

**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

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Mosul

Faculty/Institute: Collage of Education for Pure Science

Scientific Department: Physics

Academic or Professional Program Name: Bachelor of Science Final

Certificate Name: Bachelor in Physics

Academic System: Year

Description Preparation Date:

File Completion Date:

Signature:

Head of Department Name:

Date:

رئيس قسم الفيزياء
أ.م.د. مروان حفيظ يونس
٢٠٢٤/٤/١

Signature:

Scientific Associate Name:

Date:

أ.م.د. ياسر يحيى قاسم
معاون العميد للشؤون العلمية
٢٠٢٤/٤/١

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

أ.م.د. ياسر شكريب
شعبة ضمان الجودة

Approval of the Dean

أ.م.د. قيس اسعيل ابراهيم

و. عميد كلية التربية للعلوم السرفقة

1. Program Vision

Providing a distinguished scientific environment to reach the highest standards to contribute to community service, thus enhancing the role of the Physics Department in the academic aspect and scientific research, and balancing between the requirements of the labor market and preparation requirements.

2. Program Mission

The Department of Physics is to be a pioneer in the field of education and scientific research, which contributes to the development of society by providing it with highly qualified graduates.

3. Program Objectives

The educational program aims to develop faculty members, improve their performance, and make graduates qualified and able to obtain employment opportunities, whether in education or in various sectors of society. Therefore, the goals and objectives can be summarized as follows:

1. Providing the community with teaching staff.
2. Keeping pace with global developments in specialized fields.
3. Communicate with the community to provide the required services.
4. Directing education to serve community development.
5. Diversity of teaching methods between electronic teaching, in-person teaching, and blended teaching.
6. Maintaining the ethics of the teaching profession

4. Program Accreditation

NACTE

5. Other external influences

School training

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	1	2	1.83	Basic
College Requirements	8	32	17.39	Basic
Department Requirements	32	150	81.5	Basic
Summer Training	1	4	2.77	School training
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First year				
	EDPH22F101	Mechanics	3	3
	EDPH22F102	Electricity and Magnetism	3	3
	EDPH22F103	Heat and State Properties	2	--
	EDPH22F104	Mathematics	3	--
	EDPH22F105	Computers	1	2
	EDPH22F106	Educational Psychology	2	--
	EDPH22F107	Principles Education	2	--
	EDPH22F108	Human Right	1	--
	EDPH22F109	Arabic Language	2	--
EDPH22F110	English Language	1	--	

Second year	EDPH22F201	Advance Electricity and Magnetism	2	3
	EDPH22F202	Optics	3	3
	EDPH22F203	Sound and Wave Motion	1	2
	EDPH22F204	Astronomy	2	--
	EDPH22F205	Advance Mathematics	2	--
	EDPH22F206	Programming	3	--
	EDPH22F207	Research Approach	2	--
	EDPH22F208	Growth Psychology	2	--
	EDPH22F209	Administration and Secondary Education	2	--
	EDPH22F210	English Language	1	--
	EDPH22F211	Baath crimes	1	--
Third year	EDPH22F301	Atom and Molecule physics	3	3
	EDPH22F302	Analytical Mechanics	2	1
	EDPH22F303	Electronics	3	3
	EDPH22F304	Thermodynamic	2	1
	EDPH22F305	Complex Functions	2	--
	EDPH22F306	Selective	2	--
	EDPH22F307	Mythology and Teaching Methods	1	2
	EDPH22F308	Psychological Heath and Guidance	2	--
	EDPH22F309	English language	1	--

Fourth year	EDPH22F401	Nuclear Physics	3	3
	EDPH22F402	Electromagnetic theory	2	1
	EDPH22F403	Quantum mechanic	2	1
	EDPH22F404	Solid state Physics	2	1
	EDPH22F405	Laser	2	--
	EDPH22F406	Educational Lab.	--	3
	EDPH22F407	Graduated Project	2	
	EDPH22F408	School Practice	2	
	EDPH22F409	Measurement and Evaluations	2	--
	EDPH22F410	English language	1	--

8. Expected learning outcomes of the program

Knowledge	
Preparing a scientific researcher	by providing them with the basic principles of scientific research and teaching
Strengthening scientific cooperation	by holding courses, workshops or seminars within continuing education
Providing the opportunity to complete postgraduate studies	through mastering the scientific subject and scientific research methods
Skills	
Teaching Profession Skills	Acquire basic skills for the teaching profession in the fields of physics
Scientific research skills:	Developing scientific research skills in the field of physics and teaching methods
Sustainable development skills	by preserving the country's resources and sources from depletion in all fields
Ethics	
Developing beneficial values and trends	in harmony with the principles of divine religions, customs and traditions
Developing the trend towards the teaching	profession to meet current challenges and develop the educational system as a whole

Establishing teaching principles	to limit the misuse of their responsibilities in the scientific and educational field
Explaining the importance of science in human life	the great role that physics plays in serving people's lives

9. Teaching and Learning Strategies

Theoretical and practical lecture, dialogue and discussions, problem solving, conducting practical experiments, graduation project and application in schools.

10. Evaluation methods

Quiz and final exam

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof.	Physics	Solid State Nuclear – Teaching Methods			3	
Prof. Assist.	Physics	Solid State Nuclear – Teaching Methods– laser– Plasma– Optical fiber			11	

Lecturer	Physics	Solid State Nuclear – Teaching Methods– laser– Plasma– Optical fiber			17	
Lecturer Assist.	Physics	Solid State Nuclear laser–			9	
Lecturer Assist.	Mathematic	Complex functions			1	
Lecturer Assist.	English	Literature			2	

Professional Development

Mentoring new faculty members

Using modern scientific sources, educational methods, courses and workshops

Professional development of faculty members

Providing the library with modern scientific sources and participating in specialized training courses

12. Acceptance Criterion

Direct Admission

13. The most important sources of information about the program

Direct admission guide, the department's website and the Internet

14. Program Development Plan

The content has been updated based on new sources

Program Skills Outline

				Required program Learning outcomes												
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	
First Year	EDPH22F101	Mechanics	Basic	*	*	*										
	EDPH22F102	Electricity and Magnetism	Basic	*	*	*										
	EDPH22F103	Heat and State Properties	Basic	*	*	*										
	EDPH22F104	Mathematics	Basic					*			*					
	EDPH22F105	Computers	Basic					*								
	EDPH22F106	Educational Psychology	Basic		*						*					
	EDPH22F107	Principles Education	Basic		*						*					
	EDPH22F108	Human Right	Basic		*			*			*					

	EDPH22F109	Arabic Language	Basic												
	EDPH22F110	English Language	Basic												
Second Year	EDPH22F201	Advance Electricity and Magnetism	Basic	*	*	*	*								
	EDPH22F202	Optics	Basic	*	*	*									
	EDPH22F203	Sound and Wave Motion	Basic	*	*	*									
	EDPH22F204	Astronomy	Basic	*	*	*			*						
	EDPH22F205	Advance Mathematics	Basic				*								
	EDPH22F206	Programmin g	Basic		*			*		*	*				
	EDPH22F207	Research Approach	Basic		*			*							
	EDPH22F208	Growth Psychology	Basic		*				*						
	EDPH22F209	Administrati on and	Basic												

		Secondary Education															
	EDPH22F210	English Language	Basic														
	EDPH22F211	Baath crimes	Basic	*	*												
Third Year	EDPH22F301	Atom and Molecule physics	Basic	*	*	*											
	EDPH22F302	Analytical Mechanics	Basic	*				*									
	EDPH22F303	Electronics	Basic	*	*												
	EDPH22F304	Thermodynamic	Basic	*		*		*									
	EDPH22F305	Complex Functions	Basic	*	*			*									
	EDPH22F306	Selective	Optional	*				*									
	EDPH22F307	Mythology and Teaching Methods	Basic	*				*									
	EDPH22F308	Psychological Health and	Basic	*				*		*	*						

		Guidance															
	EDPH22F309	English language	Basic	*													
Forth Year	EDPH22F401	Nuclear Physics	Basic	*		*											
	EDPH22F402	Electromagnetic theory	Basic	*		*											
	EDPH22F403	Quantum mechanic	Basic	*		*											
	EDPH22F404	Solid state Physics	Basic	*		*											
	EDPH22F405	Laser	Basic	*													
	EDPH22F406	Educational Lab.	Basic														
	EDPH22F407	Graduated Project	Basic														
	EDPH22F408	School Practice	Basic														
	EDPH22F409	Measurement and Evaluations	Basic														

	EDPH22F410	English language	Basic													
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- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name:					
Quantum Mechanic					
2. Course Code:					
EDPH22F403					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Marwan Hafeeh Younus Email: Marwan.hafed@uomosul.edu.iq Name: lubna haqi ismael lubna.haqi_ismael178@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of quantum mechanical theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1.	2	Fundamentals of quantum mechanics	Influences and exchange of influences	Lecture	Quiz
2.	2	Hermitian effect	Properties of the Hermitian effect	Lecture	Quiz
3.	2	Hermitian effect	Properties of the Hermitian effect	Lecture	Quiz
4.	2	Expected value	Examples of expected value	Lecture	Quiz
5.	2	Expected value	Examples of expected value	Lecture	Quiz
6.	2	Schrödinger equation	Solve the time-dependent Schrödinger equation	Lecture	Quiz
7.	2	Schrödinger equation	Solve the time-dependent Schrödinger equation	Lecture	Quiz
8.	2	Applications of the Schrödinger equation	The free particle and the particle inside the box in one dimension and in three dimensions	Lecture	Quiz
9.	2	Applications of the Schrödinger equation	The free particle and the particle inside the box in one dimension and in three dimensions	Lecture	Quiz
10.	2	Reflectance and transmittance	Through low voltage with limited height	Lecture	Quiz
11.	2	Reflectance and transmittance	Through low voltage with limited height	Lecture	Quiz
12.	2	Harmonic oscillator	Solve the harmonic oscillator equation	Lecture	Quiz
13.	2	Harmonic oscillator	Solve the harmonic oscillator equation	Lecture	Quiz
14.	2	Harmonic oscillator	Comparison between quantum theory and classical theory	Lecture	Quiz
15.	2	Harmonic oscillator	Comparison between quantum theory and classical theory	Lecture	Quiz
16.	2	An atom has a single electron	Solve the differential equation	Lecture	Quiz
17.	2	An atom has a single electron	Solve the differential equation	Lecture	Quiz

18.	2	Angular momentum	Comparison between quantum theory and classical theory	Lecture	Quiz
19.	2	Angular momentum	Comparison between quantum theory and classical theory	Lecture	Quiz
20.	2	Approximation methods	Perturbation theory: first approximation: the dissolved state and the non-dissolved state	Lecture	Quiz
21.	2	Approximation methods	Perturbation theory: first approximation: the dissolved state and the non-dissolved state	Lecture	Quiz
22.	2	Approximation methods	Applications to perturbation theory	Lecture	Quiz
23.	2	Approximation methods	Applications to perturbation theory	Lecture	Quiz
24.	2	Approximation methods	Covariance method	Lecture	Quiz
25.	2	Approximation methods	Covariance method	Lecture	Quiz
26.	2	Scattering theory	Comparison between classical and quantum scattering	Lecture	Quiz
27.	2	Scattering theory	Comparison between classical and quantum scattering	Lecture	Quiz
28.	2	Scattering theory	Calculating the differential and total cross-sectional area	Lecture	Quiz
29.	2	Scattering theory	Calculating the differential and total cross-sectional area	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Quantum Mechanic
Main references (sources)	Basic Quantum Mechanic
Recommended books and references (scientific journals, reports...)	Quautum mechanics and spectroscopy:another workbook:M.Kuno
Electronic References, Websites	https://www.google.com/search?q=quantum+mechanics+pdf+notes&oq=Quautum+mechanics+pdf&aqs=chrome.2.69i57j0i13i512l9.5499j0j15&sourceid=chrome&ie=UTF-8

Course Description Form

1. Course Name:					
English Language					
2. Course Code:					
EDPH22F110					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/10/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
1 Credit Hour					
7. Course administrator's name (mention all, if more than one name)					
Name: Abdulazeez Taha Ahmed Al-Sheikh Ahmed Email: abdulazeez.ahmed@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of the English Language. • The student is able to solve all the various problems related to the subject. • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	1	Subject Pronouns	Subjects and their pronouns	Lecture	Quiz

