

1- Course name	Nuclear Pl	hysics				
2- Course code	Ph401					
3- Semester/Year		yearly	,			
4- Date this description was prepared			* • * £ /* • **			
5- Available attendance forms	Lectures a in person a announced	are deliv accordin l in the d	ered to students g to the schedule epartment			
٦- Number of study hours (total)/number of units (total)	Hours 10. (3 theoretical hours and 2 practical hours per week (0 * 30 weeks)					
7- Name of the course administrator (if more than one name is mentioned						
		Cours	se objectives .			
1- The student knows the nature of the nucleus and nuclea	r force	Object	ives of the study			
and studies its properties			subject			
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 th	ese					
reactions.						
5- The student understands the different uses of nuclear ray	ys.					
٦- The student understands the different uses of nuclear rays						
	Teaching a	and learn	ing strategies .			
1. In-person lectures in classrooms.						
2. Discussion method, surprise exams, and methods of refining skill		The strategy				
3 Asking intellectual questions or holding a competition between students, stimulating						

creative thinking and answering clearly and quickly to the problems presented.								
Course structure . 1 . 1								
Evaluation method	Learning method	Name of the unit or topic	Required learning ho outcomes		ours	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	91	Hours	٣ ,٢ ,١		
Quarterly and daily attendance exams	In- person lectures	<ul> <li>1- Binding energy</li> <li>2-Average binding energy</li> <li>3-Calculating separation energies</li> <li>4 Line of stability and abundance Natural</li> </ul>	9 Hours 70 learn about installation nucleus		Hours	6 ,° ,'		
Quarterly and daily attendance exams	In- person lectures	1-Liquiddropmodel2-Nuclear2-Nuclearshellmodel3-othernuclearmodels	Distinguish between models Nuclear	9 H	ours	۹ ٫۸ ٫۷		
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	,11,1. 17,17		
Quarterly and daily attendance exams	In- person lectures	Nuclear reactors Fissile 1-The working principle of the reactor	Learn about energy production Nuclear reactors	3 H	ours	۲.		

		reactor				
Quarterly and daily attendance exams	In- person lectures	Particles accelerators Charged		How to speed up the particles Charged	3 Hours	۲۱
Quarterly and daily attendance exams	In- person lectures	Types of radiation doses1- Risk factor2-Recommendations regarding limits and periods of exposure to workers In the field of radiation.		radiation Identify the tor types of potions ndations limits iods of to exposure to In the liation.		<b>7</b> 7 <del>7</del> 7 7
Quarterly and daily attendance exams	In- person lectures	Introduction to particle physic Primary	to Particle cs identification Primary		6 Hours	Y0+Y2
			Lea	rning and teach	ing resourd	ces .1 .1
Main references (sour					es (sources)	
الفيزياء النووية أ. م. د مناف عبد حسن المثالي في الفيزياء غيداء محمد ز عرين			Recommended supporting books and .references (scientific journals)			
				Electronic	references, I	nternet sites



1- Course name			Electromagnetic wave		
2- Course code	PH403			3	
3- Semester/Year			yearly	,	
4- Date this description was prepared		۲.	7 £ /7 • 7	٣	
5- Available attendance forms	Lectures person anno	ar ac	e delive cording ced in th	red to students in to the schedule ne department	
<pre>٦- Number of study hours (total)/number of units (total)</pre>			۹۰ho	ours	
7- Name of the course administrator (if more than one name is mentioned					
			Cour	se objectives .	
1. Introducing students to the subject of electromagnetic program giving students a basic overview of the electrostatic field in or and insulating media and explaining the importance of the elemagnetic field and how to benefit from them and avoid the resulting from them and their role in understanding the primodern physics and its daily uses and how to employ this lin facing daily life developments in the field of education 2. Makes students of colleges of education for pure science value and importance of physics and the role of electror radiation in science and technology, especially in the field communications and mobile phones and how to deal with students after graduation and practice their specialties as the middle and preparatory schools and some research labor government departments related to industry and in the field of the special states of the parameters and the students and the students related to industry and in the field of the special states of the special states of the special states of the special states and the special states and the special states and preparatory schools and some research labor government departments related to industry and in the field of the special states and	aysics and conductive ectric and e dangers nciples of knowledge n, family, society es feel the omagnetic of towers, th school eachers in ratories in		Object	ives of the study subject	
	Teaching	g a	nd learr	ning strategies .	
<ol> <li>In-person lectures in classrooms.</li> <li>Discussion method, surprise exams, and methods of refining 3 Asking intellectual questions or holding a competition betwee stimulating creative thinking and answering clearly and quickly</li> </ol>	The strategy				

presented.							
			С	ourse struc	ture		
Evaluation method	Learning method	Name of the unit or topic	Required learning	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	ź		
Quarterly and daily attendance exams	In-person lectures	Steady electricity (electrostatics)	The student is able to understand the static electricity	10	0		
Quarterly and daily attendance exams	In-person lectures	Solving electrostatic problems.	The student is able to Solving electrostatic problems	nt is NY ving atic			
	[]	Exam1	ſ	1			
Quarterly and daily attendance exams	In-person lectures	Electrostatic field in insulating media	The student is able to understand the Electrostatic field	1°	5		
Quarterly and daily attendance exams	In-person lectures	Electrostatic energy	The student is able to understand the Electrostatic energy	١٢	£		
	1	Exam2	Γ	Γ			
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	۲		
Quarterly and daily attendance exams	In-person lectures	Antennas and their types	The student is able to understand the Antennas and their types	٦	۲		
Course evaluation							
* Semi-daily and mo	nthly tests ,And surpr	ise exams, Daily class par	rticipation				
Learning and teachi	ng resources	nati t kni strativ	·· <u>cti a vii ti l</u>				
Main references (sources) المجالات الكهرومغناطيسية الجزء الأول والثاني المجالات الكهرومغناطيسية الجزء الأول والثاني اساسيات النظرية الكهرومغناطيسية الجزء الأول والثاني							

