makes students of colleges of education for pure sciences feel the value and importance of physics and the role of electromagnetic radiation in science and technology, especially in the field of towers, communications and mobile phones and how to deal with school students after graduation and practice their specialties as teachers in middle and preparatory schools and some research laboratories in government departments related to industry and in the field of research**	Objectives of the study subject

١. Teaching and learning strategies

1. In-person lectures in classrooms. **2. Discussion method, surprise exams, and methods of refining skills.** **3 Asking intellectual questions or holding a competition between students, stimulating creative thinking and answering clearly and quickly to the problems**	**The strategy**

presented.	

Course structure .١ .١

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Quarterly and daily attendance exams	In-person lectures	The student should know vector analysis and types of coordinates Vector analysis	The student is able to understand the Vector analysis	١٢	٤
Quarterly and daily attendance exams	In-person lectures	Steady electricity (electrostatics)	The student is able to understand the static electricity	١٥	٥
Quarterly and daily attendance exams	In-person lectures	Solving electrostatic problems.	The student is able to Solving electrostatic problems	١٢	٤
Exam1					
Quarterly and daily attendance exams	In-person lectures	Electrostatic field in insulating media	The student is able to understand the Electrostatic field	15	5
Quarterly and daily attendance exams	In-person lectures	Electrostatic energy	The student is able to understand the Electrostatic energy	١٢	٤
Exam2					
Quarterly and daily attendance exams	In-person lectures	Electric current and magnetism	The student is able to understand the Electric current and magnetism	١٥	٥
Quarterly and daily attendance exams	In-person lectures	Electromagnetic wave equation and its solution in different media	The student is able to understand the Electromagnetic wave equation	٦	٢
Quarterly and daily attendance exams	In-person lectures	Antennas and their types	The student is able to understand the Antennas and their types	٦	٢

Course evaluation

* Semi-daily and monthly tests ,And surprise exams, Daily class participation

Learning and teaching resources

Main references (sources)	المجالات الكهرومغناطيسية الجزء الأول والثاني اساسيات النظرية الكهرومغناطيسية الجزء الأول والثاني

	اساسيات الكهربائية والمغناطيسية سلسلة ملخصات شوم: الكهرومغناطيسيات ٢٠٠٠(تأليف جوزيف ادمنس)

Course description

١. Course name	Mathematic
٢. Course code:	Ph307
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	
٧. Name of the course administrator (if more than one name is mentioned)	

٨. Course objectives

Objectives of the study subject	Qualifying, training and teaching the student on ordinary differentials and integrals. Qualifying and teaching the student to benefit from differentials and integrals in the study topics of advanced stages. Qualifying, training and teaching the student on mathematical applications of differentials and integrals.

١. ١. Teaching and learning strategies

The strategy	**١. Attending lectures in the study halls.** **٢. The method of discussion and surprise tests and methods of sharpening skills.** **3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented**

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical) tests and questions	lectures	Functions 1.Functions analysis and	Gain knowledge in the Functions analysis	١٥	٥-١

		2. graphic			
(theoretical) tests and questions	lectures	Limit and continuity	Gain knowledge in the Limit and continuity	١٢	٩-٦
(theoretical) tests and questions	lectures	Differentiation Application	Gain knowledge in the Differentiation	١٥	١٤-١٠
(theoretical) tests and questions	lectures	Trigonometric Functions Properties Derivative	Gain knowledge in the Trigonometric Functions	١٢	١٨-١٥
(theoretical) tests and questions	lectures	Integration	Gain knowledge in the Integration	١٥	٢٣-١٩
(theoretical) tests and questions	lectures	Integration Application	Gain knowledge in the Integration Application	١٢	٢٧-٢٤
3 week Exam					

Course evaluation

Semi-daily and monthly tests
And surprise exams
Daily class participation

Learning and teaching resources

1. فيزياء الحالة الصلبة د. مؤيد جبرائيل
2. فيزياء الجوامد د. محمد أحمد الجاللي
3. Introduction to Solid State Physics Charles Kittel
4. Fundamentals of Solid State Engineering Manijeh Razeghi
5. Materials Science and Engineering an Introduction William D. Calliste

Course description

١. Course name	Solid state
٢. Course code:	Ph405
٣. Semester/year:	Yearly
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	
٧. Name of the course administrator (if more than one name is mentioned)	

٨. Course objectives

Objectives of the study subject	1. The student should know the science of solids, their types, what is the Bravise lattice and its types 2. The student should know the science of X-rays and what are the particles that are accompanied by waves that can be used to study crystals 3. The student should know Bragg's law and what are the conditions for applying Bragg's law 4. The student should know the inverted lattice and how to apply it 5. The student should know the lattice vibrations and their types 6. The student should know the theories of thermal conductivity and specific heat

١. ١. Teaching and learning strategies

The strategy	**١. Attending lectures in the study halls.** **٢. The method of discussion and surprise tests and methods of sharpening skills.** **3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented**

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical) tests and questions	lectures	Introduction Crystalline structure non-crystalline structure Unit cell Bravise lattice & non -Bravis lattice. kind of lattice structure: a- simple cubic, b-Body center cubic c- Face centre cubic	Gain knowledge in the Crystalline structure	3	1
(theoretical) tests and questions	lectures	Hexagonal system symmetry Miller Indices Incident Rays & Braggs Law X-Ray - Neutrons- Electron	Gain knowledge in the hexagonal system symmetry	6	2
(theoretical) tests and questions	lectures	Diffraction Method: a- Laue Method. b- Powder Method C- Rotating method Reciprocal Lattice Lattice Structure Factor	Gain knowledge in the Diffraction Method: a- Laue Method. b- b- Powder Method C- Rotating method	6	2
(theoretical) tests and questions	lectures	lattice Vibration Vibrational modes of linear monoatomic lattice Diatomic linear lattice Thermal Conductivity theories Specific heat theories	Gain knowledge in the lattice Vibration Vibrational modes of linear	3	1
Exam					

Course evaluation

Semi-daily and monthly tests
And surprise exams
Daily class participation

Learning and teaching resources

1. فيزياء الحالة الصلبة د. مؤيد جبرائيل
2. فيزياء الجوامد د. محمد أحمد الجاللي
3. Introduction to Solid State Physics Charles Kittel
4. Fundamentals of Solid State Engineering Manijeh Razeghi
5. Materials Science and Engineering an Introduction William D. Calliste