2.	1	Present simple of “ be ”	Affirmative and Negative forms	Lecture	Quiz
3.	1	Present simple of “be”	Questions and Short answers	Lecture	Quiz
4.	1	Definite and Indefinite Articles	a/an and the	Lecture	Quiz
5.	1	Part of Speech	Adjectives	Lecture	Quiz
6.	1	Position of Adjectives: nationality, and color Adjectives	Two positions of Adjectives	Lecture	Quiz
7.	1	Part of Speech	Noun	Lecture	Quiz
8.	1	Plural of Nouns	Adding (s) and (es) to pluralize nouns.	Lecture	Quiz
9.	1	Comprehension	Reading Passage	Lecture	Quiz
10.	1	Comprehension	Reading Passage	Lecture	Quiz
11.	1	Possessive Adjectives	My, our, your, their, his, her, and its.	Lecture	Quiz
12.	1	Present simple	Affirmative and Negative	Lecture	Quiz
13.	1	Present simple	Question and Answer	Lecture	Quiz
14.	1	Demonstrative	This, these, that, and those	Lecture	Quiz
15.	1	Possessive (‘s/s’)	Children’s book boys’ book	Lecture	Quiz
16.	1	Possessive pronouns	Mine, yours, his, hers, ours, yours, theirs.	Lecture	Quiz
17.	1	Countable nouns	Apple – Apples	Lecture	Quiz
18.	1	Uncountable nouns	Milk – milk	Lecture	Quiz
19.	1	Comprehension	Reading Passage	Lecture	Quiz
20.	1	Comprehension	Reading Passage	Lecture	Quiz
21.	1	Present simple of have got	Has got Have got	Lecture	Quiz
22.	1	Present continuous	Affirmative and negative	Lecture	Quiz
23.	1	Present continuous	Questions and answers	Lecture	Quiz
24.	1	Object pronouns	Me, you, him, her, it, us, them.	Lecture	Quiz
25.	1	There is/ there are.	Affirmative and negative	Lecture	Quiz
26.	1	There is/there are	Questions and answers	Lecture	Quiz
27.	1	Past simple	Affirmative and negative	Lecture	Quiz
28.	1	Past simple	Questions and answers	Lecture	Quiz
29.	1	Comprehension	Reading passage	Lecture	Quiz

30.			Final Exam		
1. Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, etc...					
2. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Grammar Starter/Grammar One		
Main references (sources)			Grammar Starter/Grammar One		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			https://www.eltbooks.com/item_spec.php?item=307001&cat https://www.eltbooks.com/item_spec.php?item=307002&cat		

Course Description Form

1. Course Name:					
Computers					
2. Course Code:					
EDPH22F105					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Marwan Hafeeh Younus Email: Marwan.hafed@uomosul.edu.iq Name: saif Myasar Mohammed Fadel saifalhusny@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of computers fields using them • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1.	2	Computer basics	Introduction to computer components	Lecture	Quiz
2.	2	Explanation of the physical components	type of the physical components	Lecture	Quiz
3.	2	Explanation of the software components	Identify the types of program used	Lecture	Quiz
4.	2	Private and public application software	Examples of programs	Lecture	Quiz
5.	2	. Operating systems	Examples of Operating systems	Lecture	Quiz
6.	2	Ms_Dos	Internal orders (12) Externalorders(3)	Lecture	Quiz
7.	2	Windows 7	Commands and use	Lecture	Quiz
8.	2	Microsoft office	Introduction to the program and explanation of (11) applications	Lecture	Quiz
9.	2	Microsoft word	Commands and use	Lecture	Quiz
10.	2	Microsoft Excel	Commands and use	Lecture	Quiz
11.	2	Microsoft Excel	Arithmetic operations, functions	Lecture	Quiz
12.	2	Microsoft power point	Commands and use	Lecture	Quiz
13.	2	Numerical systems	Binary, octal and decimal systems	Lecture	Quiz
14.	2	Numerical systems	Sixteenth: Transfers between systems	Lecture	Quiz
15.	2	Viruses	A detailed explanation of the virus	Lecture	Quiz
16.	2	Viruses	Types of viruses	Lecture	Quiz
17.	2	Viruses	Antivirus	Lecture	Quiz
18.	2	Cyber attack	A detailed explanation of the cyber attack	Lecture	Quiz
19.	2	Cyber attack	Types of cyber attack	Lecture	Quiz
20.	2	Cyber attack and viruses	Viruses vs cyber	Lecture	Quiz

21.	2	Algorithms	Detailed Explanation	Lecture	Quiz
22.	2	Algorithms	How to write the algorithm	Lecture	Quiz
23.	2	Algorithms	Flowcharts	Lecture	Quiz
24.	2	Introduction to programming	Programming basics	Lecture	Quiz
25.	2	programming languages	Identify the types of programming languages	Lecture	Quiz
26.	2	Programming in C++	Commands and libraries	Lecture	Quiz
27.	2	Programming in C++	mathematical calculations	Lecture	Quiz
28.	2	Programming in C++	Writing the program	Lecture	Quiz
29.	2	Programming in C++	The use of conditionals in language	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to computer basics
Main references (sources)	Computer Basics, written by Tariq Al-Nasuri
Recommended books and references (scientific journals, reports...)	Programming in C++
Electronic References, Websites	https://www.noor-book.com/tag/لدكتور-طارق-الناصرى

Course Description Form

1. Course Name:					
Heat and State Properties					
2. Course Code:					
EDPH22F103					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Soham Younis Moustafa Email: soham200019@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of heat and Materials properties • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	temperature	Temperature, basics of temperature measurement,	Lecture	Quiz

			temperature gauges,		
2.	2	temperature	Types of thermometers, thermometer gradient, effect of temperature change on states of matter,	Lecture	Quiz
3.	2	temperature	Thermal expansion of materials	Lecture	Quiz
4.	2	temperature	Heat transfer and the mechanism of heat transfer in materials, black body, low temperatures	Lecture	Quiz
5.	2	Heat and phase transitions	Quantity of heat, mechanical equivalent of heat, condensed property and comprehensive property, heat capacity and specific heat of materials	Lecture	Quiz
6.	2	Heat and phase transitions	Methods of measuring specific heat, the concept of phase, homogeneous system and heterogeneous system, types of steel, phase transformations of matter, formation of glass,	Lecture	Quiz
7.	2	Heat and phase transitions	Phase diagram and its types, steam and its types,	Lecture	Quiz
8.	2	Heat and phase transitions	Laws of thermodynamics, thermodynamic systems, applications of the first law of thermodynamics	Lecture	Quiz
9.	2	Gases	Facts about gases, ideal gases and real gases, kinetic theory of gases,	Lecture	Quiz

10.	2	Gases	The mole and Avogadro's number, the ideal gas law, Boyle's law, Charles (Cay-Lussac's) law, the gas constant,	Lecture	Quiz
11.	2	Gases	The Vanderwaals equation, the internal or potential energy of a gas, the specific heat of gases, the relationship between C_p and C_v for an ideal gas,	Lecture	Quiz
12.	2	Gases	Calculating C_p and C_v for an ideal gas, entropy, work done by the gas, pressure of an ideal gas	Lecture	Quiz
13.	2	Fluids	Fluids, density, specific gravity, surface tension, capillary action, viscosity, pressure in fluids, Pascal's rule, Archimedes' rule,	Lecture	Quiz
14.	2	Fluids	Fluid flow, Poiseuille's equation, Bernoulli's equation, continuity equation, flow meters,	Lecture	Quiz
15.	2	Fluids	Venturi scale, calculating the pressure at any point for a static fluid, Pitot tube, Torricelli equation, Venturi scale,	Lecture	Quiz
16.	2	Fluids	Calculating the pressure at any point for a static fluid, Pitot tube, Torricelli equation	Lecture	Quiz
17.	2	Mechanical properties of materials	Types of solid materials, stress and its types,	Lecture	Quiz

			strain and its types, crystal defects		
18.	2	Mechanical properties of materials	, modulus of elasticity, stress-strain curve	Lecture	Quiz
19.	2	Mechanical properties of materials	, ductility, fragility, hardness, fatigue, creep, durability	Lecture	Quiz
20.	2	Mechanical properties of materials	Coefficients of elasticity, Poisson's ratio, work and strain	Lecture	Quiz
21.	2	Magnetic properties of materials	Magnetic moment of materials, angular momentum of electron,	Lecture	Quiz
22.	2	Magnetic properties of materials	The relationship between (μ) and (L), magnetic susceptibility	Lecture	Quiz
23.	2	Magnetic properties of materials	Classification of magnetic materials, magnetic elements	Lecture	Quiz
24.	2	Electrical properties of materials	Electrical conductivity, electrical resistivity, electrical conductivity phenomenon, critical magnetic field	Lecture	Quiz
25.	2	Electrical properties of materials	Properties of insulators, electric field, capacitance, polarization	Lecture	Quiz
26.	2	Electrical properties of materials	Piezoelectricity, ferroelectricity, dielectric constant and refractive index, electrical breakdown	Lecture	Quiz
27.	2	Plasma	The presence of plasma in the three states of	Lecture	Quiz

			matter, the presence of plasma in nature, the generation of plasma,		
28.	2	Plasma	Comparison between plasma and other states of matter, shapes of plasma, types of plasma, general properties of plasma,	Lecture	Quiz
29.	2	Plasma	Plasma coefficients, plasma and magnetic field, plasma containment	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<ul style="list-style-type: none"> • Heat and the properties of matter, written by Dr. Kazem Ahmed, University of Mosul
Main references (sources)	<ul style="list-style-type: none"> • Basics of physics / Bosch • Heat and thermodynamics / translated by Dr. Mohieddin Abbas Dr. Hussein Sayes.
Recommended books and references (scientific journals, reports...)	Callister, W. D., & Rethwisch, D. (2014). Materials science and engineering: an introduction. New York: John Wiley & Sons
Electronic References, Websites	https://www.google.com/search?q=Heat+and+the+properties+of+matter&sca_esv=179241790b8982d2&sca_upv=1&biw=1236&bih=527&sxsrf=ACQVn09CYffSUG5t55RL4bGb1LHvri0cHQ%3A1709476

785242&ei=sYvkZauWDv-F7NYP-8-VgA4&ved=0ahUKEwjrsqSkqdiEAxX_AtSEHftnBeAQ4dUDCBA&oq=Heat+and+the+properties+of+matter&gs_lp=Egxnd3Mtd2l6LXNlcnAilUhlYXQgYW5kIHRoZSBwcm9wZXJ0aWVzIG9mIG1hdHRlcjIGEAAYFhgeMgYQABgWGB4yBhAAGBYHjILEAAyGAQYigUYhgMyCxAAGIAEGIoFGIYDMgsQABiABBiKBRiGA0iEJIDCDljCDnABeAGQAQCYAbECoAGxAqoBAzMtMbgBDMgBAPgBAfgBApgCAqAC0AKoAgrCagcQlxjqAhgnmAMQkgcFMS4zLTE&sclient=gws-wiz-serp

Course Description Form

1. Course Name:					
HUMAN RIGHT AND DEMOCRACY					
2. Course Code:					
EDPH22F108					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class-Electronic					
6. Number of Credit Hours (Total) / Number of Units (Total)					
1 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: HOTHAIFA FATHALLAH ALI Email: Hothaifa.Fathallah@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> • the student gets to know basics of human rights and basics democratic regime • crystallizing awareness raising thought areas of human rights and democracy it reflects positively on the social and political field • Developing student skills and employment every single one or science subject in his studies or his field of work in the future 			
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1.	1	Basics of human rights	The concept of human rights	lecture	Quiz
2.	1	Basics of human rights	The features and characteristics human rights	Lecture	discussion
3.	1	The historical development of an idea human rights	The human rights in eastern civilizations(meopotamia-nile valley-persain)	Lecture	Quiz
4.	1	The historical development of an idea human rights	The human rights in western civilization(Greek-Roman)	electric	discussion
5.	1	The historical development of an idea human rights	The human rights in middle ages and the beginning of the modern era	Lecture	discussion
6.	1	The historical development of an idea human rights	The human rights in global revolutions(french-english-american-russian)	Lecture	discussion
7.	1	The historical development of an idea human rights	The human rights in the international agreements	Lecture	Quiz
8.	1	The human rights in inforatics era	The digital human rights	Lecture	Quiz
9.	1	The human rights in the heavenly laws	The human rights in the jewish law and the chritian law	Lecture	discussions
10.	1	The human rights in the heavenly laws	The human rights in the Islamic law	Lecture	Quiz
11.	1	The human rights classifications	The individual and collective human rights	Lecture	Oral exams
12.	1	The human rights in exceptional cases	The human rights in times of war and occupation	Lecture	discussions
13.	1	The guarantees of respect and protection of human rights	The protecting human rights at the national level	Lecture	Quiz
14.	1	The guarantees of respect and protection of human rights	The protecting human rights at the regional and international levels	electric	discussions
15.	1	The human rights in Iraq	The human rights in Iraqi constitutions	Lecture	Quiz
16.	1	The basics of the democratic regime	Introducing the concept of democracy	Lecture	discussions
17.	1	The basics of the democratic regime	The emergence of democracy	Lecture	Oral exams

			and its historical development		
18.	1	The basics of the democratic regime	The objectives of the democratic regime	Lecture	Quiz
19.	1	The basics of the democratic regime	The characteristics of a democratic regime	electrical	discussions
20.	1	Forms and images of the democratic regime	The direct democracy	Lecture	Quiz
21.	1	Forms and images of the democratic regime	The semi direct democracy	Lecture	Quiz
22.	1	Forms and images of the democratic regime	The indirect democracy	Lecture	Quiz
23.	1	The democracy and the Islamic regime	The difference between the democracy and the shura	Lecture	discussions
24.	1	The electoral system as an application of democracy	The concept of election and distinguish it from other concepts	Lecture	discussions
25.	1	The electoral system as an application of democracy	The election methods	Lecture	Quiz
26.	1	The electoral system as an application of democracy	The methods of rigging elections	Lecture	reports
27.	1	The Forms of governments and contemporary governance systems	The Parliamentary system	Lecture	Quiz
28.	1	The Forms of governments and contemporary governance systems	The Presidential system	Lecture	Quiz
29.	1	The Forms of governments and contemporary governance systems	The council system	Lecture	Oral exams
30.	1		Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Not found book systematic
Main references (sources)	Hameed Hanon ,human rights
Recommended books and references (scientific journals, reports...)	1-Mohammed Aabid Aljaberey,human rights in Arabic thought 2-Hasan Shafeeq Alanie,the regimes political and constitutional comparison

Electronic References, Websites

<https://www.ohchr.org/>

Course Description Form

1. Course Name:

Electric and Magnetic

2. Course Code:

EDPH23F102

3. Semester / Year:

2023–2024

4. Description Preparation Date:

15/10/2023

5. Available Attendance Forms:

Class

6. Number of Credit Hours (Total) / Number of Units (Total)

3 Credit Hours

7. Course administrator's name (mention all, if more than one name)

Name: Bashar Basim Jaro

Email: bashar_basim_jaro@uomosul.edu.iq

8. Course Objectives

Course Objectives

- The student learns the basics of Electricity and Magnetism .
- The student is able to solve all the various problems related to the subject .
- Developing the student's knowledge about the subject by adding some modern topics .