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



		Mathematic	Course name			
		Ph307	:Course code			
		Year			:Seme	ester/year .۳
		7.75 /7.78	The	late this	descrip	tion was ٤ prepared:
Lectures are d according to t	elivered to s he schedule	tudents in person announced in the department	:Av	vailable a	ttenda.	nce forms .°
			((tot	Numbe	r of stu	dy hours .
			Nomo of	the course	o odmi	nistrator V
			Name or	if more t	hon on	a nomo is
			(If more than one name is			e name is
				(	Course	objectives .A
Qualifying, training and teaching the student on ordinary differentials and integrals.				0	bjectives o	f the study subject
Qualifying and teaching in the study topics of ad	g the student to lvanced stages.	benefit from differentic	ıls and integrals			
Qualifying, training and differentials and integra	l teaching the st als.	udent on mathematical	applications of			
Toophing and la	owning stre	toriog ) )				
Teaching and le		ategies			[	
1. Attending lectures in	the study halls.					
Y. The method of discus	sion and surpris	se tests and methods of	sharpening skills	<b>.</b> .		The strategy
3.Proposing intellectual	questions and o t and clear and o	conducting competition	between students	and		
Course structur	e					
Evaluation method	Learning method	Name of the unit	Required lo	earning	hours	Week
(theoretical) tests and questions	lectures	Functions 1.Functions analysis and	Gain knowled Functions a	lge in the nalysis	10	0_1

		2. graphic			
(theoretical) tests and questions	lectures	Limit and continuity	Gain knowledge in the Limit and continuity		۹_٦
(theoretical) tests and questions	lectures	Differentiation Application	Gain knowledge in the Differentiation	10	15-1.
(theoretical) tests and questions	lectures	Trigonometric Functions Properties Derivative	Gain knowledge in the Trigonometric Functions	۲۱	14-10
(theoretical) tests and questions	lectures	Integration	Gain knowledge in the Integration	10	۲۳_۱۹
(theoretical) tests and questions	lectures	Integration Application	Gain knowledge in the Integration Application	۲۲	۲۷_۲ ٤
		3 week	Exam		
Course evaluation					
Semi-daily and monthly And surprise exams Daily class participatio	tests on				
Learning and teaching r	esources				
الة الصلبة د. مؤيد جبرائيل . 1 وامد د. محمد أحمد الجاللي .2 3. Introduction to Solid S 4. Fundamentals of Solic	فیزیاء الح فیزیاء الج State Physics C d State Engine	harles Kittel ering Manijeh Razeghi			

5. Materials Science and Engineering an Introduction William D. Calliste



Solid state			Course name .
Ph405	:Course code		
Yearly			:Semester/year .۳
۲۰۲٤ /۲۰۲۳	The	date this	description was .٤ :prepared
Lectures are delivered to students in person according to the schedule announced in the department	۰. Available attendance forms.		
	((tot	Numbe al)/numb	r of study hours . Der of units (total
	Name of	the cours (if more t	se administrator . <sup>v</sup> than one name is (mentioned
		(	Course objectives .
<ol> <li>The student should know the science of solids, their types, what is the Bravise lattice and its types</li> <li>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</li> <li>The student should know Bragg's law and what are the conditions for applying Bragg's law</li> <li>The student should know the inverted lattice and how to apply it</li> <li>The student should know the lattice vibrations and their types</li> <li>The student should know the theories of thermal</li> </ol>		Obj	ectives of the study subject
Teaching and learning strategies . 1 . 1			
1. Attending lectures in the study halls.			
۲. The method of discussion and surprise tests and methods of 3.Proposing intellectual questions and conducting competition eliciting creative thought and clear and quick answers to the pro	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 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		
		Exan	1				
Course evaluation							
Semi-daily and monthly And surprise exams Daily class participation	tests on						
Learning and teaching r	resources						

- فيزياء الحالة الصلبة د. مؤيد جبر ائيل . 1
- فيزياء الجوامد د محمد أحمد الجاللي 2
- 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



		laser	Course name .			
		Ph402	:Course code .			
		Yearly			:Seme	ester/year .۳
		7.75 /7.78	The d	late this	descrip	tion was ٤ prepared:
Lectures are d according to t	elivered to st he schedule	tudents in person announced in the department	Available attendance forms .°			
		90 hours	((tota	Numbe al)/numb	r of stu er of u	dy hours ۲. nits (total
Name of the cours (if more t				e admi han on (n	nistrator . <sup>v</sup> e name is nentioned	
				(	Course	objectives .A
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				Obj	ectives	of the study subject
Teaching and lea	arning stra	ategies . 1 . 1	1			
1. Attending lectures in	the study halls.					
Y. The method of discussion and surprise tests and methods of sharpening skills.       The strate         3.Proposing intellectual questions and conducting competition between students and       The strate					The strategy	
Course structure	е					
Evaluation method	Learning method	Name of the unit or topic	Required le outcom	earning nes	hours	Week
(theoretical) tests and questions	lectures	Introduction The Nonlinear Wave Equation	Gain knowledge Nonlinear Wav	e in the The e Equation	١٨	٦

		Second harmonic			
		generation			
		Phase Matching			
		Exercises and			
		solutions			
(theoretical) tests and	lectures	laser types	Gain knowledge in the		
questions		A solid-state laser	laser types		
queenene		Laser liquid state			
		laser agreous state			
		The semiconductor		۲£	٨
		laser			
		Chemical Laser			
		Exercises and			
		solution			
(theoretical) tests and	lectures	Laser Applications	Gain knowledge in the		
(mediencal) resis and	leciores	Introduction	Laser Applications		
questions		Industrial			
		Applications			
		Applications maggirements and			
		detection			
		modical and			
		hielegical		* 4	٨
		biological		14	~
		minitary applications			
		Applications			
		Applications			
		Communications			
		Holography .8			
(theoretical) tests and	lectures	Laser Safety in	Gain knowledge in the		
questions		Research	Laser Safety in		
		Laboratories	Research		
		Introduction	Laboratories		Å
		Radiation Hazards		72	Λ
		Electrical Power			
		Hazards			
		Explosion Hazards			
		Poisoning Hazards .			
~		Exan	1		
Course evaluation					
Semi-daily and monthly	tests				
And surprise exams					
Daily class participation	on				
Learning and teaching r	resources				
1. Principles of Lasers C	Drazio Svelto				
بزرات - تأليف بيلا آ. لينكيل	كتاب اللي				