Course description

laser	١. Course name
Ph402	٢. Course code:
Yearly	٣. Semester/year:
2024-2025	٤. The date this description was prepared:
Lectures are delivered to students in person according to the schedule announced in the department	٥. Available attendance forms:
90 hours	٦. Number of study hours (total)/number of units ((total
	٧. Name of the course administrator (if more than one name is mentioned)

٨. Course objectives

It makes students of pure science colleges of education feel the value and importance of physics and the role of lasers in science and technology and how they deal with school students after graduation and practice their specializations as teachers in primary, middle and preparatory schools and some research laboratories in government departments related to industry and in the field of research and development.	Objectives of the study subject

١. ١. Teaching and learning strategies

١. Attending lectures in the study halls. **٢. The method of discussion and surprise tests and methods of sharpening skills.** **3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented**	The strategy

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical) tests and questions	lectures	Introduction The Nonlinear Wave Equation	Gain knowledge in the The Nonlinear Wave Equation	١٨	٦

		Second harmonic generation Phase Matching Exercises and solutions			
(theoretical) tests and questions	lectures	laser types A solid-state laser Laser liquid state Laser gaseous state The semiconductor laser Chemical Laser Exercises and solution	Gain knowledge in the laser types	٢٤	٨
(theoretical) tests and questions	lectures	Laser Applications Introduction Industrial Applications measurements and detection medical and biological applications military applications Marketing Applications Optical Communications Holography .8	Gain knowledge in the Laser Applications	٢٤	٨
(theoretical) tests and questions	lectures	Laser Safety in Research Laboratories Introduction Radiation Hazards Electrical Power Hazards Explosion Hazards Poisoning Hazards .	Gain knowledge in the Laser Safety in Research Laboratories	٢٤	٨
Exam					

Course evaluation

Semi-daily and monthly tests
And surprise exams
Daily class participation

Learning and teaching resources

1. Principles of Lasers Orazio Svelto
كتاب الليزرات ـ تأليف بيلا آ. لينكيل

Course description

Quantum Mechanic	١. Course name
Ph404	٢. Course code:
Year	٣. Semester/year:
2024-2025	٤. The date this description was prepared:
Lectures are delivered to students in person according to the schedule announced in the department	٥. Available attendance forms:
90	٦. Number of study hours (total)/number of units ((total
Name: Dr. Younis Mohamed Atiah	٧. Name of the course administrator (if more than one name is mentioned)

٨. Course objectives

➢ Students learn about the subject of Quantum Mechanic and its importance in physics. ➢ Employ the knowledge acquired by the student in explaining the natural phenomena associated with Quantum Mechanic. ➢ Provide students with the necessary thinking skills to use in the field of teaching the subject of Quantum Mechanic when practicing their specializations as teachers in primary, middle, and preparatory schools, which are part of the science or physics curriculum. ➢ Provide students with scientific research skills to use them in research and applied fields in government departments concerned with the research aspect	Objectives of the study subject

١. ١ Teaching and learning strategies

١. Attending lectures in the study halls. **٢. The method of discussion and surprise tests and methods of sharpening skills.** **3.Proposing intellectual questions and conducting competition between students and**	**The strategy**

eliciting creative thought and clear and quick answers to the problems presented	

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical) tests and questions	lectures	Introduction to mechanic quantum	Gain knowledge in the field of quantum mechanic	3	1
(theoretical) tests and questions	lectures	Dimension and Basis of a Space Vector	Gain knowledge in the field of Space Vector	6	2
(theoretical) tests and questions	lectures	Square-Integrable Functions: Wave Functions	Gain knowledge in the field of Wave Functions	6	2
(theoretical) tests and questions	lectures	,Hermitian Adjoint Projection Operators	Gain knowledge in the field of Hermitian Adjoint, Projection Operators	3	1
Exam					
(theoretical) tests and questions	lectures	Algebra Commutator	Gain knowledge in the field of Algebra Commutator	6	2
(theoretical) tests and questions	lectures	Uncertainty Relation between Two Operators	Gain knowledge in the field of Uncertainty Relation between Two Operators	3	1
(theoretical) tests and questions	lectures	Functions of Operators, Inverse and Unitary Operators	Gain knowledge in the field of Functions of Operators, Inverse and Unitary Operators	9	3
Exam					
Quarterly and daily attendance exams	lectures	Matrix Representation of Kets, Bras, and Operators	Gain knowledge in the field of Matrix Representation of Kets, Bras, and Operators	۹	3
Quarterly and daily attendance exams	lectures	Matrix Representation of the Eigenvalue Problem	Gain knowledge in the field of Matrix Representation of the Eigenvalue Problem	9	3
Exam					
Quarterly and daily attendance exams	lectures	Position and Momentum Representation	Gain knowledge in the field of Position and Momentum Representation	9	3

Quarterly and daily attendance exams	lectures	Mechanics Matrix	Gain knowledge in the field of Mechanics Matrix	9	3
Quarterly and daily attendance exams	lectures	Wave Mechanics	Gain knowledge in the field of Wave Mechanics	9	3
Quarterly and daily attendance exams	lectures	Hydrogen atom	Gain knowledge in the field of Hydrogen atom	9	3

Exam

Course evaluation

Semi-daily and monthly tests
And surprise exams
Daily class participation

Learning and teaching resources

- P. A. M. Dirac, "Principles of quantum mechanics", Oxford University Press (1947)-
- د. ج. غريفيثس، مقدمة في ميكانيكا الكم، ط٣، كامبريدج برس (2018) -

Course description form

1- Course name	**Electrical and magnetic 1**
2- Course code	Ph102
3- Semester/Year	
4- Date this description was prepared	2024-2025
5- Available attendance forms	Lectures are delivered to students in person according to the schedule announced in the department
٦- Number of study hours (total)/number of units (total)	٩٠ **hours**
7- Name of the course administrator (if more than one name is mentioned	

١. Course objectives

1- The student learns the basics of astronomy. 2- The student learns the basics of celestial mechanics. 3- The student gets to know the physical and kinetic properties of the solar system. 4- The student should know the physical and motion characteristics of stars and their types 5- The student learns about the types of galaxies, their physical properties, and the birth of the universe and its physical properties.		Objectives of the study subject

١. Teaching and learning strategies

1. **In-person lectures in classrooms.**	The strategy

2. Discussion method, surprise exams, and methods of refining skills. 3 Asking intellectual questions or holding a competition between students, stimulating creative thinking and answering clearly and quickly to the problems presented.	