9. Teaching and Learning Strategies

Strategy

Theoretical lecture, dialogue and discussions, daily assignments, quiz

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Charge and Matter	Electric Charges , Atomic Number, Mass Number	Lecture	Quiz

			.Isotopes,		
2.	3	Charge and Matter	Charge Conservation, Conductors and Insulator , Semiconductors , Negative-Type Semiconductor , Positive- Type Semiconductor .	Lecture	Quiz
3.	3	Charge and Matter	Rutherford Experiment, Coulomb s Law, Units of Electric Charge , Permittivity, Permittivity of the Medium, Dielectric Constant .	Lecture	Quiz
4.	3	Electric Field	E. F. Strength , Lines of Force , Calculation of E.F.S. .	Lecture	Quiz
5.	3	Electric Field	Emerging Electric Field on Electric Dipole , Emerging Electric Field on Charged Straight Line .	Lecture	Quiz
6.	3	Electric Field	Emerging Electric Field on Charged Ring , Emerging Electric Field on Charged Flat Plate .	Lecture	Quiz
7.	3	Electric Field	Effect of Electric Field On Charged Particles .	Lecture	Quiz
8.	3	Electric Field	Effect of Electric Field On Dipoles .	Lecture	Quiz
9.	3	The Electron	The Charge of the Electron , Millikan Experiment .	Lecture	Quiz
10.	3	Gauss s Law	Flux of Electric Field Intensity .	Lecture	Quiz
11.	3	Gauss s Law	The relationship Gauss s Law and Coulomb s Law , Account of Electric Field Intensity Using Gauss s Law .	Lecture	Quiz
12.	3	Gauss s Law	Emerging Electric Field on	Lecture	Quiz

			Charged Straight Line , Emerging Electric Field on Charged Flat Plate .		
13.	3	Gauss s Law	Emerging Electric Field on Spherical Charge , Emerging Electric Field between Two Parallel Conductive Boards .	Lecture	Quiz
14.	3	Gauss s Law	Calculation of Electric Field for Cylinder .	Lecture	Quiz
15.	3	Capacitors	Capacitance , The Parallel Plate Capacitor , Cylindrical Capacitor .	Lecture	Quiz
16.	3	Capacitors	Spherical Capacitor , Two Parallel Long Wires Capacitor	Lecture	Quiz
17.	3	Capacitors	Capacitors in Series , Capacitors in Parallel .	Lecture	Quiz
18.	3	Capacitors	Stored Energy in Capacitors , Attractive Force between Expanding Panels .	Lecture	Quiz
19.	3	Capacitors	Vastus Foliaceus , Mica Capacitors , Electrolyte Capacitors .	Lecture	Quiz
20.	3	Capacitors	Applications of Capacitors .	Lecture	Quiz
21.	3	Current and Resistance	Electric Current , Amper , Drift Velocity .	Lecture	Quiz
22.	3	Resistances	Resistance , Resistivity , Temperature Coefficient of Resistivity .	Lecture	Quiz
23.	3	Resistances	Standard Resistors , Wire-Wound Resistors , Carbon Resistors ,	Lecture	Quiz
24.	3	Resistances	Rheostat , Resistor Color Code .	Lecture	Quiz

25.	3	Ohm's Law	Ohm's Law , Joule's Law	Lecture	Quiz
26.	3		Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Basics of Electricity and Magnetism (Book) Author/Yahya Abdel Hamid
Main references (sources)	• Basics of physics / Bosch
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:

Electricity And Magnetism

2. Course Code:

EDPH22F102

3. Semester / Year:

2023–2024

4. Description Preparation Date:

1/9/2023

5. Available Attendance Forms:

Lab.

6. Number of Credit Hours (Total) / Number of Units (Total)

2 Credit Hours

7. Course administrator's name (mention all, if more than one name)

Name: Ghazwan Ghazi Ali

Email: dr.ghazwan39@uomosul.edu.iq

Dr. Soham Younis Moustafa

Bashar Basim Jaro

8. Course Objectives

Course Objectives

- The student learns the basics of electrical experimental.
- The student is able to solve all the various problems related to subject
- Developing the student's knowledge about the subject by adding modern topics

9. Teaching and Learning Strategies

Strategy

Experimental and quiz

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Calculation of linear relationship Volt and current	Ohm's law	Experimental	Quiz
2.	2	Maximum power	Calculation of Power and Resistance	Experimental	Quiz

3.	2	Non-liner relation between volt and current	Calculation of Non-liner relation between volt and current	Experimental	Quiz
4.	2	Weteston Bridge	Calculation of Unknown Resistivity	Experimental	Quiz
5.	2	Voltmeter Resistance	Calculation of Voltmeter Resistance	Experimental	Quiz
6.	2	Review	Review	Experimental	Review
7.	2	Quiz	Quiz of the first course	Experimental	Quiz
8.	2	Capacity Experimental	Calculation of Capacity	Experimental	Quiz
9.	2	Resistance Thermometer	Calculation of Resistance Thermometer	Experimental	Quiz
10.	2	Tanget galvanometer	Calculation of Tanget galvanometer	Experimental	Quiz
11.	2	Joule equivalent	Calculation of Joule equivalent	Experimental	Quiz
12.	2	Electrochemical equivalent	Calculation of Electrochemical equivalent	Experimental	Quiz
13.	2	Experimental Review	Experimental Review	Experimental	Quiz
14.	2	Quiz of second course	Quiz of second course	Experimental	Quiz
15.	2	Calculation of liner relationship Volt and current	Ohm's law	Experimental	Quiz
16.	2	Maximum power	Calculation of Power and Resistance	Experimental	Quiz
17.	2	Non-liner relation between volt and current	Calculation of Non-liner relation between volt and current	Experimental	Quiz
18.	2	Weteston Bridge	Calculation of Unknown Resistivity	Experimental	Quiz
19.	2	Voltmeter Resistance	Calculation of Voltmeter Resistance	Experimental	Quiz
20.	2	Review	Review	Experimental	Review
21.	2	Quiz	Quiz of the first	Experimental	Quiz

			course		
22.	2	Capacity Experimental	Calculation of Capacity	Experimental	Quiz
23.	2	Resistance Thermometer	Calculation of Resistance Thermometer	Experimental	Quiz
24.	2	Tanget galvanometer	Calculation of Tanget galvanometer	Experimental	Quiz
25.	2	Joule equivalent	Calculation of Joule equivalent	Experimental	Quiz
26.	2	Experimental Review	Experimental Review	Experimental	Quiz
27.	2	Question solve	Question solve	Experimental	Quiz
28.	2	Question solve	Question solve	Experimental	Quiz
29.	2	Question solve	Question solve	Experimental	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Electricity And Magnetism Science Experiments
Main references (sources)	Charles Kittel, (1985) Electricity Magnetism
Recommended books and references (scientific journals, reports...)	Electricity And Magnetism
Electronic References, Websites	https://www.sciencefun.org/kidszone/experiments/electricity-and-magnetism-science-experiments/

Course Description Form

1. Course Name:	
Mechanics Lab (Practical)	
2. Course Code:	
Mechanics Lab (Practical)	
3. Semester / Year:	
Annual 2023–2024	
4. Description Preparation Date:	
1/11/2023	
5. Available Attendance Forms:	
Laboratories (Physical presence in the laboratory)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 Hours per week / 60 Hours per year / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Marwan Hafeez Younis Email: Marwan.hafed@uomosul.edu.iq Name: Asmaa Zaki Khalil Al-obadi Email: Asmaa.zaki@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The program aims at the practical application of students and their acquisition of all the basic Concepts and theoretical calculations in mechanics, represented by (Simple pendulum, Hardness modulus, Archimedes base, velocity of sound, Central force, Frequency an unknown resonant fork by the sonometer, Surface tension, Moment of inertial, Coefficient of static and kinetic friction, Hooke's law) so that the student gets to know the laws of physics and achieve the validity of theoretical ideas in a practical way through experiment and the student is able to support and develop his skills in mechani experiments.

9. Teaching and Learning Strategies

Strategy

Practical experiences, dialogue and discussions, daily assignments, quiz .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Finding gravitational acceleration using a simple pendulum	Simple pendulum	Conducting a practical experiment in the laboratory	Quiz and reports
2.	3	Finding the hardness modulus of a thin metal rod	Hardness modulus	Conducting a practical experiment in the laboratory	Quiz and reports
3.	3	Determination of specific weight using Archimedes rule	Archimedes base	Conducting a practical experiment in the laboratory	Quiz and reports
4.	3	Measuring the velocity of sound in air using a resonant tube	Velocity of sound	Conducting a practical experiment in the laboratory	Quiz and reports
5.	3		General review of experiments		
6.	3		Practical exam		
7.	3	Realize the relationship between centripetal	Central force	Conducting a practical experiment in the	Quiz and reports

		force, angular velocity and radius of rotation		laboratory	
8.	3	Realize the relationship between centripetal force, angular velocity and radius of rotation	Central force	Conducting a practical experiment in the laboratory	Quiz and reports
9.	3	Finding an unknown resonant fork frequency by a sonometer	Sonometer	Conducting a practical experiment in the laboratory	Quiz and reports
10.	3	Finding the coefficient of static and kinetic friction	Static and kinetic friction	Conducting a practical experiment in the laboratory	Quiz and reports
11.	3		General review of experiments		
12.	3		Practical exam		
13.	3	Hooke's law investigation	Hooks law	Conducting a practical experiment in the laboratory	Quiz and reports
14.	3	Finding the viscosity coefficient	Surface tension	Conducting a practical experiment in the laboratory	Quiz and reports
15.	3	Finding the moment of inertial counterbalan	Moment of inertial	Conducting a practical experiment in the	Quiz and reports

		ce wheel in practice compared to the theoretical value		laboratory	
16.3		Finding viscosity coefficient	Viscosity coefficient	Conducting a practical experiment in the laboratory	Quiz and reports
17.3			General review of experiments		
18.3			Practical exam		
19.3		Determination of the specific heat capacity of solids	Specific heat capacity of solids	Conducting a practical experiment in the laboratory	Quiz and reports
20.3		Investigate boyles law and find atmospheric pressure	Boyles law	Conducting a practical experiment in the laboratory	Quiz and reports
21.3		Study of heat transfer in insulating objects and poor conductors and finding the coefficient of thermal conductivity	Coefficient of thermal conductivity	Conducting a practical experiment in the laboratory	Quiz and reports
22.3			General review of experiments		
23.3			Practical exam		

1. Course Evaluation

Submit daily report, Daily tests, Class participations.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mechanics lab experiments ...First grade
Main references (sources)	Practical Physics in SI(E Armitage MA BSc / Director of the sixth from center at the city of Ely college
Recommended books and references (scientific journals, reports...)	Physics lab work guide book
Electronic References, Websites	https://www.fizya10.com