Quantum Mechanic	nnic Course name .		
Ph404			Course code .۲
Year			:Semester/year . <sup>v</sup>
۲۰۲٤ /۲۰۲۳	The c	late this	description was .٤ :prepared
Lectures are delivered to students in person according to the schedule announced in the department	:Available attendance forms .		
90	Number of study hours ((total)/number of units (total		
Name: Dr. Younis Mohamed Atiah	Name of the course administrator (if more than one name is (mentioned		
		(	Course objectives .A
<ul> <li>Students learn about the subject of Quantum Mechanic and its importance in physics.</li> <li>Employ the knowledge acquired by the student in explaining the natural phenomena associated with Quantum Mechanic.</li> <li>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.</li> <li>Provide students with scientific research skills to use them in research and applied fields in government departments concerned with the</li> </ul>			ectives of the study subject
Teaching and learning strategies . 1 . 1			
۲. Attending lectures in the study halls. ۲. The method of discussion and surprise tests and methods of 3.Proposing intellectual questions and conducting competition	The strategy		

eliciting creative though	t and clear and	quick answers to the pro	oblems presented		
Course structure	е				
Evaluation method	Learning	Name of the unit	Required learning	hours	Week
	method	or topic	outcomes	noors	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
		Exa	m		L
(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
		Exa	m		
Quarterly and daily attendance exams	uarterly and daily ittendance exams lectures lectures Additional data and the state of the state		٩	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
		Exa	m		
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	y tests							
And surprise exams								
Daily class participatior	ı							
			Learning	and teac	hing resources 🛛 🖊			
<ul> <li>P. A. M. Dirac, "Principles of quantum mechanics", Oxford University Press (1947)-</li> <li>4 مبريدج برس - (2018)</li> </ul>								



1- Course name	El	ec	trical ar	nd magnetic 1
2- Course code			Ph102	2
3- Semester/Year				
4- Date this description was prepared				4.45/4.44
5- Available attendance forms	Lectures are delivered to students in person according to the schedule announced in the department			
<pre>`- Number of study hours (total)/number of units (total)</pre>	۹۰ hour	S		
7- Name of the course administrator (if more than one name is mentioned				
			Cours	se objectives .
1- The student learns the basics of astronomy.			Objecti	ves of the study
2- The student learns the basics of celestial mechani	ics.			subject
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, th	eir			
physical properties, and the birth of the universe and	its			
physical properties.				
	Teaching	а	nd learn	ing strategies .
1. In-person lectures in classrooms.				The strategy

2. Discussion mether							
3 Asking intellectu stimulating creative presented.							
Course structure . 1 . 1							
Evaluation	Learning	Name of the unit or	Required				

Evaluation	Learning	Name of the unit or	learning	hours	the week
method	method	topic	outcomes		
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 universe, th of the emerg of the univ life in universe	f the leory gence erse, the	The student is able to understand the given material	10hours	5weeks			
					Course ev	valuation .۲			
* Semi–daily and r	nonthly tests								
And surprise exam	S.								
Daily class particip	Daily class participation								
			Lea	rning and teach	ing resour	rces .1 .7			
م الفلك) – حميد	ساء : الجزء الاول (عل	فيزياء الجو و الفض		N	lain referenc	ces (sources)			
	باض النجم	مجول النعيمي وفب							
۲– Fundame	ntal Astronon	ny 5 <sup>th</sup> ed							
H.Karttunen,et	al ; Springer- 20	06.							
3- Astronomy	– Principles and	Practice 4 <sup>th</sup>							
ed, A. Roy,D C	larke; Springer.								
			Recor	mmended sup	porting b	ooks and			
	.references (scientific journals								
Electronic references, Internet site						Internet sites			



Heat				Co	urse name	۰. i		
		Ph103	3 :Course code				ourse code	). (
		Year				:Sen	nester/year	· .٣
		۲۰۲٤ /۲۰۲۳	Γ	'he	date this	s descri	iption was :preparec	٤. ا
Lectures are according to	delivered t the schedu	o students in person ile announced in the department	:Available attendance forms			3 .°		
hours (3 theore hours per weel	tical hours k) (5 hours numł	and 2 practical 10. * 30 weeks) and the per of units = 7 units	Number of study ho ((total)/number of units (to				udy hours units (total	٦. ا
Name: Dr. Younis Mohamed Atiah administrator (n			ame of t (if mor ame is	the course e than one mentioned	.^ ,			
						Course	objectives	۸. ډ
The aim of my cours THERMAL TRANSFER required to solve pr fields of theoretical Understanding and	e is to familiar RE methods and oblems in HEA physics assimilation o	ize students with HEAT and d develop mathematical skills T, kinetic dynamics and other f theoretical mathematical			Ob	ojective	s of the stu subj	idy iect
THERMAL TRANSFER	RE	ation of various HEAT and						
		Tea	achi	ng	and lear	ning st	rategies .	.١
۱. Attending lectur	res in the stud	ly halls.						
<ul> <li>*. The method of discussion and surprise tests and methods of sharpening skills.</li> <li>3. Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented</li> </ul>				The stra	tegy			
	<b>T</b> •			<b>–</b>	• 1	Course	e structure	• 🕇
Evaluation	Learning	Name of the unit or		Kec	juired	hours	Week	

method	method	topic	learning		
			outcomes		
(theoretical) tests and questions	Types of ThermometerslecturesThermal Expansion Methods of HeatThermal Expansion		Gain knowledge in the field of Types of Thermometers	٩	۳+۲+۱
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	۲+0+٤
Quarterly and daily attendance exams	and e lectures gases suspended hetween Cy and Cp		Gain knowledge in the field of Real gas and ideal gas	9	۹+۸+۷
		Density and Specific Weight Bernoulli's Equation Surface Tension Viscosity	Gain knowledge in the field of Bernoulli's Equation Surface Tension Viscosity	12	17+17+11+1.
Quarterly and daily In-person attendance exams In-person lectures betw prop		-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	19+14+14+15

		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	۲۱+۲.
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	77+77 77+79+75+
		Second exam	L		
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		۳۰+۲۹+۲۸

		Rubber Flexible				
		polymers				
		Inorganic materials				
		Composites				
		Based material				
		Mineral-based				
		Composites				
		Ceramic-based				
		Composites				
		Polymer-based				
				Cours	se evaluatio	on 🔸
			Semi-daily a	nd mon	thly tests	+
			And	surpris	e exams	4
			Daily cla	lss parti	cipation	4
						4
			Learning and	d teachi	ng resourc	es 🔸
🔸 1 - Physics fo	r Scientists	and Engineers with mod	lern) physics, SER	WAY a	nd JEWEI	T, 9.
Edition , 2014	Ł.					