Course structure .١ .١

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Quarterly and daily attendance exams	In-person lectures	Kepler's laws, dome Celestial bodies, astronomical terms, celestial dome coordinate systems	The student is able to understand the given material	10hours	weeks 5
Quarterly and daily attendance exams	In-person lectures	Astronomical seasons, units of measurement, physical properties of the sun and its layers, surface phenomena of the sun and moon, physical properties of the planets	The student is able to understand the given material	10hours	5weeks
Quarterly and daily attendance exams	In-person lectures	Meteors, meteorites, and comets, the origin of the solar system, the steller Magnitude- the luminosity of the stars, the (H-R) diagram. For the stars and matters	The student is able to understand the given material	10hours	5weeks
Quarterly and daily attendance exams	In-person lectures	Steller Evolution, binary stars - measuring the mass of two stars, types of binary stars - variable stars, our Milky Way galaxy	The student is able to understand the given material	10hours	5weeks
Quarterly and daily attendance exams	In-person lectures	Galaxy movement, galaxy mass calculation, types of galaxies, active galaxies.	The student is able to understand the given material	10hours	5weeks

Quarterly and daily attendance exams	**In-person lectures**	**Quasars - expansion of the universe, theory of the emergence of the universe, life in the universe**	**The student is able to understand the given material**	**10hours**	**5weeks**

٢. Course evaluation

* **Semi-daily and monthly tests**

And surprise exams.

Daily class participation

٢. ١. Learning and teaching resources

Main references (sources)	فيزياء الجو و الفضاء : الجزء الاول (علم الفلك) – حميد مجول النعيمي وفياض النجم ٢- **Fundamental Astronomy 5th ed H.Karttunen,etal ; Springer- 2006.** 3- **Astronomy – Principles and Practice 4th ed, A. Roy,D Clarke; Springer.**
Recommended supporting books and references (scientific journals).	
Electronic references, Internet sites	

Course description form

١. Course name	Heat
٢. Course code:	Ph103
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	١٥٠ hours (3 theoretical hours and 2 practical hours per week) (5 hours * 30 weeks) and the number of units = 7 units
٧. Name of the course administrator (if more than one name is mentioned)	Name: Dr. Younis Mohamed Atiah

٨. Course objectives

Objectives of the study subject	The aim of my course is to familiarize students with HEAT and THERMAL TRANSFERE methods and develop mathematical skills required to solve problems in HEAT, kinetic dynamics and other fields of theoretical physics Understanding and assimilation of theoretical mathematical derivations important for interpretation of various HEAT and THERMAL TRANSFERE

١. ١. Teaching and learning strategies

The strategy	١. Attending lectures in the study halls. ٢. The method of discussion and surprise tests and methods of sharpening skills. 3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented

Course structure

Week	hours	Required	Name of the unit or	Learning	Evaluation

method	method	topic	learning outcomes		
(theoretical) tests and questions	lectures	Types of Thermometers Thermal Expansion Methods of Heat Transfer	Gain knowledge in the field of Types of Thermometers	٩	٣+٢+١
Quarterly and daily attendance exams	lectures	Thermal Energy Sources Specific Heat First Law of Thermodynamics	Gain knowledge in the field of Specific Heat First Law of Thermodynamics	٩	٦+٥+٤
Quarterly and daily attendance exams	In-person lectures	Real gas and ideal gas Kinetic theory of gases suspended between Cv and Cp	Gain knowledge in the field of Real gas and ideal gas	9	٩+٨+٧
		Density and Specific Weight Bernoulli's Equation Surface Tension Viscosity	Gain knowledge in the field of Bernoulli's Equation Surface Tension Viscosity	12	١٣+١٢+١١+١٠
Quarterly and daily attendance exams	In-person lectures	-Types of stress and strain -Young's modulus The relationship - between mechanical properties and temperature	Gain knowledge in the field of Young's modulus	3	14
First exam					
Quarterly and daily attendance exams	In-person lectures	Study of the properties Magnetic of materials Classification of materials Electrical conductivity Conductors and insulators Semiconductors Electrical conductivity Electrical resistivity Specific resistance Hall effect Piezoelectricity Ferroelectricity	Gain knowledge in the field of Classification of materials	12	١٩+١٨+١٧+١٦

		Relationship between conductivity Electrical and thermal Superconducting materials			
Quarterly and daily attendance exams	In-person lectures	Plasma	Gain knowledge in the field of Plasma	6	٢٠+٢١
Quarterly and daily attendance exams	In-person lectures	Composite materials Classification of engineering materials Organic materials -Polymers Classification of polymers A- Classification According to the polymer structure -PolymersLinear polymer Branched -Polymers Crosslinked -Networks Hybrid composites Reinforcement materials Characteristics Hybrid composites Interface And adhesion strength	Gain knowledge in the field of Classification of polymers	15	٢٢+٢٣ ٢٤+٢٥+٢٦
Second exam					
Quarterly and daily attendance exams	In-person lectures	B- Classification According to the thermal behavior: Thermosetting polymers Non-thermosetting polymers -Thermosetting polymers	Gain knowledge in the field of Classification According to the thermal behavior		٢٨+٢٩+٣٠

		Rubber Flexible polymers Inorganic materials Composites Based material Mineral-based Composites Ceramic-based Composites Polymer-based			

Course evaluation
Semi-daily and monthly tests And surprise exams Daily class participation
Learning and teaching resources

- 1 - Physics for Scientists and Engineers with modern) physics, SERWAY and JEWETT , 9 Edition , 2014 .
- 2- University Physics by Francis W. Sears, Mark W. Zemanseky and Hugh D. Young, 1982.