Course Description Form

1. Course Name:					
Mechanics					
2. Course Code:					
EDPH22F101					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours/ 3 Number of Units					
7. Course administrator's name (mention all, if more than one name)					
Name: Odai Falah Ameen Email: odai.ameen@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> This course provides the student with mechanical knowledge and scientific knowledge. Designate this course to enable the student to learn about the physical phenomena that cause bodies to move. This course enables the student to know characteristics and types of forces. To organize this course, the student must know the laws of accuracy 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1.	3	Physical Quantity	Definition of physical quantity	Lecture	Quiz
2.	3	Systems of Units	Unit and system of units	Lecture	Quiz
3.	3	Dimensions and Dimensional equations	Check the physical equation through the dimensional equation	Lecture	Quiz
4.	3	Vectors	Concept of direction and classification vectors	Lecture	Quiz
5.	3	Representative of Vectors	Addition and Subtracted of Vectors	Lecture	Quiz
6.	3	Addition of Several Vectors	Component of Vector and find the sum of several vectors	Lecture	Quiz
7.	3	Vector Multiplication	Scalar product (or dot product) & Vector product (or cross product)	Lecture	Quiz
8.	3	Solving examples	Solving examples	Lecture	Quiz
9.	3	Motion in One Dimension	Concept Rest and Motion	Lecture	Quiz
10.	3	Equations of motion	Derivation of motion equations	Lecture	Quiz
11.	3	Freely Falling Bodies	The concept of free fall and free fall equations	Lecture	Quiz
12.	3	Motion in a plane (Two Dimension)	The concept of movement in two dimensions	Lecture	Quiz
13.	3	Motion in a plane (Two Dimension)	Projectile Motion	Lecture	Quiz
14.	3	Equations of the path of a projectile	Flight time, horizontal range, maximum height of the projectile	Lecture	Quiz
15.	3	Circular Motion	Angular displacement, angular velocity, angular acceleration,	Lecture	Quiz
16.	3	Forces	The concept of forces and effect of a force and methods for finding out the resultant force	Lecture	Quiz

17.	3	The laws of motion	Newton's laws of motion and Centripetal Force	Lecture	Quiz
18.	3	Frictional forces	Applications second law of newton (Atwood machine)	Lecture	Quiz
19.	3	Torque	The concept of torque and its laws	Lecture	Quiz
20.	3	Composition of parallel forces	Find the position of the resultant of the parallel forces	Lecture	Quiz
21.	3	Center of mass	Find the Center of mass and Equilibrium of a particle and Equilibrium of a solid body (Bar)	Lecture	Quiz
22.	3		Examination	Lecture	Quiz

1. Course Evaluation

- The evaluation by involving students in discussions.
- Simple attempt (test).
- Monthly and quarterly exams.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Applied book in Arabic: Mechanics science and engineering applications
Main references (sources)	Applied book in Arabic: Mechanics science and engineering applications
Recommended books and references (scientific journals, reports...)	Physics for Scientists and Engineers with Modern Physics
Electronic References, Websites	https://objectstorage.ap-mumbai-1.oraclecloud.com/n/bmzytd5z5pt3/b/Class12/o/1653331658-ncert-6.pdf

Course Description Form

1. Course Name:					
Selective (Semiconductor)					
2. Course Code:					
EDPH22F306					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Fathi Mohammed Jasim Email: phyfathe1@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics semiconductor theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Classification of solids	metals, semiconductors and insulators	Lecture	Quiz

2.	2	Atomic structure and quantum numbers	Bohr's atomic model and Pauli's principle of exclusion	Lecture	Quiz
3.	2	Basic principles of semiconductors	Arrangement of atoms in space	Lecture	Quiz
4.	2	Unit Cell	Types of unit Cells	Lecture	Quiz
5.	2	Crystal Systems	Paravisiian Lattice	Lecture	Quiz
6.	2	Crystal structure	Translation operator	Lecture	Quiz
7.	2	Two-dimensional Lattices	Types of two-dimensional Lattices	Lecture	Quiz
8.	2	Three-dimensional Lattices	Types of three-dimensional Lattices	Lecture	Quiz
9.	2	Directions in the crystal	Crystal Planes and Miller Indices	Lecture	Quiz
10.	2	Reciprocal Lattice	Fourier Transformation	Lecture	Quiz
11.	2	Thermally activated processes	Thermal activation energy	Lecture	Quiz
12.	2	Atomic diffusion in solids	Diffusion coefficient	Lecture	Quiz
13.	2	Crystalline defects	Classification of crystalline defects	Lecture	Quiz
14.	2	Point defects	Vacancies and impurities	Lecture	Quiz
15.	2	Point defects in ionic crystals	Schottky defects and Frenkel defects	Lecture	Quiz
16.	2	Vacancies in metals and semiconductors	Concentration of Vacancies in the crystal	Lecture	Quiz
17.	2	Substitutional impurities as Dopants	Extrinsic semiconductors	Lecture	Quiz
18.	2	Electron Behavior in crystal	Free Electron	Lecture	Quiz
19.	2	Power & Momentum Packs	The relationship of energy with momentum in semiconductors	Lecture	Quiz
20.	2	Semiconductor Energy Gap	Direct and indirect energy gap	Lecture	Quiz
21.	2	Charge carriers in semiconductors	Electrons and Vacancies	Lecture	Quiz
22.	2	Effective mass	Effective electron mass	Lecture	Quiz
23.	2	Density of cases	Density of states in an Energy bands	Lecture	Quiz
24.	2	Fermi Dirac Statistics	Density of state and	Lecture	Quiz

			probability of distribution		
25.	2	Ionization of impurity atoms	Electron-hole pair at equilibrium	Lecture	Quiz
26.	2	Charge carrier mobility	Charge carriers diffusion and drift	Lecture	Quiz
27.	2	Generation and recombination processes	Radiative and non-radiative recombination	Lecture	Quiz
28.	2	Electronic transitions	Direct and indirect transitions	Lecture	Quiz
29.	2	P – n junction	Characteristic curve of a p–n junction	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Semiconductor Devices S.M.Ze
Main references (sources)	Introduction to Semiconductor Physics September 2018 10.13140/RG.2.2.26536.42242/5
Recommended books and references (scientific journals, reports...)	Introduction to Semiconductor Physics Prepared by Prof. Dr. Alaa Abdel Hamid Bahgat
Electronic References, Websites	https://en.wikipedia.org/wiki/Semiconductor

Course Description Form

1. Course Name:					
Selective/ irradiative					
2. Course Code:					
EDPH22F306					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Rawah Naji Nayeef Email: rawahnaji@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of quantum mechanical theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Introduction to radiation	Radiation and its types	Lecture	Quiz
2.	2	Ionizing rays	Its characteristics and sources	Lecture	Quiz
3.	2	Methods of creating radiation	Ionization and excitation	Lecture	Quiz

4.	2	Non-ionizing rays	Its characteristics and sources	Lecture	Quiz
5.	2	Electromagnetic rays	Its nature and properties	Lecture	Quiz
6.	2	Spectrum of electromagnetic radiation	Sections of the electromagnetic spectrum	Lecture	Quiz
7.	2	X ray	Types and characteristics of each type	Lecture	Quiz
8.	2	X-ray measurement	X-ray measuring devices	Lecture	Quiz
9.	2	Gamma rays	Its nature and characteristics	Lecture	Quiz
10.	2	Ways radiation interacts with matter	A detailed explanation of these methods	Lecture	Quiz
11.	2	Radioactive decay	The law of radioactive decay and examples	Lecture	Quiz
12.	2	Radioactive decay	Solve examples	Lecture	Quiz
13.	2	Ways radiation interacts with matter	Its types and examples	Lecture	Quiz
14.	2	Ways radiation interacts with matter	Solve examples	Lecture	Quiz
15.	2	Radiation measurement units	Types according to the nature of radiation	Lecture	Quiz
16.	2	Radiation measurement units	Radiological unit conversion	Lecture	Quiz
17.	2	Radiation measurement units	Solve examples	Lecture	Quiz
18.	2	Absorbed radiation dose	Definition and examples	Lecture	Quiz
19.	2	Absorbed radiation dose	Solve examples	Lecture	Quiz
20.	2	Equivalent dose	Definition and examples	Lecture	Quiz
21.	2	Absorption coefficient	Its definition and types	Lecture	Quiz
22.	2	Absorption coefficient	Solve examples	Lecture	Quiz
23.	2	Absorption coefficient	Solve examples	Lecture	Quiz
24.	2	Radiation exposure	Its sources and types	Lecture	Quiz
25.	2	Methods of measuring and detecting radiation	Types of measuring devices and methods	Lecture	Quiz
26.	2	Radiation protection	Radiation protection methods	Lecture	Quiz
27.	2	Radiotherapy	The effect of the time factor	Lecture	Quiz
28.	2	Radiotherapy	Cellular repair	Lecture	Quiz
29.	2	Radiotherapy	Histological restoration	Lecture	Quiz
30.		Semester exam			

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Nothing
Main references (sources)	Radiation physics book
Recommended books and references (scientific journals, reports...)	Medical radiation physics, ionizing radiation
Electronic References, Websites	https://www.physics-pdf.com/

Course Description Form

1. Course Name:					
Psychological Health and Guidance					
2. Course Code:					
EDPH22F308					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: ZINAH TARQ DAHHAM Email: zenatalhayaly@uomosul.edu.iq					
8. Course Objectives					
<ul style="list-style-type: none"> The student learns the basics of counseling Enabling the student to acquire skills about psychological and family counseling and its theories Developing the student's knowledge about psychological counseling and therapeutic counseling Developing student knowledge about modern counseling methods 					
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Introducing the student to counseling psychology	Introduction and general idea	Lecture	Quiz

2.	2	Introducing the student to the importance of recognizing the relationship between the concept of guidance and these concepts.	Basic definitions of counseling psychology	Lecture	Quiz
3.	2	Introducing the student to the characteristics of counseling in light of the previous definitions	The relationship of counseling to other terms (guidance, psychotherapy)	Lecture	Quiz
4.	2	Introducing the student to an overview of counseling and its practice historically	A brief historical overview of the development of psychological counselling	Lecture	Quiz
5.	2	Introducing the student to the importance of psychological counseling and the goals he seeks to achieve	The importance of psychological counselling, its goals, justifications, and function	Lecture	Quiz
6.	2	Introducing the student to the goals of psychological counseling, including self-actualization, achieving mental health, and achieving compatibility, and on the basis of them, he can add these goals to his professional work in the future.	Practical objectives of psychological educational counseling	Lecture	Quiz
7.	2	Defining the student that any profession cannot grow and flourish without there being a function that this profession performs and constitutes a justification for its growth and the need for it, as well as guidance.	Justifications for psychological educational counseling and the need for it	Lecture	Quiz
8.	2	Enabling students to become familiar with the regulations that allow the counselor to accept the conditions of work at the school or any institution in which he may practice the counseling process on the one hand, and to meet his responsibilities towards himself, his profession, and his clients.	The mentor's ethics and professional specifications	Lecture	Quiz
9.	2	Introducing the student to the importance of recognizing the relationship between the concept of guidance and these concepts.	Fields of psychological counseling and its practical applications	Lecture	Quiz
10.	2	Defining the student: There are three approaches to achieving the goals of guidance and counseling in the counseling process, and the counselor must take a specific goal from them or according to what the need and problem require.	Methods and methods of psychological counseling	Lecture	Quiz
11.	2	Introducing the student to psychological counseling methods	Development approach	Lecture	Quiz
12.	2	Introducing the student to the importance of psychological counseling	Curricula and methods of	Lecture	Quiz

		and the goals he seeks to achieve	psychological counseling, Prerentive approach		
13.	2	Introducing the student to the goals of psychological counseling, including self-actualization, achieving mental health, and achieving compatibility, and on the basis of them, he can add these goals to his professional work in the future.	-Therapeutic approach	Lecture	Quiz
14.	2	Defining the student that any profession cannot grow and flourish without there being a function that this profession performs and constitutes a justification for its growth and the need for it, as well as guidance.	Psychological counseling methods	Lecture	Quiz
15.	2	Enabling students to become familiar with the regulations that allow the counselor to accept the conditions of work at the school or any institution in which he may practice the counseling process on the one hand, and to meet his responsibilities towards himself, his profession, and his clients.	Individual guidance	Lecture	Quiz
16.	2	Enabling students to become familiar with the interview method	the interview	Lecture	Quiz
17.	2	Introducing the student to the feedback method	Observation methods	Lecture	Quiz
18.	2	Introducing the student to the case study method	Case Study	Lecture	Quiz
19.	2	Introducing the student to the psychological counseling method	Psychological counseling methods and methods: Part 1	Lecture	Quiz
20.	2	Introducing the student to the psychological counseling method	Psychological counseling methods and methods: Part 2	Lecture	Quiz
21.	2	Introducing the student to the concepts of individual counseling	Individual guidance: its concept and importance	Lecture	Quiz

22.	2	Introducing the student about the disadvantages of individual counselling	Individual guidance: Disadvantages and advantages of individual guidance	Lecture	Quiz
23.	2	Introducing the student to the concepts of group counseling	Group counseling: its concept and importance	Lecture	Quiz
24.	2	Introducing the student to the negatives of group counseling	Group Guidance: Disadvantages and Advantages of Group Guidance	Lecture	Quiz
25.	2	Introducing the student to the concepts of academic advising	Academic advising: its concept and importance	Lecture	Quiz
26.	2	Introducing the student to the concepts of electronic counseling	Electronic guidance: its concept and importance	Lecture	Quiz
27.	2	Introducing the student to modern guidance methods	Group counseling, play counseling, behavioral counseling	Lecture	Quiz
28.	2	Introducing the student to modern and professional counseling fields	Areas of guidance: Professional guidance	Lecture	Quiz
29.	2	Introducing the student to school guidance	Guidance in school and the comprehensive school program	Lecture	Quiz
30.		Semester exam			