- 4 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



Mechanic			Course name .
Ph101			:Course code .۲
Year			:Semester/year . <sup>v</sup>
۲۰۲٤ /۲۰۲۳	The	date this	description was .٤ :prepared
ccures are delivered to students in person ccording to the schedule announced in the :Av department		vailable a	o. •
hours (3 theoretical hours and 2 ) practical hours per week) (5 hours * 30 weeks) and the number of units = 7 units	s and 2 10. 5 hours $*$ 30 its = 7 units ((total)/r		r of study hours ۲. Der of units (total
Name: Dr. Younis Mohamed Atiah		the cours (if more t	e administrator . <sup>v</sup> han one name is (mentioned
		(	Course objectives .
The aim of my course is to familiarize stud with mechanical methods and develop mathematical skills required to solve prob mechanics, kinetic dynamics and other fie theoretical physics Understanding and assimilation of theore	dents olems in olds of tical	Obj	ectives of the study subject
mathematical derivations important for interpretation of various kinetic and mechanical phenomena related to industry and in the field of research and development			
	Teaching a	and learr	ing strategies
•. Attending lectures in the study halls.			
۲. The method of discussion and surprise tests and m skills.	ethods of sharp	ening	The strategy

3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented						
• •				Course	Course structure 🖊	
Evaluation	Learning	Name of the	Required learning	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	۳+۲+۱	
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	ą	۲+0+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	1 Y	۹+۸+۷	
		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		17+17+11+1.	
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	١ ٤	

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	۲	1 V
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	۲	١٨
Quarterly and daily attendance exams	In-person lectures	linear momentum, repulsion and collisions	Understanding linear momentum and the theory of linear momentum repulsion,		۲۰+۱۹
Quarterly and daily attendance exams	In-person lectures	the rotational motion	Understanding the rotational kinetic energy and inertia of the rotational motion		* *+* 1
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		۲ o+ t t + t ٣

			energy of a body,			
			slope, distance and			
			curvature of objects			
Ou ortonly on d		derivations of	The definition of the			
doily attendence	In-person	movement in	harmonic oscillator			
daily attendance	lectures	the harmonic	in the second and			
exams		oscillator	third dimensions			
				Course	evaluation	1 🖊
			Semi-daily an	ıd montl	nly tests 🖪	-
			.And s	surprise	exams 🚽	-
			Daily clas	s partic	ipation 🚽	-
			Learning and	teachin	g resource	s 🖊
4 1 - Physics for Edition , 2014 .	Scientists ar	nd Engineers with	modern) physics, SERV	WAY an	d JEWETI	[,9
			1 1 1 1 1	1 I I I	N/ 1/	$\alpha \alpha \alpha$

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



1- Course	name		<b>Complex Functions</b>					
2- Course	e code		РН 305	PH 305				
3- Semes	ster/Year		1 <sup>st</sup> and 2 <sup>nd</sup> semester/ 3 <sup>rd</sup>	Year				
4- Date t	his descripti	on was prepare	2023-2024					
5- Availa	ble attendar	ace forms	Lectures are delivered to students in person according to the schedule announced in the department					
6- Num (total)/num	ber of nber of unit	study hours s (total)	Hours 60 (2 hours per	week <sup>:</sup>	* 3	0 weeks)		
7- Name administ name is r	of the cours rator (if mo nentioned	se ore than one	Name:					
8- Cou	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.					the study			
Teaching	and learning	g 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.								
1. Course	e structure							
Weeks	Hours	Required learning outcomes	Name of the unit or topic met		arning ethod	Evaluation method		
1-5	10	Gaining knowledge in	Preface, the complex numb Exercises, attributes	er.	Ι	Lecture and	Quarterly and daily	

		complex	Algebra, exercises.	Discussion	attendance
		numbers and	Absolute value.		exams
		their	Exercises, acting		
		properties	The geometry of the complex		
			number:		
			Exercises Devices		
			And roots eversions		
		+	Functions of a complex		
		Gaining	variable		
		knowledge in	evercises Limits evercises	Lecture	Quarterly
6-10	10	complex	Continuity	and	and daily
0 10	10	functions and	exercises Derivatives	Discussion	attendance
		their	exercises. Analytic functions		exams
		properties	Harmonics functions, exercises		
		Gaining	Exponential function, the		
		knowledge in	Logarithmic function, exercises,	-	Orace et a ellar
		elementary	Trigonometric functions,	Lecture	Quarterly
11-15	10	complex	Inverse trigonometry functions,	and	and daily
		functions and	Hyperbolic functions, Inverse	Discussion	attendance
		their	Hyperbolic functions,		exams
		properties	exercises		
			Paths, complex integration,		
		~	exercises, Cauchy- Goursat's		
		Gaining	theorem, generalization of		
		knowledge in	Cauchy- Goursat's theorem to a	<b>T</b> .	Ouarterly
16.00	10	complex	multi-contact area, indefinite	Lecture	and daily
16-20	10	integration and	integrals, exercises, Cauchy	and	attendance
		nroperties and	theorem Moreira's theorem the	Discussion	exams
		theorems	fundamental theorem in		
		licorenis	Algebra, the Gauss mean value		
			theorem, exercises		
			Convergence of sequences and		Orrente alex
		Gaining	series, exercises, power series,	Lecture	Quarterly
21-25	10	knowledge in	exercises, Taylor series,	and	allu dally
		complex series	exercises, Laurent series,	Discussion	exams
			exercises		CAUIIIS
		Gain			
		knowledge in		Ŧ /	Quarterly
26.20	10	the treatment	Applications on electrostatics,	Lecture	and daily
20-30	10	important	flow of heat averaises	Discussion	attendance
		nhysical	now of neat, exercises	Discussion	exams
		applications			
2. Course	e evaluation	upphoutions			
* Semi-dai	ly and monthly	y tests			
And surpris	se exams.				
Daily class	participation				