3- Introduction to Physics by Jojn D.Cutnell, Kenneth W.Johnson 8th Ed.,2010

Course description form

١. Course name	Mechanic
٢. Course code:	Ph101
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	ectures are delivered to students in person ccording to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	١٥٠ hours (3 theoretical hours and 2 practical hours per week) (5 hours * 30 weeks) and the number of units = 7 units
٧. Name of the course administrator (if more than one name is mentioned)	Name: Dr. Younis Mohamed Atiah

٨. Course objectives

Objectives of the study subject	The aim of my course is to familiarize students with mechanical methods and develop mathematical skills required to solve problems in mechanics, kinetic dynamics and other fields of theoretical physics Understanding and assimilation of theoretical mathematical derivations important for interpretation of various kinetic and mechanical phenomena related to industry and in the field of research and development

١. ١. Teaching and learning strategies

The strategy	**١. Attending lectures in the study halls.** **٢. The method of discussion and surprise tests and methods of sharpening skills.**

3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented					
Course structure					
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical) tests and questions	lectures	introduction to vectors, analysis and importance	The student's definition of vector analysis and importance, the basics of vector concepts, an	٩	٣+٢+١
Quarterly and daily attendance exams	lectures	The basics of vector concepts	Definition of the student's units of vector and quantity, numerical multiplication and directional multiplication of vectors and their properties and uses	٩	٦+٥+٤
Quarterly and daily attendance exams	In-person lectures	Movement in a single dimension	Acquiring knowledge in understanding the meaning of movement in a single dimension and how to adapt	١٢	٩+٨+٧
		the movement of objects in a straight line, the fall of the free, and the throwing of the objects upwards	Understanding the movement in the two dimensions		١٣+١٢+١١+١٠
Quarterly and daily attendance exams	In-person lectures	Motion of the objects in the field of uniform gravity (projectile)	Identifying the motion along the straight line of the equations of motion of the objects in the field of uniform gravity	١٢	١٤

Quarterly and daily attendance exams	In-person lectures	Newton's laws of motion	The student Definition of Newton's laws of motion	15	١٥
Quarterly and daily attendance exams	In-person lectures	frictional forces	Dealing with the laws of motion due to the presence of friction	12	١٦
Quarterly and daily attendance exams	In-person lectures	derivation of laws of circular motion	Definition of regular and irregular circular motion	٦	١٧
Quarterly and daily attendance exams	In-person lectures	work, potential energy, kinetic energy	Understanding work, potential energy, kinetic energy, the law of conservation of energy, and conditions for conservation of power	٦	١٨
Quarterly and daily attendance exams	In-person lectures	linear momentum, repulsion and collisions	Understanding linear momentum and the theory of linear momentum repulsion,		٢٠+١٩
Quarterly and daily attendance exams	In-person lectures	the rotational motion	Understanding the rotational kinetic energy and inertia of the rotational motion		٢٢+٢١
Quarterly and daily attendance exams	In-person lectures	Potential energy and kinetic energy For bodies and power, for speed	Definition of the student how to create Potential energy and kinetic energy For bodies and power, for speed And the time and the time are completely separate and the conditions for maintaining strength Creation of the function of potential		٢٥+٢٤+٢٣

			energy of a body, slope, distance and curvature of objects		
Quarterly and daily attendance exams	In-person lectures	derivations of movement in the harmonic oscillator	The definition of the harmonic oscillator in the second and third dimensions		

Course evaluation

Semi-daily and monthly tests
.And surprise exams
Daily class participation

Learning and teaching resources

- 1 - Physics for Scientists and Engineers with modern) physics, SERWAY and JEWETT , 9 Edition , 2014 .
- 2- University Physics by Francis W. Sears, Mark W. Zemanseky and Hugh D. Young, 1982.
3- Introduction to Physics by Jojn D.Cutnell, Kenneth W.Johnson 8th Ed.,2010

Course description form

1- Course name	**Complex Functions**
2- Course code	PH 305
3- Semester/Year	1st and 2nd semester/ 3rd Year
4- Date this description was prepare	2024-2025
5- Available attendance forms	Lectures are delivered to students in person according to the schedule announced in the department
6- Number of study hours (total)/number of units (total)	**Hours 60 (2 hours per week * 30 weeks)**
7- Name of the course administrator (if more than one name is mentioned	Name:

8- Course objectives

Qualifying and training the student and teaching him on complex numbers, complex functions and their properties, complex integration, sequences, physical applications and the employment of functions in the service of other school subjects.	Objectives of the study subject

Teaching and learning strategies

1. In-person lectures in classrooms. **2. Discussion method, surprise exams, and methods of refining skills.** **3 Asking intellectual questions or holding a competition between students, stimulating creative thinking and answering clearly and quickly to the problems presented.**	The strategy

1. Course structure

Weeks	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1-5	10	Gaining knowledge in	Preface, the complex number، Exercises, attributes	Lecture and	Quarterly and daily

		complex numbers and their properties	Algebra, exercises، Absolute value، Exercises, acting The geometry of the complex number، Polar coordinates، Exercises, Powers And roots, exercises	Discussion	attendance exams
6-10	10	Gaining knowledge in complex functions and their properties	Functions of a complex variable, exercises, Limits, exercises, Continuity, exercises, Derivatives, exercises, Analytic functions, Harmonics functions, exercises	Lecture and Discussion	Quarterly and daily attendance exams
11-15	10	Gaining knowledge in elementary complex functions and their properties	Exponential function, the Logarithmic function, exercises, Trigonometric functions, Inverse trigonometry functions, Hyperbolic functions, Inverse Hyperbolic functions, exercises	Lecture and Discussion	Quarterly and daily attendance exams
16-20	**10**	Gaining knowledge in complex integration and their properties and theorems	Paths , complex integration, exercises, Cauchy- Goursat's theorem, generalization of Cauchy- Goursat's theorem to a multi-contact area, indefinite integrals, exercises, Cauchy integral formulas, Liouville's theorem, Moreira's theorem, the fundamental theorem in Algebra, the Gauss mean value theorem, exercises	Lecture and Discussion	Quarterly and daily attendance exams
21-25	**10**	Gaining knowledge in complex series	Convergence of sequences and series, exercises, power series, exercises, Taylor series, exercises, Laurent series, exercises	Lecture and Discussion	Quarterly and daily attendance exams
26-30	**10**	Gain knowledge in the treatment of the most important physical applications	Applications on electrostatics, exercises, applications on the flow of heat, exercises	Lecture and Discussion	Quarterly and daily attendance exams

2. Course evaluation

* **Semi-daily and monthly tests**

And surprise exams.