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<p>The methodological book in Arabic</p> <p>Educational and psychological guidance in educational institutions</p> <p>Written by: Dr. Rafida Al-Hariri, Dr. Samir Al-Imami</p>
Main references (sources)	<p>1- Theoretical trends in counseling. Jalal Kayed Damra, 1st edition, Safaa Publishing and Distribution House, Amman, Jordan</p> <p>2. Basics in Psychological Counseling, Mahmoud Abdullah Saleh, Saudi Arabia - Riyadh, Dar Al-Marikh, 1989.</p> <p>3. Applications in educational supervision, Dr. Ahmed Jamil Ayesh, 1st edition, Dar Al-Masirah for Publishing and Distribution, Jordan - Amman,</p>
Recommended books and references (scientific journals, reports...)	<p>Journal of Psychological Counseling: A peer-reviewed scientific journal published by the "Psychological Counseling Center," Ain Shams University, Volume 76, 2023</p>
Electronic References, Websites	<p>http://www.rameztaha.net/tadreat%20al%20seha%20al%20nafstn</p> <p>http://www.eawraq.com/news.php?action=view&id=69</p> <p>http://www.cocegypt.8m.com/page2.htm</p>

Course Description Form

1. Course Name:					
English Language					
2. Course Code:					
EDPH22F309					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
1 Credit Hour					
7. Course administrator's name (mention all, if more than one name)					
Name: Abdulazeez Taha Ahmed Al-Sheikh Ahmed Email: abdulazeez.ahmed@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of the English Language. • The student is able to solve all the various problems related to the subject. • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	1	Part of Speech	Noun	Lecture	Quiz

2.	1	Plural of Nouns	Adding (s) and (es) to pluralize nouns.	Lecture	Quiz
3.	1	Part of Speech	Adjectives	Lecture	Quiz
4.	1	Position of Adjectives: nationality, and color Adjectives	Two positions of Adjectives	Lecture	Quiz
5.	1	Present simple	Affirmative and negative	Lecture	Quiz
6.	1	Present simple	Questions and answers	Lecture	Quiz
7.	1	Subject Pronouns	Subjects and their pronouns	Lecture	Quiz
8.	1	Definite and Indefinite Articles	a/an and the	Lecture	Quiz
9.	1	Comprehension	Reading Passage	Lecture	Quiz
10.	1	Comprehension	Reading Passage	Lecture	Quiz
11.	1	Present simple of “ be ”	Affirmative and Negative forms	Lecture	Quiz
12.	1	Present simple of “be”	Questions and Short answers	Lecture	Quiz
13.	1	Present continuous (ing)	Affirmative and Negative	Lecture	Quiz
14.	1	Present continuous (ing)	Question and answer	Lecture	Quiz
15.	1	Past simple	Affirmative and negative	Lecture	Quiz
16.	1	Past simple	Questions and answers	Lecture	Quiz
17.	1	Could for Ability	Past of can	Lecture	Quiz
18.	1	Comparison of adjectives 1	Adding er/est	Lecture	Quiz
19.	1	Comparison of adjectives 2	Using more/most	Lecture	Quiz
20.	1	Using “Should”	Obligation and advice	Lecture	Quiz
21.	1	Comprehension	Reading passage	Lecture	Quiz
22.	1	Comprehension	Reading passage	Lecture	Quiz
23.	1	Using “Shall”	Offer to do something for someone	Lecture	Quiz
24.	1	Expressing quantity	A lot of/ lots of/ a little/ a few	Lecture	Quiz
25.	1	Past continuous	Affirmative and negative	Lecture	Quiz
26.	1	Past continuous	Question and answer	Lecture	Quiz
27.	1	Comprehension	Reading passage	Lecture	Quiz
28.	1	Comprehension	Reading passage	Lecture	Quiz
29.				Lecture	Quiz

30.					
1. Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, etc...					
2. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Grammar Two		
Main references (sources)			Grammar Two		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			https://www.eltbody.com/item_spec.php?item=307003&cat		

Course Description Form

1. Course Name:					
Thermodynamic					
2. Course Code:					
EDPH22F304					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
4/9/2022					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Raghad Saeed Habeeb Email: raghad.sagat@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • Providing students with basic concepts of thermodynamics and statistical mechanics. 1 •The student becomes familiar with the laws of thermodynamics, statistical distributions and their mathematical relationships •Enable the student to teach this subject in schools 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

				d	
1.	2	Review concepts in thermodynamics.	Basic concepts in thermodynamics.	Lecture	Quiz
2.	2	Introduction to the thermodynamics.	Principles and functions of Thermodynamic	Lecture	Quiz
3.	2	Introduction to the thermodynamics.	Useful Mathematical Theories in Thermodynamics	Lecture	Quiz
4.	2	An adiabatic and isothermal process	An adiabatic and isothermal process	Lecture	Quiz
5.	2	Carnot cycle	Carnot cycle	Lecture	Quiz
6.	2	Pure materials classification	Properties of Pure Substances	Lecture	Quiz
7.		equations of states	Introduction to the equations of states	Lecture	Quiz
8.	2	equations of states	Conditions of the equations of states	Lecture	Quiz
9.	2	equations of states	Solve an examples and questions of the equations of states	Lecture	Quiz
10.	2	Ideal and real Gases	Introduction to the Ideal and real Gases	Lecture	Quiz
11.	2	Ideal Gas	Ideal Gas Specification	Lecture	Quiz
12.	2	Ideal Gas	Variables of Ideal Gas equation in details	Lecture	Quiz
13.	2	Ideal and real gases	Ideal and real gases	Lecture	Quiz
14.	2	Real Gas Equation	Some Real Gas's Equation	Lecture	Quiz
15.	2	Real Gas Equation	Van der Waals Equation	Lecture	Quiz
16.	2	Real Gas and the Van der Waals Equation	Van der Waals Equation discussen	Lecture	Quiz
17.	2	Entropy	equations of entropy	Lecture	Quiz
18.	2	Enthalpy	Introduction to the equations of Enthalpy	Lecture	Quiz
19.	2	The heat capacity and work	heat capacity of the material	Lecture	Quiz
20.	2	laws of thermodynamic	The laws of thermodynamic	Lecture	Quiz
21.	2	laws of thermodynamic	The thermodynamic law's application	Lecture	Quiz
22.	2	concepts in statistical mechanics	Basic concepts in statistical mechanics	Lecture	Quiz
23.	2	probability	Calculations on probability principle	Lecture	Quiz
24.	2	Maxwell-Boltzmann equations	Maxwell-Boltzmann Statistics	Lecture	Quiz
25.	2	Maxwell-Boltzmann equations	examples of Maxwell-Boltzmann statistics	Lecture	Quiz
26.	2	Bose-Einstein equations	Bose-Einstein statistics	Lecture	Quiz
27.	2	Bose-Einstein equations theory	Examples of Bose-Einstein statistics	Lecture	Quiz

28.	2	Fermi-Dirac equations	Fermi-Dirac statistics	Lecture	Quiz
29.	2	Fermi-Dirac equations	Examples of Fermi-Dirac statistics	Lecture	Quiz
30.	2	Review	Review	Lecture	
31.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thermodynamic Thermodynamic and statistical Mechanics
Main references (sources)	Thermodynamic
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Complex Functions					
2. Course Code:					
EDPH22F305					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Ekram Mohammed Abdullah Email: ekramm.abdullah@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			The student gets to know an extended concept in mathematics, which is the complex number, and how to solve problems related to complex numbers and functions.		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Fundamentals of complex numbers	Complex numbers	Lecture	Quiz
2.	2	Conjugates of complex number	Complex numbers	Lecture	Quiz
3.	2	Geometric representation of complex number	Complex numbers	Lecture	Quiz

4.	2	Ellipse	Conic sections	Lecture	Quiz
5.	2	Hyperbola	Conic sections	Lecture	Quiz
6.	2	Parabola	Conic sections	Lecture	Quiz
7.	2	Polar representation of complex number	Polar representation	Lecture	Quiz
8.	2	Euler's formula	Euler's formula of complex number	Lecture	Quiz
9.	2	Complex function	Complex function	Lecture	Quiz
10.	2	Limits and continues for complex functions	Complex function	Lecture	Quiz
11.	2	Derivative of complex function	Complex function	Lecture	Quiz
12.	2	Couchy-Rieman conditions for derivative	Derivative	Lecture	Quiz
13.	2	Analytic function	Derivative	Lecture	Quiz
14.	2	Harmonic function	Derivative	Lecture	Quiz
15.	2	Exponential function	Elementary functions	Lecture	Quiz
16.	2	Logarithm function	Elementary functions	Lecture	Quiz
17.	2	Trigonometric functions	Elementary functions	Lecture	Quiz
18.	2	Inverse trigonometric functions	Elementary functions	Lecture	Quiz
19.	2	Hypobaric function	Elementary functions	Lecture	Quiz
20.	2	Inverse hypobaric function	Elementary functions	Lecture	Quiz
21.	2	Paths	Complex Integral	Lecture	Quiz
22.	2	Parametric equations	Complex Integral	Lecture	Quiz
23.	2	Applications on complex integral	Complex Integral	Lecture	Quiz
24.	2	Couchy-Gorsat theorem for integral	Complex Integral	Lecture	Quiz
25.	2	Mourier theorem for integral	Complex Integral	Lecture	Quiz
26.	2	Basic-Theorem in algebra	Complex Integral	Lecture	Quiz
27.	2	Sequences and series in complex formula	Sequences and series	Lecture	Quiz
28.	2	Infinite series	Sequences and series	Lecture	Quiz
29.	2	Applications on complete functions	Complete functions	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily

preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Complex Functions
Main references (sources)	The complex function
Recommended books and references (scientific journals, reports...)	Complex Analysis : Mc Graw-Hill ; 2nd Edition
Electronic References, Websites	https://fastercapital.com/arabpreneur/%D9%D9%83%81%D8%A7%D9%84%D8%B4%D9%81%D8%B1%D8%A9D8%A5%D8%AA%D9%82%D8%A7%D9%86%D8%A7%D9%84%D8%AF%D9%88%D8%A7%D9%84D8%A7%D9%85%D8%B1%D9%83%D8%A8%D8%A9-D9%81%D9%8A%D8%A7%D9%84%D8%B1%D9%8A%B6%D9%8A%D8%A7%D8%A7%D8%AA.html

Course Description Form

1. Course Name:					
Atomic and Molecule physics					
2. Course Code:					
EDPH22F301					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Muayad Abdullah Ahmed Email: moyadalharbi@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of quantum mechanical theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Relativity	concept(time, mass, reference, Galilean	Lecture	Quiz

			Transformation		
2.	3	Relativity	Newton's laws, The Michelson-Morley experiment, ether	Lecture	Quiz
3.	3	Relativity	Einstein's hypotheses, Lorentz transformations and their reciprocals, relativistic length contraction	Lecture	Quiz
4.	3	Relativity	Einstein's hypotheses, Lorentz transformations and their reciprocals, relativistic length contraction	Lecture	Quiz
5.	3	Relativity	Relative time deceleration(dilation), the sum of relative speeds, relative mass, energy and momentum	Lecture	Quiz
6.	3	Electromagnetic radiation and matter	Theory of photons, black body radiation, electro-optical phenomena	Lecture	Quiz
7.	3	Electromagnetic radiation and matter	Compton effect, pair production and annihilation	Lecture	Quiz
8.	3	Electromagnetic radiation and matter	Photon absorption, de Broglie waves, electron diffraction experiments	Lecture	Quiz
9.	3	Electromagnetic radiation and matter	Phase velocity and group velocity, Heisenberg's uncertainty principle.	Lecture	Quiz
10.	3	The hydrogen atom and its like	Bohr atom, spectrum of hydrogen atom,	Lecture	Quiz

			Bohr's theory of hydrogen atom,		
11.	3	The hydrogen atom and its like	Spectral series of the hydrogen atom, nuclear motion, radiation emission according to Bohr's theory, energy levels	Lecture	Quiz
12.	3	The hydrogen atom and its like	Solution of the Schrodinger equation for the hydrogen atom, hydrogen-like atoms, the Bohr-Sommerfeld model, the overall model.	Lecture	Quiz
13.	3	Electron motion	Orbital angular momentum classically, magnetic dipole moment classically, Zeeman experiment, quantization of the value of orbital angular momentum	Lecture	Quiz
14.	3	Electron motion	Interpretation of the Zeeman effect, Stern and Kerlach experiment, electron spin, spin-orbit coupling	Lecture	Quiz
15.	3	Electron motion	Atomic structure of hydrogen, total angular momentum, quantum theory of the hydrogen atom	Lecture	Quiz
16.	3	Multi-electron atoms	Quantum mechanical systems with more than one electron, Pauli exclusion principle, spectroscopic	Lecture	Quiz

			symbols for the formation of electrons in atoms, the periodic table and the shell model, spectroscopic symbols for the states of the atom		
17.	3	Multi-electron atoms	Atomic excitations, L.S. coupling, amazing Zeeman effect, lambda factor.	Lecture	Quiz
18.	3	X ray	Discovery of X-rays, production of primingshtirling , quantum and classical characteristic X-ray spectra	Lecture	Quiz
19.	3	X ray	Moseley's relationship, clarifying it and solving applied questions on Moseley's law	Lecture	Quiz
20.	3	X ray	X-ray absorption edges	Lecture	Quiz
21.	3	X ray	The Euger effect and clarification of the mechanism of radiative and radiative transfer	Lecture	Quiz
22.	3	X ray	Solve questions on non-radiative transmission of fluorescent X-rays.	Lecture	Quiz
23.	3	Molecular physics	The molecule, types of bonds, dissociation energy of the molecule, solving	Lecture	Quiz

			questions on the dissociation energy		
24.	3	Molecular physics	hydrogen molecule, hydrogen molecule ion, molecular spectrum,	Lecture	Quiz
25.	3	Molecular physics	Rotational energy levels, solved questions and examples of rotational energy levels	Lecture	Quiz
26.	3	Molecular physics	Rotational spectrum with questions solution and examples	Lecture	Quiz
27.	3	Molecular physics	Vibrational energy levels with solving examples	Lecture	Quiz
28.	3	Molecular physics	Vibration spectra and solving questions on rotational and vibrational energy levels	Lecture	Quiz
29.	3	Molecular physics	Electronic spectra, total energy of the molecule, energy of rotational levels	Lecture	Quiz
30.	3		Electronic spectra, total energy of the molecule, energy of vibrational	Lecture	Quiz

			levels, energy of electronic levels, chapter questions		
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1. Course Evaluation