Learning and teaching resources	
الدوال المعقدة للصف الثالث فيزياء في كليات التربية	Main references (sources)
سمیر بشیر حدید، یحیی عبد سعید	
Complex analysis with applications,	Recommended supporting books and references
Asmar, Nakhle H., Grafkos, Loukas-	(scientific journals).
Grafakos L., (2018) Springer	· · · · · · · · · · · · · · · · · · ·
	Electronic references, Internet sites



ELECTRONICS	Course name .			
Ph303	:Course code .۲			
Year		:Semester/year .۳		
7.75 /7.78	The date th	is description was ٤ prepared:		
Lectures are delivered to students in person according to the schedule announced in the department	:Available attendance forms .			
(hours (3 hours per week □30 per week ٩٠	Number of study hours ((total)/number of units (total			
Name: Dr. Mohammed SalimJasim Msjadr72@gmail.com	n Name of the cours administrator (if more that (one name is mentione			
	· · · ·	Course objectives .A		
Introducing the students to the subj	ect of $\checkmark$	Objectives of the		
electronics physics and giving the students a	basic	study subject		
overview of the diode in electrical circuit	ts and			
explaining its importance and how to benefit f	rom it			
and avoid the dangers resulting from it and it	ts role			
in understanding the principles of modern p	hysics			
and its daily uses and how to employ this know	vledge			
in confronting daily life developments in the f	ield of			
.modern techno	logies			
□ It makes students of colleges of education for sciences feel the value and importance of pl and the role of semiconductor materials in se and technology, especially in the field of to communications and mobile phones, and how	pure ✓ hysics cience owers, v they			
·deal with stu	their			
Schools after graduation and practice	uneir v			

specialties as tea	chers in mi	ddle and middle so	chools			
and some research	h laborator	ies in state depart	ments			
related to indus	stry and in	the field of researc	h and			
		.develop	oment			
		Tea	ching and lea	arning st	rategie	s.1.1
		.In-person	lectures in class	srooms 🖊		
Discus	sion method, s	surprise exams, and me	thods of refining	g skills 🔸		
Asking intellectual of stimulating creative the	uestions or	holding a competition	n between stu wickly to the pro	dents,		
	inining and a	isworing oroarry and q	.pre	sented		
			Cognitive obje	ctives 🔸		
The student sho	uld know the f	foundations of electronic	cs and the fields	of use 🔸		
Introducing students	to the types o	i materiais and maini	semicond	luctors	The	strategy
ſ	he student sh	ould know how the proc	cess of mixing is	done 🔸		
.The student	should know t	the process of creating a	and designing a	diode 🔸		
.The student	should know h	now the process of conne	ecting a diode is	done 🔸		
The student will know	w how to ana Kinch	lyze complex electrica	l networks three	ough 📥		
	MICH	Course-sp	ecific skills objec	tives 🔸		
How to perform mathe	matical operat	tions on electronic circu	its and employ	their 🔸		
		theories thro	ugh scientific th	Course		
	Learning	Name of the unit	Required le	orning		ure 🕂
Evaluation method	method	or topic	outcom	les	hours	Week
		Materials in	The studen	t should		
	<b>.</b>	nature	know the t	ypes of		
Quarterly and daily	In-person		the energy	a rely on	12	4
	lectures		distinguish	between		
			then	1		
	- -	Identify silicon	The studen	t should	1°	
Quarterly and daily	In-person	and germanium	know the im	portance		٥
attendance exams	lectures		their tv	ctors and pes		
		Through heat and	To know the	types of	١٢	
Quarterly and daily	In-person	quenching, the	semiconduc	tors and		£
attendance exams	lectures	quenching process	how the	y are		
		lakes place		200 Long		
	-					
Quarterly and daily	In-person	Electrical energy	Student defi	nition of	17	٤

attendance exams	lectures	stored in doped	potential energy in		
		semiconductors	doped semiconductors		
			The student defines		
Quarterly and daily	In-person	.1	the nature of the	15	•
attendance exams	lectures	electric current	current and the	19	
			density of the current		
			Introducing the		
Quarterly and daily	In-person	Holes and	student to diodes and	10	1
attendance exams	lectures	electrons	their importance in	12	4
			electronic circuits		
			Introducing the		
			student to Kirchhoff's		
Quarterly and daily	In-person	Kirchhof and	laws and Thevenin's	٦	۲.
attendance exams	lectures	Thevenin	laws in analyzing and		,
			simplifying electronic		
			networks		
			Analyzing complex		
Quarterly and daily	In-person	complex	electrical networks in	٦	۲
attendance exams	lectures	electronics	the simplest possible		
			ways		
			Cours	e evalua	tion 🔸
			Semi-daily and mont	hly test	s 📥
			.And surprise	e exams	+
			Daily class partie	<u>cipation</u>	<u> </u>
			Learning and teaching	ng resou	rces 🔸
			Electr	onics ba	usics 🖊
			Basics of electri	cal theor	ry - 🔸
	<b>~</b> . —		Basics of electron	ic circui	ts - 🛛 🖊
🖊 🛛 - Schaum Abstra	icts Series: E	lectrical 2000 (writte	n by Joseph Edmonds)		