Daily class participation

Learning and teaching resources	
الدوال المعقدة للصف الثالث فيزياء في كليات التربية سمير بشير حديد، يحيى عبد سعيد	Main references (sources)
Complex analysis with applications, Asmar, Nakhle H., Grafkos, Loukas-Grafakos L., (2018) Springer	Recommended supporting books and references (scientific journals).
	Electronic references, Internet sites

Course description form

١. Course name	ELECTRONICS
٢. Course code:	Ph303
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	٩٠ per week □30 per week (3 hours per week (3 hours
٧. Name of the course administrator (if more than one name is mentioned)	Name: Dr. Mohammed SalimJasim Msjadr72@gmail.com
٨. Course objectives	
Objectives of the study subject	□ Introducing the students to the subject of electronics physics and giving the students a basic overview of the diode in electrical circuits and explaining its importance and how to benefit from it and avoid the dangers resulting from it and its role in understanding the principles of modern physics and its daily uses and how to employ this knowledge in confronting daily life developments in the field of modern technologies. ✓
	□ It makes students of colleges of education for pure sciences feel the value and importance of physics and the role of semiconductor materials in science and technology, especially in the field of towers, communications and mobile phones, and how they deal with students. ✓
	Schools after graduation and practice their ✓

specialties as teachers in middle and middle schools and some research laboratories in state departments related to industry and in the field of research and development.		

١. ١ Teaching and learning strategies

The strategy	In-person lectures in classrooms. Discussion method, surprise exams, and methods of refining skills. Asking intellectual questions or holding a competition between students, stimulating creative thinking and answering clearly and quickly to the problems presented. Cognitive objectives The student should know the foundations of electronics and the fields of use Introducing students to the types of materials and mainly paying attention to semiconductors The student should know how the process of mixing is done The student should know the process of creating and designing a diode. The student should know how the process of connecting a diode is done. The student will know how to analyze complex electrical networks through Kirchhoff's laws as well as using Thevenin's theory Course-specific skills objectives How to perform mathematical operations on electronic circuits and employ their theories through scientific thinking

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
Quarterly and daily attendance exams	In-person lectures	Materials in nature	The student should know the types of materials and rely on the energy gap to distinguish between them	12	4
Quarterly and daily attendance exams	In-person lectures	Identify silicon and germanium	The student should know the importance of semiconductors and their types	١٥	٥
Quarterly and daily attendance exams	In-person lectures	Through heat and quenching, the quenching process takes place	To know the types of semiconductors and how they are catalyzed	١٢	٤
Quarterly and daily	In-person	Electrical energy	Student definition of	١٢	٤

attendance exams	lectures	stored in doped semiconductors	potential energy in doped semiconductors		
Quarterly and daily attendance exams	In-person lectures	electric current	The student defines the nature of the current and the density of the current	15	٥
Quarterly and daily attendance exams	In-person lectures	Holes and electrons	Introducing the student to diodes and their importance in electronic circuits	12	4
Quarterly and daily attendance exams	In-person lectures	Kirchhof and Thevenin	Introducing the student to Kirchhoff's laws and Thevenin's laws in analyzing and simplifying electronic networks	٦	٢
Quarterly and daily attendance exams	In-person lectures	complex electronics	Analyzing complex electrical networks in the simplest possible ways	٦	٢

Course evaluation

Semi-daily and monthly tests
.And surprise exams
Daily class participation

Learning and teaching resources

Electronics basics
Basics of electrical theory -
Basics of electronic circuits -
- Schaum Abstracts Series: Electrical 2000 (written by Joseph Edmonds)

Course description form

١. Course name	**Atomic**
٢. Course code:	Ph307
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	١٥٠ hours (3 theoretical hours and 2 practical hours per week) (5 hours * 30 weeks) and the number of units = 7 units
٧. Name of the course administrator (if more than one name is mentioned)	Name: Dr. Younis Mohamed Atiah

٨. Course objectives

• Objectives of the study subject	• Introducing the student to the basics Special Theory of Relativity Newton's Laws of Motion. Galileo's Transformations. Newton's Principle of Relativity. • Introducing the student to some Nature of light and electromagnetic radiation. Thermal radiation. Emission and absorption of radiation. Black body radiation. Black body radiation spectrum. Introducing the student to Production of X-rays. Measurement of X-ray intensity-ray spectra: Continuous X-ray spectrum, Sharp line X-ray spectrum. Nature and diffraction of X-rays. Refraction of X-rays. Compton effect. Pair production

Teaching and learning strategies

The strategy	**١. Attending lectures in the study halls.** **٢. The method of discussion and surprise tests and methods of sharpening skills.** **3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented**

Course structure

Week	hours	Required	Name of the unit or topic	Learning	Evaluation

method	method		learning outcomes		
(theoretical) tests and questions	lectures	Special Theory of Relativity Newton's Laws of Motion. Galileo's Transformations. Newton's Principle of Relativity. Michelson-Morley Experiment. Assumptions of Special Theory of Relativity. Lorentz Transformations. Lorentz Transformations Results: Relativity of Length, Relativity of Time, Relativity of Velocity. Relative Mass. Relative Force. Relative Energy. Relationship between Energy and Momentum. Electron Volt. Relative Force. Relative Energy. Relationship between Energy and Momentum. .Electron Volt	Gain knowledge in the field of Assumptions of Special Theory of Relativity	٩	
Quarterly and daily attendance exams	lectures	Nature of light and electromagnetic radiation. Thermal radiation. Emission and absorption of radiation. Black body radiation. Black body radiation spectrum. Rayleigh-Jeans law. Planck's law of radiation. The photoelectric effect. Einstein's explanation of the photoelectric effect	Gain knowledge in the field of Nature of light and electromagnetic radiation	٩	
Exam					
Quarterly and daily attendance exams	lectures	Applications of the photoelectric effect. Solved problems. Discovery of natural radioactivity. Atomic models: Thomson model, Rutherford model. Rutherford's scattering theory. Solved problems	Gain knowledge in the field of Atomic models	12	
Quarterly and daily attendance exams	lectures	Discovery of X-rays. Production of X-rays. Measurement of X-ray intensity. X-ray spectra: Continuous X-ray spectrum, Sharp line X-ray spectrum.	Gain knowledge in the field of X-rays.		