Distribution of the grade out of 80, with practical out of 20, according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, and reports.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	atomic molecular physics
Main references (sources)	Concepts of Modern Phys Arthur Beiser Sixth Edition
Recommended books and references (scientific journals, reports...)	Introduction to modern physics volume I second edition by R.B. Singh

Course Description Form

1. Course Name: Atomic laboratory					
Atomic laboratory (Practical)					
2. Course Code: EDPH22F301					
Atomic laboratory (Practical)					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours/1 units					
7. Course administrator's name (mention all, if more than one name)					
Name: lubna haqi ismael lubna.haqi_ismael178@uomosul.edu.iq Name: Aya Azad Rasheed Email: aya.azad@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> ● The student learns about the basics of the atomic laboratory process ● The student is able to collect basic concepts and theoretical calculations and compare them practical calculations related to atomicity ● Know the graph and extracting the values of physical parameters from the graph ● Developing the student's knowledge about the subject by adding some recent experiences 			
9. Teaching and Learning Strategies					
Strategy		Practical lecture, dialogue, discussions, making weekly reports, and tests			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Use to devices in the atomic laboratory	Learn about the devices used in atomic	Practical	

			experiments		
2.	3	Determine the absorption coefficient of glass	The interaction of light with matter	Practical	Report week
3.	3		Test in the Experiment	Practical	Quiz
4.	3	Determine the glass absorption coefficient for different wavelengths	The interaction of light with matter	Practical	Report week
5.	3		Test in the Experiment	Practical	Quiz
6.	3	Fulfillment of the inverse square law	Inverse square law	Practical	Report week
7.	3		Test in the Experiment	Practical	Quiz
8.	3	Determine the specific charge of the electron to the mass using the Schuster method using a graduated mirror	The specific charge of the electron to the mass (e/m) according to the Schuster method using a graduated mirror	Practical	Report week
9.	3		Test in the Experiment	Practical	Quiz
10.	3	Determine the specific charge of the electron to the mass using the Schuster method using fluorescent rods	The specific charge of the electron to the mass (e/m) by the Schuster method using fluorescent rods	Practical	Report week
11.	3		Test in the Experiment	Practical	Quiz
12.	3		Review of experiments for the first course	Practical	
13.	3		Experimental exam for the first course	Practical	Test
14.	3	Find Reddberg's constant	Rydberg constant	Practical	Report week
15.	3		Test in the experiments	Practical	Quiz
16.	3	Find the x-ray spectrum	X-ray	Practical	Report week
17.	3		Test in the experiments	Practical	Quiz
18.	3	Studying the wave character of the electrons and then determining the separation distance between the atoms of the graphite crystal	Electron diffraction	Practical	Report week

19.	3		Test in the experiment	Practical	Quiz
20.	3	Find the work function	Ionic emission	Practical	Report week
21.	3		Test in the experiment	Practical	Quiz
22.	3	Find the characteristic curve of the discharge tube	Electrical discharge	Practical	Report week
23.	3		Test in the experiment	Practical	Quiz
24.	3	Find the Stefan Boltzmann constant	Stefan Boltzmann's experiment	Practical	Report week
25.	3		Test in the experiment	Practical	Quiz
26.	3	Find the value of Planck's constant theoretically and practically	Measurement of Planck's constant	Practical	Report week
27.	3		Test in the experiment	Practical	Quiz
28.	3		Preparing an extensive report on the completed experiments	Practical	Reports
29.	3		Review of experiments for the second course	Practical	
30.	3		Experimental exam for the second course	Practical	Test

1. Course Evaluation

Submitting reports, daily tests, and class contributions

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Experiments in modern physics Written by (Dr. Salem Hassan Al-Shamaa a Dr. Khalil Ibrahim Saeed), (1992), College Education - Department of Physics University of Mosul
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Electronics Lab.					
2. Course Code:					
EDPH22F403					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Mohammed Ibrahim Ismael Email: mohammedalsalihi@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of quantum mechanical theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Investigation of Si diode properties		Lecture	Quiz

2.	2	Investigation of Ge diode properties		Lecture	Quiz
3.	2	Investigation of GaAs light emitter diode properties		Lecture	Quiz
4.	2	Investigation of temperature effect on the Si diode using direct method		Lecture	Quiz
5.	2	Investigation of temperature effect on the Si diode using indirect method		Lecture	Quiz
6.	2	Investigation of the change in I_{sc} due to the change in temperature and E_g calculation		Lecture	Quiz
7.	2	Half wave rectifier		Lecture	Quiz
8.	2	Full wave rectifier		Lecture	Quiz
9.	2	Bridge rectifier		Lecture	Quiz
10.	2	Clipping circuits		Lecture	Quiz
11.	2	The effect of operation point, the effect of the temperature, stability factor		Lecture	Quiz
12.	2	Clamping Circuits and voltage multiplier		Lecture	Quiz
13.	2	Forward and reverse bias characteristics of Zener diode		Lecture	Quiz
14.	2	Zener as a voltage regulator		Lecture	Quiz
15.	2	Examination		Lecture	Quiz
16.	2	Input characteristics of NPN transistor		Lecture	Quiz
17.	2	Output characteristics of NPN transistor		Lecture	Quiz
18.	2	Two source CE amplifier		Lecture	Quiz
19.	2	CE amplifier biased using base resistor method		Lecture	Quiz
20.	2	CE amplifier biased using collector feedback resistor		Lecture	Quiz
21.	2	CE amplifier biased using voltage divider		Lecture	Quiz
22.	2	Transit characteristics of JFET		Lecture	Quiz
23.	2	Output characteristics of JFET		Lecture	Quiz
24.	2	JFET amplifier		Lecture	Quiz
25.	2	sinusoidal oscillators		Lecture	Quiz

26.	2	Non sinusoidal oscillators		Lecture	Quiz
27.	2	Operational Amplifiers		Lecture	Quiz
28.	2	Logic circuits		Lecture	Quiz
29.	2	Review		Lecture	Quiz
30.		Examination			

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<p><u>الكتاب المنهجي باللغة العربية</u></p> <ul style="list-style-type: none"> • فيزياء الألكترونيات للدكتور صبحي الراوي • مبادئ الألكترونيات مالفينو <p><u>الكتاب المنهجي باللغة الإنكليزية:</u> Electronic devises (Floyed, 2005)</p>
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name: Atomic laboratory					
Atomic laboratory (Practical)					
2. Course Code: EDPH22F301					
Atomic laboratory (Practical)					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours/1 units					
7. Course administrator's name (mention all, if more than one name)					
Name: lubna haqi ismael lubna.haqi_ismael178@uomosul.edu.iq Name: Aya Azad Rasheed Email: aya.azad@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> • The student learns about the basics of the atomic laboratory process • The student is able to collect basic concepts and theoretical calculations and compare them practical calculations related to atomicity • Know the graph and extracting the values of physical parameters from the graph • Developing the student's knowledge about the subject by adding some recent experiences 			
9. Teaching and Learning Strategies					
Strategy		Practical lecture, dialogue, discussions, making weekly reports, and tests			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Use to devices in the atomic laboratory	Learn about the devices used in atomic experiments	Practical	
2.	3	Determine the absorption coefficient of glass	The interaction of light with	Practical	Report week

			matter		
3.	3		Test in the Experiment	Practical	Quiz
4.	3	Determine the glass absorption coefficient for different wavelengths	The interaction of light with matter	Practical	Report week
5.	3		Test in the Experiment	Practical	Quiz
6.	3	Fulfillment of the inverse square law	Inverse square law	Practical	Report week
7.	3		Test in the Experiment	Practical	Quiz
8.	3	Determine the specific charge of the electron to the mass using the Schuster method using a graduated mirror	The specific charge of the electron to the mass (e/m) according to the Schuster method using a graduated mirror	Practical	Report week
9.	3		Test in the Experiment	Practical	Quiz
10.	3	Determine the specific charge of the electron to the mass using the Schuster method using fluorescent rods	The specific charge of the electron to the mass (e/m) by the Schuster method using fluorescent rods	Practical	Report week
11.	3		Test in the Experiment	Practical	Quiz
12.	3		Review of experiments for the first course	Practical	
13.	3		Experimental exam for the first course	Practical	Test
14.	3	Find Reddberg's constant	Rydberg constant	Practical	Report week
15.	3		Test in the experiments	Practical	Quiz
16.	3	Find the x-ray spectrum	X-ray	Practical	Report week
17.	3		Test in the experiments	Practical	Quiz
18.	3	Studying the wave character of the electrons and then determining the separation distance between the atoms of the graphite crystal	Electron diffraction	Practical	Report week
19.	3		Test in the experiment	Practical	Quiz
20.	3	Find the work function	Ionic emission	Practical	Report week
21.	3		Test in the experiment	Practical	Quiz
22.	3	Find the characteristic curve of the discharge tube	Electrical discharge	Practical	Report week

23.	3		Test in the experiment	Practical	Quiz
24.	3	Find the Stefan Boltzmann constant	Stefan Boltzmann's experiment	Practical	Report week
25.	3		Test in the experiment	Practical	Quiz
26.	3	Find the value of Planck's constant theoretically and practically	Measurement of Planck's constant	Practical	Report week
27.	3		Test in the experiment	Practical	Quiz
28.	3		Preparing an extensive report on the completed experiments	Practical	Reports
29.	3		Review of experiments for the second course	Practical	
30.	3		Experimental exam for the second course	Practical	Test

1. Course Evaluation

Submitting reports, daily tests, and class contributions

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Experiments in modern physics Written by (Dr. Salem Hassan Al-Shamaa and Dr. Khalil Ibrahim Saeed), (1992), College Education - Department of Physics University of Mosul
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Curriculum and Teaching Methods	
2. Course Code:	
EDPH22F307	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
1/9/2023	
5. Available Attendance Forms:	
Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Credit Hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Radwan Mohammed Mustafa	
Email: dr.radwanmohammed@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> • Identify the concept of traditional and modern educational curricula. • Comparison between types of curricula. • Clarifying the stages of development of the educational curriculum. • Identify the scientific basis used in writing behavioral objectives. • Classification of behavioral purposes. • Learn about the concepts of teaching methods, teaching methods and teaching strategies. • Description of types of teaching methods related to cognitive, behavioral and social theories and their characteristics. • Explaining the concept of evaluation, its importance and types • Identify the concept of planning in teaching, its importance and types • Providing students with the skills of writing annual, quarterly and daily teaching plans.
9. Teaching and Learning Strategies	
Strategy	Lecture, Discussion and Dialogue, Developed Lecture, Questioning, Cooperative Learning, Educational Games
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	- Introduction - The concept of science, and the concept of technology	Science and its components	Lecture	Oral discussion
2.	2	- The components of science - Scientific thinking skills	Components of science and scientific thinking skills	Lecture and discussion	Oral discussion
3.	2	- Characteristics of science - Philosophy of teaching science - Modern trends in teaching science	Philosophy of teaching science	Lecture and discussion	Oral discussion
4.	2	- Development of the concept of curriculum - Types of curricula and criticism directed at them	curriculum	Lecture and discussion	Class questions and oral discussions
5.	2	The meaning of the ancient and modern concept of the curriculum and a comparison between them	The ancient and modern concept of the curriculum	Lecture and discussion	Class questions and oral discussions
6.	2	- Factors that contributed to the development of the curriculum - Curriculum organizations	Curriculum organizations	Lecture and discussion	Class questions and oral discussions
7.	2	The philosophical basis in building the curriculum and its philosophical schools	Foundations of curriculum construction	Lecture and interrogation	Constructive oral discussions
8.	2	The cognitive basis in building the curriculum and its philosophical schools	Foundations of curriculum construction	Lecture and interrogation	Constructive oral discussions
9.	2	- The social basis in building the curriculum. - the relationship of society to the curriculum	Foundations of curriculum construction	Lecture and interrogation	Constructive oral discussions
10.	2	The relationship of culture to the curriculum, components of culture, generalities, specificities and alternatives, the relationship of the curriculum to social change	Foundations of curriculum construction	Lecture and interrogation	Class questions and oral discussions
11.	2	The psychological basis in building the curriculum	Foundations of curriculum construction	Lecture and interrogation	Constructive oral discussions