		Atomic	Course name .				
		Ph307		:	Course code .۲		
		Year		:Se	mester/year ."		
		T.TE /T.TT	The date this description was :prepared				
Lectures are de t	elivered to s he schedule	tudents in person according to announced in the department	:Avai	lable atten	dance forms .•		
hours (3 theor week) (5 hour	etical hours rs * 30 week	and 2 practical hours per 10. s) and the number of units = 7 units	N ((total)	Number of s //number of	study hours .٦ f units (total		
	Name	Dr. Younis Mohamed Atiah	Name of the course administrator (if more than one name is (mentioned				
			•	Cours	se objectives .A		
<ul> <li>Introducin Relativity Transform</li> <li>Introducin electrome and absord body rad Productio ray spect spectrum X-rays. C</li> </ul>	ng the student v Newton's Law nations. Newto ng the student agnetic radiat orption of radi diation spectru on of X-rays. A tra: Continuou . Nature and a Compton effect	to the basics Special Theory of ws of Motion. Galileo's on's Principle of Relativity. to some Nature of light and tion. Thermal radiation. Emission iation. Black body radiation. Black um. Introducing the student to Measurement of X-ray intensity- s X-ray spectrum, Sharp line X-ray diffraction of X-rays. Refraction of t. Pair production	Objectives of the study subject  ack  ray  of				
Teaching an	d learning	; strategies					
1. Attending lea	ctures in the	study halls.					
<ul> <li>r. The method of discussion and surprise tests and methods of skills.</li> <li>3.Proposing intellectual questions and conducting competition students and eliciting creative thought and clear and quick and problems presented.</li> </ul>			sharpening between swers to the		The strategy		
				Course	e structure 🕇		
Evaluation	Learning	Name of the unit or topic	Required	hours	Week		

method	method		learning		
			outcomes		
		Special Theory of Relativity	Gain		
		Newton's Laws of Motion.	knowledge in		
		Galileo's Transformations.	the field of		
		Newton's Principle of Relativity.	Assumptions of		
		Michelson-Morley Experiment.	Special Theory		
		Assumptions of Special Theory of	of Relativity		
		Relativity.			
		Lorentz Transformations.			
		Lorentz Transformations Results:			
		Relativity of Length.			
(theoretical)		Relativity of Time.			
tests and	lectures	Relativity of Velocity.		٩	
questions		Relative Mass.			
quoundis		Relative Force.			
		Relative Energy.			
		Relationship between Energy and			
		Momentum.			
		Electron Volt.			
		Relative Force.			
		Relative Energy.			
		Relationship between Energy and			
		Momentum.			
		.Electron Volt			
		Nature of light and electromagnetic	Gain	٩	
		radiation.	knowledge in		
		Thermal radiation.	the field of		
Overster shy and		Emission and absorption of radiation.	Nature of light		
daily		Black body radiation.	and		
attendance	lectures	Black body radiation spectrum.	electromagnetic		
		Rayleigh-Jeans law.	radiation		
exams		Planck's law of radiation. The			
		photoelectric effect. Einstein's			
		explanation of the photoelectric			
		effect			
		Exam			
		Applications of the photoelectric	Gain	19	
		effect.	knowledge in	14	
		Solved problems.	the field of		
Quarterly and		Discovery of natural radioactivity.	Atomic models		
daily	lectures	Atomic models:			
affendance		Thomson model,			
exams		Rutherford model.			
		Rutherford's scattering theory.			
		Solved problems			
		Discovery of X-rays. Production of X-	Gain		
Quarterly and		rays.	knowledge in		
daily	loctures	Measurement of X-ray intensity.	the field of X-		
attendance	lecioles	X-ray spectra:	rays.		
exams		Continuous X-ray spectrum,			
		Sharp line X-ray spectrum.			

		Nature and diffraction of X-rays.				
		Refraction of X-rays.				
		Compton effect.				
		Pair production				
	1	Exam	-	I I		
		- 1	I	1		
Quarterly and daily attendance exams	lectures	<ul> <li>Photon absorption. Questions.</li> <li>Solved problems.</li> <li>De Broglie hypothesis.</li> <li>Electron diffraction.</li> <li>Neutron diffraction.</li> <li>What are de Broglie waves?</li> <li>De Broglie wave velocity.</li> <li>Phase velocity and group velocity.</li> <li>Double slit experiment.</li> <li>Uncertainty principle.</li> <li>Questions and solved problems</li> </ul>	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	1			
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 ev	valuatio	on 🔸
			Semi-daily a	nd monthly	v tests	4
			And	surprise e	ams	4
			Daily cla	ss participa	ation	4
Reference						
🛓 Fundamer	ntals of Ph	vsice F Bush translation of the	1977 edition			

- 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.



Mechanical analysis Cours					Course name .	
		Ph304	:Course code			
		Year		:Se	emester/year ."	
		T.TE /T.TT	The dat	e this desc	۰؛ . cription was prepared:	
Lectures are de t	elivered to s he schedule	tudents in person according to announced in the department	:Avai	lable atten	dance forms .•	
hours (3 theore week) (5 hour	etical hours s * 30 week	and 2 practical hours per vo. s) and the number of units = 7 units	N ((total)	Jumber of /number or	study hours .ा f units (total	
	Dr. Younis Mohamed Atiah	Name of the (if	e course ad more than	ministrator . <sup>v</sup> one name is (mentioned		
				Cour	se objectives .A	
<ul> <li>Introducin Equation gravitati oscillator curve and</li> <li>Introducin velocity of cylindrice</li> </ul>	ng the student s of motion of onal field ,De is in two and t d the simple p ng the student and accelerat al and spheric	to the basics Special Theory of projectiles in a uniform rivatives of motion in harmonic three dimensions, Motion on a bendulum to some Vector differentiation, ion of particles in polar, cal coordinates.	• Objec	tives of the s	study subject	
Teaching an	d learning	g strategies				
<ol> <li>Attending led</li> <li>The method of skills.</li> <li>Proposing int students and el the problems po</li> </ol>	study halls. and surprise tests and methods of stions and conducting competition ive thought and clear and quick an	f sharpening n between nswers to		The strategy		
	_ · · ·			Course	e 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	٩	
		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		