		Nature and diffraction of X-rays. Refraction of X-rays. Compton effect. Pair production			
Exam					
Quarterly and daily attendance exams	lectures	Photon absorption. Questions. Solved problems. De Broglie hypothesis. Electron diffraction. Neutron diffraction. What are de Broglie waves? De Broglie wave velocity. Phase velocity and group velocity. Double slit experiment. Uncertainty principle. .Questions and solved problems	Gain knowledge in the field of De Broglie hypothesis		
Quarterly and daily attendance exams	lectures	Introduction, Hydrogen Atom Spectrum Bohr's Theory of Hydrogen Atom, Derivation of Binding Energy of Hydrogen Atom Finding the Angular Velocity of Electron, Bohr's Postulates To Interpret the Hydrogen Atom Spectrum	Gain knowledge in the field of Hydrogen Atom Spectrum		
Exam					
Quarterly and daily attendance exams	lectures	Derive the Wavenumber Equation Using Bohr's Second Postulate, Electron Transitions in Hydrogen Atom Motion of Hydrogen Nucleus. Questions Solved Problems	Gain knowledge in the field of Derive the Wavenumber Equation Using Bohr's Second Postulate,		
Exam					

Course evaluation

- Semi-daily and monthly tests
- And surprise exams
- Daily class participation

Reference

- Fundamentals of Physics, F. Bush, translation of the 1977 edition.
- Atomic Physics, Dr. Talib Nahi Al-Khafaji, Dr. Abbas Hammadi, and Dr. Hormuz Moshi.
- Concepts in Modern Physics, Arthur Beiser, translation of the second edition.

Course description form

١. Course name	**Mechanical analysis**
٢. Course code:	Ph304
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	١٥٠ hours (3 theoretical hours and 2 practical hours per week) (5 hours * 30 weeks) and the number of units = 7 units
٧. Name of the course administrator (if more than one name is mentioned)	Name: Dr. Younis Mohamed Atiah

٨. Course objectives

• Objectives of the study subject	• Introducing the student to the basics Special Theory of Equations of motion of projectiles in a uniform gravitational field ,Derivatives of motion in harmonic oscillators in two and three dimensions, Motion on a curve and the simple pendulum • Introducing the student to some Vector differentiation, velocity and acceleration of particles in polar, cylindrical and spherical coordinates.

Teaching and learning strategies

The strategy	**١. Attending lectures in the study halls.** **٢. The method of discussion and surprise tests and methods of sharpening skills.** **3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented**

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical)	lectures	The meaning of thermodynamics, the	The student	٩	

tests and questions		definition of the system and its types (real and ideal system), the boundaries of the system (open, closed and isolated), the processes in thermodynamics, the thermodynamic equilibrium, the properties of the system, the relationship between heat and work, the zeroth law. .	understands the meaning of thermodynamics and the basic concepts of the system.		
Quarterly and daily attendance exams	lectures	The equation of state for an ideal gas and the experimental method for deriving it, the equation of state for a real gas, the equation of state for a Van der Waals gas and finding its constants. Partial derivatives, the state function and its conditions, the path function, extensibility and compressibility	Introducing the student to Equations of state for ideal and real gases and some useful mathematical .theories	۹	
Exam					
Quarterly and daily attendance exams	lectures	the text of the first law, the formula of the first law, applications of the first law, results of the first law, the meaning of enthalpy, the free expansion of gases, the true expansion of gases, the work done in adiabatic and isothermal processes and constant volume processes, the work of a gas in constant temperature processes, heat capacity under constant pressure and heat capacity under constant volume and the relationship between them, the concept of work in thermodynamics, the dependence of work on the path	The student should understand the first law of thermodynamics, the meaning of enthalpy, the expansion of gases, heat capacity, the concept of work and its dependence on ,the path	12	
Quarterly and daily attendance exams	lectures	The text of the second law, the formulas of the second law (Classius, Kelvin-Planck), linking the first law and the second law and the results of this link when applied to an ideal gas, the Carnot cycle machine, representing the Carnot cycle, heat engines and their cycle and efficiency, the heat pump and its operation and efficiency	The student should understand the second law of thermodynamics and link it to the first law and the results of this link and the Carnot cycle machine and the heat engine and the heat pump		

Exam					
Quarterly and daily attendance exams	lectures	Definition of entropy (inertia), calculation of the change in entropy, the principle of increasing entropy in the universe and the system, the relationship between entropy and temperature, Clausius's theory, Gibbs's function, Helmholtz's function, thermodynamic potential .equations, Maxwell's equations	The student understands entropy and its relationship with the system and the universe, Clausius's theory, and some functions and equations related to entropy and .temperature		
Quarterly and daily attendance exams	lectures	Potential and kinetic energy, energy conservation law and force conservation conditions	Introducing the student to vector differentiation and integration, their properties and uses		
Exam					
Quarterly and daily attendance exams	lectures	Understanding and comprehending the derivatives of the motion of a body in a resistive medium, finding the final velocity and the change in gravity with height	Introducing the student to motion in a straight line Introducing potential and kinetic energy and the law of conservation of energy		
Quarterly and daily attendance exams	lectures	Physical applications of simple harmonic motion	Introducing the student to vertical motion in a resistive medium, the velocity of the end, and the change in gravity with height Linear impeding force, harmonic motion and their applications		
Quarterly and daily attendance exams	lectures	Finding the potential energy function of a particle, slope, divergence and twist of vectors	Introducing the student to particle motion in general		

			motion, the principle of work, conservative forces and force fields		
Quarterly and daily attendance exams	lectures	Equations of motion of projectiles in a uniform gravitational field	Introducing the student to how to find Potential energy and kinetic energy For particles and force as a function of speed For position and time, each separately And the conditions for conservation of force		
Quarterly and daily attendance exams	lectures	Derivatives of motion in harmonic oscillators in two and three dimensions	Introducing the student to projectile motion in a uniform gravitational field and various solved problems Introducing the student to the harmonic oscillator in two and three dimensions		
Quarterly and daily attendance exams	lectures	Motion on a curve and the simple pendulum	Introducing the student to the harmonic oscillator in two and three dimensions		
Exam					
Course evaluation					
Semi-daily and monthly tests And surprise exams Daily class participation					
Reference					

- Fundamentals of Physics, F. Bush, translation of the 1977 edition.
- Atomic Physics, Dr. Talib Nahi Al-Khafaji, Dr. Abbas Hammadi, and Dr. Hormuz Moshi.
- Concepts in Modern Physics, Arthur Beiser, translation of the second edition.