12.	2	Types of curriculum, their characteristics and disadvantages	Types of curriculum	Lecture and interrogation	Class questions and oral discussions
13.	2	Educational objectives, their importance, sources of derivation, and levels	Curriculum elements as a four-part system (educational objectives)	Lecture and discussion	Class questions and oral discussions
14.	2	Behavioral objectives, formulation, specifications, and classification	Curriculum elements as a four-part system (educational objectives)	Lecture and discussion	Quiz
15.	2	Content and educational experiences	Curriculum elements as a four-part system (content and educational experiences)	Lecture	Class questions
16.	2	Written exam	-	-	-
17.	2	- The concept of teaching method, teaching method and teaching strategy - Foundations of good teaching - Advantages of a good method	Curriculum elements as a four-part system (teaching methods and educational techniques)	Developed lecture and interrogation	Oral discussions And write a summary report
18.	2	- Teaching methods related to cognitive theories -Directed exploratory method	Teaching methods related to cognitive theories	Developed lecture and interrogation	Class questions and oral discussions
19.	2	- The method of the lecture, its development, methods, advantages and disadvantages - Problem-solving approach, steps, advantages, and disadvantages	Teaching methods related to cognitive theories	Developed lecture and interrogation	Class questions and oral discussions
20.	2	- Teaching methods related to behavioral theories -Programmed teaching method	Teaching methods related to behavioral theories	Lecture, discussion and interrogation	Class questions and oral discussions
21.	2	- Teaching methods related to social theories -The cooperative education method, its basic pillars, steps, advantages and disadvantages	Teaching methods related to social theories	Lecture and cooperative education	Class questions and oral discussions

22.	2	<ul style="list-style-type: none"> - The method of discussion, its steps, role, advantages and disadvantages - The project method, steps, advantages and disadvantages 	Teaching methods related to social theories	Developed lecture and discussion	Quiz
23.	2	The method of educational games, steps, disadvantages and advantages	Teaching methods related to social theories	Lecture and educational games	Constructive oral discussions
24.	2	<ul style="list-style-type: none"> - Direct presentation method, steps, areas, advantages and disadvantages - The method of interrogation, steps, advantages and disadvantages 	Teaching methods related to social theories	Developed lecture and interrogation	Class questions
25.	2	<ul style="list-style-type: none"> - Method of field visits, its steps, advantages and disadvantages -Method of preparing reports, areas of use and means 	Teaching methods related to social theories	Lecture and discussion	Class questions
26.	2	Philosophy of laboratory teaching, ancient philosophy and modern philosophy, the importance of the laboratory in teaching science, occupational safety in laboratories	Laboratory in science teaching	Lecture and discussion	Write a summary report
27.	2	<ul style="list-style-type: none"> - The concept of educational technologies and their types - The concept of educational evaluation, characteristics, types, and curriculum evaluation 	Curriculum elements as a four-part system (educational evaluation)	Lecture and discussion	Class questions and oral discussions
28.	2	<p>The concept of the school textbook, its importance, function, and the foundations of its preparation:</p> <ul style="list-style-type: none"> - Social and cultural foundations - Educational and philosophical foundations - Psychological foundations <p>Characteristics of a good book</p>	School Textbook	Lecture, discussion and interrogation	Class questions and oral discussions

29.	2	The concept of planning, the concept of teaching planning, the importance of planning, the annual plan, the quarterly plan, the daily plan	Planning in teaching	Developed lecture and discussion	Prepare a simple daily plan
30.	2	Written exam	-	-	-

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Curriculum and teaching methods: Written by (Dr. Abdul Razzaq Yassin Abdullah, Enas Younis Mustafa, Ma'rib Younis Al Mawla)
Main references (sources)	- General teaching methods: Written by (Tawfiq Ahmed Marei, Muhammad Mahmoud Al-Haila) - Methods of teaching science, concepts and practical applications: written by (Abdullah bin Khamis Ambu Saeedi, Suleiman bin Muhammad Al Balushi)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Directing students to websites related to subject topics

Course Description Form

1. Course Name:					
Analytical Mechanic					
2. Course Code:					
EDPH24F302					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours+ 1 hour tutorial					
7. Course administrator's name (mention all, if more than one name)					
Name: Ali Abbas Mohammed Salih Email: dr.ali1969@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of analytical mechanical theory. • The student is able to solve all the various problems related to the subject. • Developing the student's knowledge about the subject by adding some modern topics. • Developing the students skills in mathematics and physics. 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Basic principle of vectors	Defined vectors and representation	Lecture	Quiz
2.	2	Basic principle of vectors	Dot and cross product And solve problems	Lecture	Quiz
3.	2	Basic principle of vectors	Triple product and solve problems	Lecture	Quiz
4.	2	Change of Coordinate System	The Transformation Matrix	Lecture	Quiz

5.	2	Derivative and integral of vectors	Derivative and integral of vectors with solve problems and Gradient, Divergence and Curl.	Lecture	Quiz
6.	2	Newtonian Mechanics: the rectilinear motion	Position , velocity and acceleration	Lecture	Quiz
7.	2	Coordinate systems	Velocity and Acceleration in Plane Polar Coordinates	Lecture	Quiz
8.	2	Coordinate systems	Velocity and Acceleration in Cylindrical and Spherical Coordinates	Lecture	Quiz
9.	2	Rectilinear Motion of a Particle	Uniform Acceleration Under a Constant Force	Lecture	Quiz
10	2	Rectilinear Motion of a Particle in one dimension	Forces that Depend on Position: The Concepts of Kinetic and Potential Energy Velocity-Dependent Forces: Fluid Resistance	Lecture	Quiz
11	2	Vertical Fall Through a Fluid	No air resistance and with air resistance	Lecture	Quiz
12	2	Linear Restoring Force	Harmonic Motion and Energy Considerations in Harmonic Motion	Lecture	Quiz
13	2	Damped Harmonic Motion	Explain Damped Harmonic Motion with solve problems	Lecture	Quiz
14	2	General Motion of a Particle in Three Dimensions	The Potential Energy Function in 3D Motion: The Del Operator	Lecture	Quiz
15	2	Forces of the Separable Type	Projectile Motion	Lecture	Quiz
16	2	General Motion of a Particle in 3D	Constrained Motion of a Particle	Lecture	Quiz
17	2	General Motion of a Particle in 3D	Moving Reference coordinate systems	Lecture	Quiz
18	2	Gravitation and central Forces	Kepler's Laws of Planetary Motion	Lecture	Quiz
19	2	Gravitation and central Forces	Potential Energy in a Gravitational Field: Gravitational Potential	Lecture	Quiz
20	2	Dynamics of Systems of Particles	Center of Mass and Linear Momentum of a System	Lecture	Quiz
21	2	Dynamics of Systems of Particles	Dynamics of a Particle in a Rotating Coordinate System	Lecture	Quiz
22	2	Dynamics of Systems of Particles	Motion of Two Interacting Bodies: The Reduced Mass	Lecture	Quiz
23	2	Mechanics of Rigid Bodies	Center of Mass and Rotation of a Rigid Body about a Fixed Axis	Lecture	Quiz
24	2	Mechanics of Rigid Bodies	Calculation of the Moment of Inertia and Solving Problems	Lecture	Quiz
25	2	Introduction to Lagrangian mechanics	Lagrangian Mechanics	Lecture	Quiz
26	2	Lagrangian Mechanics	Generalized Coordinates	Lecture	Quiz
27	2	Lagrangian Mechanics	Generalized forces for conservative systems	Lecture	Quiz
28	2	Lagrangian Mechanics	Solve problems	Lecture	Quiz

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Analytical Mechanics
Main references (sources)	Basic Analytical Mechanics
Recommended books and references (scientific journals, reports...)	Analytical Mechanics 7 th edition by Fowles and Cassiday. AN INTRODUCTION TO MECHANICS, by Daniel Kleppner and Robert Kolenkow, 2014 * الميكانيك التحليلي ترجمة الدكتور طالب ناهي الخفاجي * سلسلة ملخصات شوم * متابعة الدروس النظرية عبر قناة خاصة باليوتيوب والتي يتم من خلالها شرح تفصيلي للمقرر
Electronic References, Websites	https://nicadd.niu.edu/~jahreda/phys300/phys300%20Chapter%201%20and%20intro.pdf https://www.youtube.com/channel/UCxieMwKNtR8XL-waDHVLbGg

Course Description Form

1. Course Name:					
Optics					
2. Course Code:					
EDPH22F202					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Ivan Bahnam Karomi Email: ivanbahnam@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of geometric and wave optics • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Concept of a ray of light, laws of reflection and	Light rays	Lecture	Quiz

		refraction, graphical construction for reflection, principle of Reversibilit			
2.	3	Fermat's principle, problems.	Light rays	Lecture	Quiz
3.	3	Wave front and ray, Huygen's principle, Index of refraction, the electromagnetic spectrum, problems.	Propagation of light	Lecture	Quiz
4.	2	Focal points and Focal lengths, Image formation, virtual Images, conjugate points and planes, signs convention	Spherical surfaces	Lecture	Quiz
5.	2	The parallel-ray method, oblique-ray method, Magnification Reduced vergence, Gaussian Formula. Problems.	Spherical surfaces	Lecture	Quiz
6.	3	Focal points and lengths, Formation of the Image, Conjugate points and planes	Thin lenses	Lecture	Quiz
7.	3	The parallel- ray and oblique-ray methods, lens Formula, Lateral Magnification, Virtual Image.	Thin lenses	Lecture	Quiz
8.	3	Lens Maker's equation The power of a thin lens, Derivation of the lens Maker's formula.	Thin lenses	Lecture	Quiz
9.	3	Two Spherical Surfaces, Focal points and principal points	Thick lenses	Lecture	Quiz
10	3	General Thick-lens Formulas, problem.	Thick lenses	Lecture	Quiz
11	3	Focal point and length, Graphical constructions, Mirror formulas, power of Mirrors	Spherical mirrors	Lecture	Quiz
12	3	Thick mirrors, Thick mirrors Formulas, other Thick mirrors, problems.	Spherical mirrors	Lecture	Quiz
13	3	Spherical aberration of a lens	Aberration	Lecture	Quiz
14	3	spherical aberration of mirrors.	Aberration	Lecture	Quiz
15	3	Coma, Astigmatism, curvature of Field, Kind of aberration	Aberration	Lecture	Quiz
16	3	The eye, Defect of vision, spectacle, The simple microscope	Optical instruments	Lecture	Quiz
17	3	magnifier, Refracting telescope, Normal magnification	Optical instruments	Lecture	Quiz

18	3	The reflecting telescope, camera, problems.	Optical instruments	Lecture	Quiz
19	3	Young's EXP. Interference Fringes from double source, Intensity distribution,	Interference	Lecture	Quiz
20	3	Fresnel's Biprism, Division of Amplitude, Michelson's Interferometer	Interference	Lecture	Quiz
21	3	circular Fringes, visibility of Fringes, Twyman and Green Interferometer	Interference	Lecture	Quiz
22	3	Fringes of equal Inclination, Newton's Rings, Problem.	Interference	Lecture	Quiz
23	2	Fresnel and Fraunhofer diffraction, Diffraction by a single slit, Rectangular aperture,	Diffraction	Lecture	Quiz
24	3	chromatic Resolving power of a Telescope, Resolving power of Microscope	Diffraction	Lecture	Quiz
25	3	The double slit, Equation Intensity, comparison of single-slit and double-slit patterns	Diffraction	Lecture	Quiz
26	3	Distinction between Interference and Diffraction, problems.	Diffraction	Lecture	Quiz
27	2	Polarization by Reflection, Polarization angle and Brewsters law	Polarization	Lecture	Quiz
28	3	polarization by a pile of plates, Malus law, polarization by Dichroic crystals	Polarization	Lecture	Quiz
29	3	polarization by double refraction, polarization by scattering.	Polarization	Lecture	Quiz
30	2		Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Geometrical Optics: Lectures in Optics, Volume 2 By: George Asimellis
Main references (sources)	Modern Geometrical Optics By: Richard Dittion / Module lectures
Recommended books and references (scientific journals, reports...)	Optics express, Applied optics.
Electronic References, Websites	https://ocw.mit.edu/courses/2-71-optics-spring-2009/resources/lecture-1-course-organization-introduction-to-optics/