		Evam					
EXUIII							
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			
		Equations of motion of projectiles in	Introducing the			
		a unitorm gravitational field	student to how			
			to find			
			rotential energy			
			For particles			
Quarterly and			and force as a			
daily			function of			
attendance	lectures		speed			
exams			For position and			
			time, each			
			separately			
			And the			
			conditions for			
			force			
		Derivatives of motion in harmonic	Introducing the			
		oscillators in two and three	student to			
		dimensions	projectile motion			
			in a uniform			
			gravitational			
Quarterly and			various solved			
daily	lectures		problems			
attendance			Introducing the			
exams			student to the			
			harmonic			
			oscillator in two			
			and three			
			dimensions			
		Motion on a curve and the simple	Introducina the			
Quarterly and		pendulum	student to the			
daily	la atura a		harmonic			
attendance	lectures		oscillator in two			
exams			and three			
		<b>F</b>	dimensions			
		Exam		Course		_
			Qami-dail-	Suro.		-
			Semi-dally al	ia mon	imy tests 🗯	
				surpris	e exams 🛸	
D (			Daily cla	ss parti	cipation 🔹	
Keterence						

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



		Electrical and Magnetic 2	2 Course name			
		Ph201	:Course code			
		Year		:Se	mester/year .۳	
		<b>۲.</b> ۲ ٤ /۲. ۲۳	The dat	e this desc	ription was .٤ :prepared	
ectures are deliv	ered to stud schedule	ents in person according to the e announced in the department	:Avail	able atten	dance forms .•	
2 theore	tical hours a	and 2 practical hours per week	N ((total))	Jumber of s /number of	study hours ۲۰۰۰ units (total	
Name:			Name of the course . administrator (if more than one (name is mentioned			
				Cours	se objectives .	
<ul> <li>Introducing electric cur from an ele</li> <li>Introducing</li> <li>Introducing magnetic fi</li> <li>A basic ove currents an</li> <li>Introducing induction (F</li> </ul>	the student to rents and the ectric current the student to the student to ield from the erview of alte d some of the the student to faraday + Bie the student to	o the basics of the effects of electromagnetic field resulting o some electrical measuring devices o the methods of generating a passage of an electric current rnating or alternating electric ir applied circuits. o the laws of electromagnetic et-Savart + Ampere's circular law) o the concepts of self and mutual	• Obje	ctives of the	study subject	
Teaching and	learning	strategies				
<ul> <li>\. Attendin</li> <li>\. The mether</li> <li>skills.</li> <li>3.Proposing</li> <li>students and</li> <li>problems a</li> </ul>	g lectures in the nod of discussing intellectual of ad eliciting cre presented	sharpening between swers to the		The strategy		
				Course	e structure 🔸	
Evaluation	Learning	Name of the unit or topic	Required	hours	Week	

method	method		learning		
			outcomes		
		AC Circuits	Gain		
(theoretical) tests			knowledge in		
and questions	lectures		the field of	8	4
and questions			Types of AC		
			Circuits		
Quarterly and		Magnetic Field	Gain	8	
daily attendance	lectures		knowledge in		4
exams			the field of		-
		<b>_</b>	Magnetic Field		
		Exam			
		Electrical Measuring Instruments	Gain	1	
			knowledge in	Ŧ	
Quarterly and			the field of		
daily affendance	lectures		Electrical		2
exams			Measuring		
			Instruments		
		Magnetic field of electric current	Gain	8	
Quarterly and			knowledge in		
daily attendance	lectures		the field of		1
exams			Magnetic field		Ŧ
			of electric		
			current		
		Exam			
		Induced electromotive force	Gain	8	
Our and the second			knowledge in	Ũ	
daily attendance	lacturas		the field of		4
	leciones		Induced		4
exams			electromotive		
			force		
Quarterly and		Inductance	Gain	8	
daily attendance	lectures		knowledge in		4
exams			the field of		-
		E.v.e.m	Inductance		
		Exam	Gain	0	
Quarterly and			knowledge in	ð	
daily attendance	lectures		the field of		4
exams			Electric current		
		Magnetic and ferromagnetic	Gain	8	
Quarterly and		properties of materials	knowledge in	0	
daily attendance	lectures		the field of		4
exams			Magnetic and		
			ferromagnetic		
Courses		Exam			
Course evaluation	مغلماني خميجة				
Semi-daily and mo	niniy tests				
Daily class participa	stion				
Learning and teach					
Learning and reach	ng resources				

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



1– Course name			Astronomy			
2- Course code			Ph203			
3- Semester/Year				year	ly	
4- Date this descri	ption was prepared		٢	•୮٤ /୮•୮۳	,	
5- Available attenc	lance forms		Lectures are de according to th	eliverec le scheo depar	l to students dule annour tment	s in person nced in the
٦- Number of str (total)	ady hours (total)/n	umber of units	זי Hours (2 h	iours p	er week * 30	) weeks)
7– Name of the co	urse administrator (i	if more than one		Na	me:	
name is mentioned						
Course objective	es					
1- The student learn	s the basics of astrono	my.		C	bjectives of	the study
2- The student learn	s the basics of celestia	l mechanics.			subje	ct
3- The student gets t system.	o know the physical a	nd kinetic propertie	es of the solar			
4- The student shoul and their types	d know the physical ar	nd motion characte	ristics of stars			
5- The student learns and the birth of the	s about the types of ga universe and its physic	alaxies, their physica al properties.	al properties,			
Teaching and le	arning strategies					
1. In-person lectures	in classrooms.					
2. Discussion metho	d, surprise exams, and	methods of refining	g skills.		ть	o atratagu
3 Asking intellectual creative thinking and	questions or holding a l answering clearly and	a competition betwo d quickly to the prol	een students, stimu blems presented.	ulating		e strategy
Course structure	;					
Evaluation method	Learning method	Name of the unit or topic	Required learn outcomes	ing	hours	the week
Quarterly and	In-person lectures	Kepler's laws,	The student is a	ble to	10hours	weeks 5

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

		life in the universe							
Course evaluation	Course evaluation								
Semi-daily and mont	thly tests								
And surprise exams.									
Daily class participat	ion								
Learning and te	aching resources								
Main references (source فيزياء الجو و الفضاء : الجزء الاول (علم الفلك) – حميد مجول النعيمي وفياض النجم						es (sources)			
- Fundamental Astronomy 5th ed H.Karttunen,etal ; Springer- 2006.									
Astronomy – Princ	iples and Practice 4t	h ed, A. Roy,D C	arke; Springer.						