Course description form

١. Course name	**Electrical and Magnetic 2**
٢. Course code:	Ph201
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	ectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	2 theoretical hours and 2 practical hours per week
٧. Name of the course administrator (if more than one name is mentioned)	Name:

٨. Course objectives

• Objectives of the study subject	• Introducing the student to the basics of the effects of electric currents and the electromagnetic field resulting from an electric current • Introducing the student to some electrical measuring devices • Introducing the student to the methods of generating a magnetic field from the passage of an electric current • A basic overview of alternating or alternating electric currents and some of their applied circuits. • Introducing the student to the laws of electromagnetic induction (Faraday + Biet-Savart + Ampere's circular law) • Introducing the student to the concepts of self and mutual induction

Teaching and learning strategies

The strategy	• ١. Attending lectures in the study halls. • ٢. The method of discussion and surprise tests and methods of sharpening skills. • 3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented

Course structure

Week	hours	Required	Name of the unit or topic	Learning	Evaluation

method	method		learning outcomes		
(theoretical) tests and questions	lectures	AC Circuits	Gain knowledge in the field of Types of AC Circuits	8	4
Quarterly and daily attendance exams	lectures	Magnetic Field	Gain knowledge in the field of Magnetic Field	8	4
Exam					
Quarterly and daily attendance exams	lectures	Electrical Measuring Instruments	Gain knowledge in the field of Electrical Measuring Instruments	4	2
Quarterly and daily attendance exams	lectures	Magnetic field of electric current	Gain knowledge in the field of Magnetic field of electric current	8	4
Exam					
Quarterly and daily attendance exams	lectures	Induced electromotive force	Gain knowledge in the field of Induced electromotive force	8	4
Quarterly and daily attendance exams	lectures	Inductance	Gain knowledge in the field of Inductance	8	4
Exam					
Quarterly and daily attendance exams	lectures	Electric current	Gain knowledge in the field of Electric current	8	4
Quarterly and daily attendance exams	lectures	Magnetic and ferromagnetic properties of materials	Gain knowledge in the field of Magnetic and ferromagnetic	8	4
Exam					
Course evaluation					
Semi-daily and monthly tests And surprise exams Daily class participation					
Learning and teaching resources					

Kip, Arthur F., "Fundamentals of Electricity and Magnetism, 2nd Ed.", McGraw-Hill, 1969
W. T., The Physics of Electricity and Magnetism, Wiley, 1959

Course description form

1- Course name	Astronomy
2- Course code	Ph203
3- Semester/Year	yearly
4- Date this description was prepared	2024-2025
5- Available attendance forms	Lectures are delivered to students in person according to the schedule announced in the department
٦- Number of study hours (total)/number of units (total)	٦٠ Hours (2 hours per week * 30 weeks)
7- Name of the course administrator (if more than one name is mentioned	Name:

Course objectives

1- The student learns the basics of astronomy. 2- The student learns the basics of celestial mechanics. 3- The student gets to know the physical and kinetic properties of the solar system. 4- The student should know the physical and motion characteristics of stars and their types 5- The student learns about the types of galaxies, their physical properties, and the birth of the universe and its physical properties.		Objectives of the study subject

Teaching and learning strategies

1. In-person lectures in classrooms. 2. Discussion method, surprise exams, and methods of refining skills. 3 Asking intellectual questions or holding a competition between students, stimulating creative thinking and answering clearly and quickly to the problems presented.	The strategy

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Quarterly and	In-person lectures	Kepler's laws,	The student is able to	10hours	weeks 5

daily attendance exams		dome Celestial bodies, astronomical terms, celestial dome coordinate systems	understand the given material		
Quarterly and daily attendance exams	In-person lectures	Astronomical seasons, units of measurement, physical properties of the sun and its layers, surface phenomena of the sun and moon, physical properties of the planets	The student is able to understand the given material	10hours	5weeks
Quarterly and daily attendance exams	In-person lectures	Meteors, meteorites, and comets, the origin of the solar system, the steller Magnitude- the luminosity of the stars, the (H-R) diagram. For the stars and matters	The student is able to understand the given material	10hours	5weeks
Quarterly and daily attendance exams	In-person lectures	Steller Evolution, binary stars - measuring the mass of two stars, types of binary stars - variable stars, our Milky Way galaxy	The student is able to understand the given material	10hours	5weeks
Quarterly and daily attendance exams	In-person lectures	Galaxy movement, galaxy mass calculation, types of galaxies, active galaxies.	The student is able to understand the given material	10hours	5weeks
Quarterly and daily attendance exams	In-person lectures	Quasars - expansion of the universe, theory of the emergence of the universe,	The student is able to understand the given material	10hours	5weeks

		life in the universe			

Course evaluation

Semi-daily and monthly tests

And surprise exams.

Daily class participation

Learning and teaching resources

Main references (sources)	فيزياء الجو و الفضاء : الجزء الاول (علم الفلك) – حميد مجول النعيمي وفياض النجم – Fundamental Astronomy 5th ed H.Karttunen,etal ; Springer– 2006. Astronomy – Principles and Practice 4th ed, A. Roy,D Clarke; Springer.

Course description form

١. Course name	Optics
٢. Course code:	Ph 202
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	١٥٠ hours (3 theoretical hours and 2 practical hours per week) (5 hours * 30 weeks) and the number of units = 7 units
٧. Name of the course administrator (if more than one name is mentioned)	Name: Dr. Younis Mohamed Atiah

٨. Course objectives

Objectives of the study subject	➢ Students learn about the importance of optics and its relationship to physics topics. Course objectives: ➢ Attempt to understand optical properties and what is related to the physical phenomenon. ➢ Introduce students to how to use illustrative tools and devices. ➢ Develop the scientific research aspect of students by identifying the optical phenomenon and knowing its causes and how it occurs. ➢ Enhance students' cognitive abilities by linking the subject to optical phenomena found in nature. ➢ Develop the spirit of cooperation among students in the field of scientific research, which enhances creative abilities.

١. ١. Teaching and learning strategies

The strategy	**١. Attending lectures in the study halls.** **٢. The method of discussion and surprise tests and methods of sharpening skills.** **3.Proposing intellectual questions and conducting competition between students and**

eliciting creative thought and clear and quick answers to the problems presented					
Course structure					
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical) tests and questions	lectures	The nature of light Color formation Absorption and reflection How to distinguish colors	Gaining knowledge related to: Color formation Absorption and reflection	٩	15
Exam					
Quarterly and daily attendance exams	lectures	Chapter Two: Reflection and refraction Light transmission in straight lines Formation of the focus in mirrors and lenses Investigation of the laws of refraction And the critical angle Refractive index for each material	Gaining knowledge related to: The principle of Reflection and refraction Light	٩	15
Exam					
Quarterly and daily attendance exams	In-person lectures	Chapter Three: Spherical surfaces Identifying the surface geometry Optical laws in spherical surfaces	Gain knowledge related to: Optical laws in spherical surfaces	١٢	15
Exam					
Quarterly and daily attendance		Chapter Four: Lenses	Gain knowledge related to: Types of		15

exams		• Types of lenses • Compound lenses • Concept of focal length • Gauss's relationship and Newton's relationship to find the focal length Using lenses Lens manufacturers' formula	lenses		
Quarterly and daily attendance exams	lectures	Chapter Five: Mirrors The nature of radiant light Reflection in mirrors Optical elements Spherical and plane mirrors Thin and thick mirrors Gauss's formula for mirrors	Gain knowledge related to: Mirrors The nature of radiant light Reflection in mirrors		
Quarterly and daily attendance exams	lectures	Chapter Six: Aberration The concept of aberration Types of aberration Methods of getting rid of aberration Chapter Seven: Interference The concept of interference Newton's ring	Gain knowledge related to: Interference The concept of interference		

		experiment Interference based on the principle of amplitude division Constructive interference The Destructive			
Quarterly and daily attendance exams	lectures	Chapter Eight: Diffraction The Concept of Diffraction young's double slit experiment The Wave Nature of Light	Gain knowledge related to: Diffraction young's double		
Quarterly and daily attendance exams	lectures	Chapter Nine: Polarization The Meaning of Polarization Types of Polarization Polarizing Materials	Gain knowledge related to: Types of Polarization		
Quarterly and daily attendance exams	lectures	Chapter Ten: Optical Devices Types of Optical Devices The Importance of Optical Devices	Gain knowledge related to: Optical Devices		
Exam					
Course evaluation					
Semi-daily and monthly tests And surprise exams Daily class participation					
Learning and teaching resources					
Fundamentals of Optics, Emmanuel E. Gdoutos Principles of Optics the Anniversary Edition Max Born, Emil Wolf60					

Course description form

١. Course name	**Vibrational motion and sound**
٢. Course code:	Ph 204
٣. Semester/year:	Year
٤. The date this description was prepared:	2024-2025
٥. Available attendance forms:	Lectures are delivered to students in person according to the schedule announced in the department
٦. Number of study hours (total)/number of units (total)	١٥٠ hours (3 theoretical hours and 2 practical hours per week) (5 hours * 30 weeks) and the number of units = 7 units
٧. Name of the course administrator (if more than one name is mentioned)	Name: Dr. Younis Mohamed Atiah

٨. Course objectives

Objectives of the study subject	➢ Students learn about the subject of sound and wave motion and its importance in physics. ➢ Employ the knowledge acquired by the student in explaining the natural phenomena associated with sound and wave motion. ➢ Provide students with the necessary thinking skills to use in the field of teaching the subject of sound and wave motion when practicing their specializations as teachers in primary, middle, and preparatory schools, which are part of the science or physics curriculum. ➢ Provide students with scientific research skills to use them in research and applied fields in government departments concerned with the research aspect

١. ١. Teaching and learning strategies

The strategy	**١. Attending lectures in the study halls.** **٢. The method of discussion and surprise tests and methods of sharpening skills.**

3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented	

Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	Week
(theoretical) tests and questions	lectures	Chapter One (Definition of sound, the psychological and physical meaning of sound, the conditions of sound occurrence and propagation) Chapter Two (Vibrational motion, simple harmonic motion, applications of simple harmonic motion)	Gaining knowledge related to: the nature of sound, the conditions of its occurrence and transmission, free vibration, simple harmonic motion and its applications.	٩	15
Exam					
Quarterly and daily attendance exams	lectures	Chapter Three (The principle of superposition, superposition of two harmonic motions in one dimension, superposition of two harmonic motions in two perpendicular dimensions,	Gaining knowledge related to: The principle of superposition and its types	٩	15
Exam					
Quarterly and daily attendance exams	In-person lectures	Chapter 4 Forces causing decay of vibrations,	Gain knowledge related to: Decayed Vibrations,	١٢	15

		decayed harmonic motion equation, types of decayed harmonic motion			
Exam					
Quarterly and daily attendance exams		Chapter 5 (Forced Vibration, Forced Vibration Equation, Resonance, Practical Applications on Resonance	Gain knowledge related to: Forced Vibration and Resonance		15
Exam					

Course evaluation
Semi-daily and monthly tests And surprise exams Daily class participation
Learning and teaching resources
الكتاب المقرر: فيزياء الصوت والحركة الموجية، امجد عبد الرزاق كرجية، جامعة الموصل، الطبعة الثانية، ٢٠٠٠. 1-THE PHYSICS OF VIBRATIONS AND WAVES, H. J. Pan, Sixth Edition, John Wiley & Sons, 2005. 2- Vibrations and Waves, George C. King, WILEY, 2009.