Optics	Course name .		
Ph 202	:Course code		
Year			:Semester/year . <sup>•</sup>
۲۰۲٤ /۲۰۲۳	The c	late this	description was .٤ :prepared
Lectures are delivered to students in person according to the schedule announced in the department	:Available attendance forms		
ars (3 theoretical hours and 2 practical hours 10. per week) (5 hours * 30 weeks) and the number of units = 7 units	f ((total)/number of units (total		
Name: Dr. Younis Mohamed Atiah	Name of the course administrator . (if more than one name is (mentioned		
		(	Course objectives .
<ul> <li>Students learn about the importance of optics and its relationship to physics topics. Course objectives:</li> <li>Attempt to understand optical properties and what is related to the physical phenomenon.</li> <li>Introduce students to how to use illustrative tools and devices.</li> <li>Develop the scientific research aspect of students by identifying the optical phenomenon and knowing its causes and how it occurs.</li> <li>Enhance students' cognitive abilities by linking the subject to optical phenomena found in nature.</li> <li>Develop the spirit of cooperation among students in the field of scientific research, which enhances</li> </ul>		Obj	ectives of the study subject
	Teaching a	nd learn	ing strategies
<ol> <li>Attending lectures in the study halls.</li> <li>The method of discussion and surprise tests and methods of</li> </ol>	sharpening skills		The strategy
3.Proposing intellectual questions and conducting competition	between students	and	8/

eliciting creative though					
				Course	structure $\downarrow$
Evaluation	Learning	Name of the	Required learning	hours	Week
method	method	unit or topic	outcomes	nours	WCCK
(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
		Exai	n	_	
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	9	15
		Exai	n	-	r
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	14	15
		Exai	n		
Quarterly and daily attendance		Chapter Four: Lenses	Gain knowledge related to: Types of		15

exams		• Types of	lenses	
		lenses		
		• Compound		
		lenses		
		Concept of		
		focal length		
		• Gauss's		
		relationshin		
		and Newton's		
		relationshin to		
		find the focal		
		longth		
		Ilging longog		
		Long		
		manufacturare'		
		formula		
Quarterly and daily	lectures	Chanter Five:		
attendance exams		Mirrors		
		The nature of		
		radiant light		
		Reflection in	Gain knowledge	
		mirrors	related to: Mirrors	
		Ontical	The nature of	
		olomonta	radiant light	
		Sphorical and	Rofloction in mirrors	
		plano mirroro	Reflection in millions	
		Thin and thick		
		mirrora		
		Gauga'a formula		
		for mirrors		
		Chapter Six:		
		Abarration		
		The concent of		
		aberration		
		Types of	Gain knowledge	
		aberration	related to:	
Quarterly and		Methods of	Interference	
daily attendance	lectures	getting rid of	The concent of	
exams		aberration	interference	
		Chanter Seven:		
		Interference		
		The concept of		
		interference		
		Newton's ming		
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					
And surprise exame					
Daily class participation					
			Learning and	teachin	g resources 🔸
<ul> <li>Fundamentals of Optics, Emmanuel E. Gdoutos</li> <li>Principles of Optics the Anniversary Edition Max Born, Emil Wolf60</li> </ul>					



Vibrational motion and sound	Course name .		
Ph 204	Course code ۲۰:		
Year	:Semester/year .۳		
۲.۲٤ /۲.۲۳	۰٤ . The date this description was prepared:		
Lectures are delivered to students in person according to the schedule announced in the department	re delivered to students in person to the schedule announced in the department :Available attendance form		o. •
urs (3 theoretical hours and 2 practical hours 10. per week) (5 hours * 30 weeks) and the number of units = 7 units Number of		r of study hours ۲. Der of units (total	
Name: Dr. Younis Mohamed Atiah	Name of t	Name of the course administrator . <sup>v</sup> (if more than one name is (mentioned	
		(	Course objectives .
<ul> <li>Students learn about the subject of sound and wave motion and its importance in physics.</li> <li>Employ the knowledge acquired by the student in explaining the natural phenomena associated with sound and wave motion.</li> <li>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.</li> <li>Provide students with scientific research skills to use them in research and applied fields in government departments concerned with the</li> </ul>		Obj	ectives of the study subject
	Teaching a	nd learn	ing strategies
۲. Attending lectures in the study halls. ۲. The method of discussion and surprise tests and methods of	sharpening skills		The strategy

3.Proposing intellectual questions and conducting competition between students and eliciting creative thought and clear and quick answers to the problems presented					
choking oreative thought and orear and quick anowers 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	9	15
Exam					
Quarterly and daily attendance exams	In-person lectures	Chapter 4 Forces causing decay of vibrations,	Gain knowledge related to: Decayed Vibrations,	17	15

	decayed				
	harmonic				
	motion				
	equation, types				
	of decayed				
	harmonic				
	motion				
	Exar	n			
	Chapter 5				
	(Forced				
Quarterly and daily attendance exams	Vibration,				
	Forced	Gain knowledge			
	Vibration	related to: Forced	15		
daily attendance	Equation,	Vibration and	15		
exams	Resonance,	Resonance			
	Practical				
	Applications on				
	Resonance				
	Exar	n	· · · ·		
Course evaluation					
Semi-daily and monthly tests					
And surprise exam	IS				
Daily class particip	ation				
		Learning and	teaching resources 🔸		
الطبعة الثانية، ٢٠٠٠ 🖊	ة، امجد عبد الرزاق كرجية، جامعة الموصل،	: فيزياء الصوت والحركة الموجيا	الكتاب المقرر		
4 1-THE PHYSICS OF VIBRATIONS AND WAVES, H. J. Pan, Sixth Edition, John Wiley &					

Sons, 2005. **4** 2- Vibrations and Waves, George C. King, WILEY, 2009.