Course Description Form

1. Course Name: Advanced computer science	
2. Course Code: EDMA23F205	
3. Semester / Year: 2023–2024	
4. Description Preparation Date: 1/9/2023	
5. Available Attendance Forms: In–person , E–Classroom	
6. Number of Credit Hours (Total) / Number of Units (Total): 2–2	
7. Course administrator's name (mention all, if more than one name)	
Name: Omar Alniemi	
Email: omaralniemi@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none">• The student gets to know the Matlab environment• The student gets to know the basic principles of programming in Matlab• Enable the student to read and write code in Matlab• Giving the student the skill of performing operations programmatically on vectors and matrices• Enable the student to build recursive loops and conditional statements• The student gets to know drawing tools in Matlab• Providing the student with the skill of drawing in Matlab
9. Teaching and Learning Strategies	
Strategy	Practical and theoretical lecture , talk and discussions, problem solving , reports and homework

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
first	2	Matlab environment	<ul style="list-style-type: none"> -Matlab environment and windows -Variables -Constants -Operators -Functions -mathematical and logical operations 	Lecture and laboratory	Experimental activities
Second	2	Matlab environment	<ul style="list-style-type: none"> -mathematical and logical operations - M-File 	Lecture and laboratory	Quiz,activities and assignment
Third	2	vectors	<ul style="list-style-type: none"> -Types of vectors -Create vectors 	Lecture and laboratory	Experimental activities
Fourth	2	vectors	<ul style="list-style-type: none"> -Element adding -Element deleting -Element replacin -maximum and minimum -vector length 	Lecture and laboratory	Experimental activities
Fifth	2	vectors	<ul style="list-style-type: none"> -Call one element -Calling sequential elements -Calling non-sequential elements -Adding sequential elements -Adding non-sequential elements -Delete sequential elements - Delete non-sequential elements - Replace sequential elements -Replace non-sequential elements 	Lecture and laboratory	Experimental activities
Sixth	2	vectors	<ul style="list-style-type: none"> - Mathematical 	Lecture and	Quiz,activities

			operations and vectors	laboratory	and assignment
Seventh	2	Matrices	Matrices –Special Matrices	Lecture and laboratory	Experimental activities
Eighth	2	Matrices	–Transpose – Symmetric –Skew symmetric –Determinant –Trace –Adjoint –Inverse	Lecture and laboratory	Experimental activities
Nineth	2	Matrices	–diag –sum –triu –tril	Lecture and laboratory	Experimental activities
Tenth	2	Matrices	–fliplr –flipud – Select a row or column –max & min	Lecture and laboratory	Experimental activities
Eleventh	2	Matrices	– Addition and subtraction – multiplication – ^	Lecture and laboratory	Experimental activities
Twelfth	2	Matrices	– Multidimensional Arrays	Lecture and laboratory	Quiz,activities and assignment
Thirteen	2	Input and output	–Input –disp – num2str	Lecture and laboratory	Quiz,activities and assignment
Fourteenth	2	loops	For Loop	Lecture and laboratory	Experimental activities
Fifteenth	2	loops	For Loop	Lecture and laboratory	Experimental activities
Sixteenth	2	loops	For Loop	Lecture and laboratory	Quiz,activities and assignment
Seventeenth	2	loops	While Loop	Lecture and laboratory	Experimental activities
Eighteenth	2	loops	While Loop	Lecture and laboratory	Experimental activities

Nineteenth	2	loops	While Loop	Lecture and laboratory	Quiz,activities and assignment
Twentieth	2	Conditional Statements	If Conditional	Lecture and laboratory	Experimental activities
Twenty first	2	Conditional Statements	If Conditional	Lecture and laboratory	Experimental activities
Twenty second	2	Interruptive Statements	Continue and Break Statements	Lecture and laboratory	Quiz,activities and assignment
Twenty third	2	plot	-Figure window -plot	Lecture and laboratory	Experimental activities
Twenty fourth	2	plot	-color, symbols and line types -linspace -fplot	Lecture and laboratory	Experimental activities
Twenty fifth	2	plot	-hold on -hold off -subplot	Lecture and laboratory	Experimental activities
Twenty sixth	2	plot	-stem -stairs -bar	Lecture and laboratory	Experimental activities
Twenty seventh	2	plot	-grid -xlabel -ylabel -title -legend -text -axis	Lecture and laboratory	Quiz,activities and assignment
Twenty eighth	2	plot	-plot3 -meshgrid	Lecture and laboratory	Experimental activities
Twenty ninth	2	plot	-pie3 -surf -ezplot	Lecture and laboratory	Experimental activities
Thirtieth	2	plot	-polar -contour	Lecture and laboratory	Quiz,activities and assignment

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Matlab help
Recommended books and references (scientific journals, reports...)	Matlab for beginners: a gentle approach
Electronic References, Websites	mathworks.com

Course Description Form

1. Course Name:					
Advanced mathematics					
2. Course Code:					
EDPH24F205					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
2024/3/21					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Mohamed Ali Mohamed Alwazan Email: mohamed.alwazan@uomosul.edu.iq					
8. Course Objectives					
Course Objectives	<ul style="list-style-type: none"> • The student learns the basics of sequences, limits, and differential equations • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 				
9. Teaching and Learning Strategies					
Strategy	Theoretical lecture, dialogue and discussions, daily assignments, quiz				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	The Sequences	Definition of sequence	Lecture	Quiz
2.	2	The Sequences	Examples of sequence	Lecture	Quiz
3.	2	The Sequences	Recursive sequence examples and solutions	Lecture	Quiz
4.	2	The Sequences	Type of sequence	Lecture	Quiz

5.	2	The Sequences	Arithmetic sequences examples and solutions	Lecture	Quiz
6.	2	The Sequences	Geometric sequences (explicit and recursive) examples and solutions	Lecture	Quiz
7.	2	The Sequences	Fibonacci sequence examples and solutions	Lecture	Quiz
8.	2	The series	Type of series	Lecture	Quiz
9.	2	The series	Arithmetic series examples and solutions	Lecture	Quiz
10.	2	The series	Geometric series examples and solutions	Lecture	Quiz
11.	2	The limit	Type of the limit	Lecture	Quiz
12.	2	The limit	Comparing the degree of the numerator with the denominator to find the objective (examples and solutions)	Lecture	Quiz
13.	2	The limit	L'Hôpital's rule (examples and solutions)	Lecture	Quiz
14.	2	Convergence and divergence of series	Convergence and divergence of arithmetic series	Lecture	Quiz
15.	2	Convergence and divergence of series	Convergence and divergence of geometric series	Lecture	Quiz
16.	2	Convergence and divergence of series	Convergence and divergence of p-series	Lecture	Quiz
17.	2	Convergence and divergence of series	Comparison test for divergence and convergence of series	Lecture	Quiz
18.	2	Convergence and divergence of series	Limit test for convergence and divergence of series	Lecture	Quiz
19.	2	Convergence and divergence of series	Ratio test and root test for convergence and divergence of series	Lecture	Quiz
20.	2	p-series	Finding the radius and interval of	Lecture	Quiz

			convergent power series		
21.	2	p-series	Examples and solutions	Lecture	Quiz
22.	2	Taylor series	Examples and solutions	Lecture	Quiz
23.	2	Partial differential equation	First order partial differential equation	Lecture	Quiz
24.	2	Partial differential equation	Second order partial differential equation	Lecture	Quiz
25.	2	Chain rule	One-variable and two-variable chain rule (examples and solutions)	Lecture	Quiz
26.	2	First order differential equation	Types of first order differential equation	Lecture	Quiz
27.	2	First order differential equation	Example of first order differential equation	Lecture	Quiz
28.	2	Second order differential equation	Types of second order differential equation	Lecture	Quiz
29.	2	Second order differential equation	Examples of second order differential equation	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Quantum Mechanics
Main references (sources)	Basic Quantum Mechanics
Recommended books and references (scientific journals, reports...)	Quantum mechanics and spectroscopy: another workbook: M. Kuno
Electronic References, Websites	https://www.google.com/search?q=quantum+mechanics+pdf+notes&oq=Quantum+mechanics+pdf&a

qs=chrome.2.69i57j0i13i512l9.54
99j0j15&sourceid=chrome&ie=UT
F-8

Course Description Form

1. Course Name:					
Advanced mathematics					
2. Course Code:					
EDPH24F205					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
2024/3/21					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Mohamed Ali Mohamed Alwazan Email: mohamed.alwazan@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> • The student learns the basics of sequences, limits, and differential equations • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 			
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	The Sequences	Definition of sequence	Lecture	Quiz
2.	2	The Sequences	Examples of sequence	Lecture	Quiz
3.	2	The Sequences	Recursive sequence examples and solutions	Lecture	Quiz
4.	2	The Sequences	Type of sequence	Lecture	Quiz

5.	2	The Sequences	Arithmetic sequences examples and solutions	Lecture	Quiz
6.	2	The Sequences	Geometric sequences (explicit and recursive) examples and solutions	Lecture	Quiz
7.	2	The Sequences	Fibonacci sequence examples and solutions	Lecture	Quiz
8.	2	The series	Type of series	Lecture	Quiz
9.	2	The series	Arithmetic series examples and solutions	Lecture	Quiz
10.	2	The series	Geometric series examples and solutions	Lecture	Quiz
11.	2	The limit	Type of the limit	Lecture	Quiz
12.	2	The limit	Comparing the degree of the numerator with the denominator to find the objective (examples and solutions)	Lecture	Quiz
13.	2	The limit	L'Hôpital's rule (examples and solutions)	Lecture	Quiz
14.	2	Convergence and divergence of series	Convergence and divergence of arithmetic series	Lecture	Quiz
15.	2	Convergence and divergence of series	Convergence and divergence of geometric series	Lecture	Quiz
16.	2	Convergence and divergence of series	Convergence and divergence of p-series	Lecture	Quiz
17.	2	Convergence and divergence of series	Comparison test for divergence and convergence of series	Lecture	Quiz
18.	2	Convergence and divergence of series	Limit test for convergence and divergence of series	Lecture	Quiz
19.	2	Convergence and divergence of series	Ratio test and root test for convergence and divergence of series	Lecture	Quiz
20.	2	p-series	Finding the radius and interval of	Lecture	Quiz

			convergent power series		
21.	2	p-series	Examples and solutions	Lecture	Quiz
22.	2	Taylor series	Examples and solutions	Lecture	Quiz
23.	2	Partial differential equation	First order partial differential equation	Lecture	Quiz
24.	2	Partial differential equation	Second order partial differential equation	Lecture	Quiz
25.	2	Chain rule	One-variable and two-variable chain rule (examples and solutions)	Lecture	Quiz
26.	2	First order differential equation	Types of first order differential equation	Lecture	Quiz
27.	2	First order differential equation	Example of first order differential equation	Lecture	Quiz
28.	2	Second order differential equation	Types of second order differential equation	Lecture	Quiz
29.	2	Second order differential equation	Examples of second order differential equation	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Quantum Mechanics
Main references (sources)	Basic Quantum Mechanics
Recommended books and references (scientific journals, reports...)	Quantum mechanics and spectroscopy: another workbook: M. Kuno
Electronic References, Websites	https://www.google.com/search?q=quantum+mechanics+pdf+notes&oq=Quantum+mechanics+pdf&a

qs=chrome.2.69i57j0i13i512l9.54
99j0j15&sourceid=chrome&ie=UT
F-8

Course Description Form

1. Course Name:					
Physics of sound and wave motion					
2. Course Code:					
EDPH22F203					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: dr. Muhsin Waleed Mohammed Email: physicsmuhsin8@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of quantum mechanical theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, tests, Recorded video lectures, dialogue, asking questions, and solving examples and exercises.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Acquire related to knowledge of the basics of wave motion	Basic concepts in wave motion ,Means of energy transfer, what is wave	Lecture	Quiz

			motion, types of wave motion		
2.	2	Acquire related knowledge: The properties of wave motion and its models	Basic properties of mechanical wave transmission, models of mechanical wave motion	Lecture	Quiz
3.	2	Acquire related knowledge : the nature of sound And the conditions for its occurrence and transmission	Sound waves, types of mechanical wave motion, features of mechanical wave motion, wave speed and particle speed	Lecture	Quiz
4.	2	Acquire related knowledge to: Representing waves with mathematical equations.	Mathematical representation of wave motion, general equation of wave motion.	Lecture	Quiz
5.	2	Acquire related knowledge with free vibration	Free vibration theory	Lecture	Quiz
6.	2	Acquire related knowledge : simple harmonic motion.	Simple harmonic motion	Lecture	Quiz
7.	2	Acquire related knowledge Applications of simple harmonic motion.	Applications to simple harmonic motion Pendulum - pulsation - movement of fluid in a tube	Lecture	Quiz
8.	2	Acquire related knowledge Applications of simple harmonic motion.	Applications to simple harmonic motion Floating body - torsion pendulum - physical pendulum	Lecture	Quiz
9.	2	composition of two simple harmonic motions	Composition of simple harmonic motions (composition rule, composition of two simple harmonic motions in the same direction)	Lecture	Quiz
10.	2	Lissajous figures	Lissajous shapes, the composition of two simple harmonic movements in two perpendicular directions with the same frequency	Lecture	Quiz
11.	2	Method of graphical representation of orthogonal harmonic motions.	Graphically composing two simple perpendicular harmonic motions with the same frequency.	Lecture	Quiz
12.	2	How to represent harmonic motions with a rotating vector	Representing the harmonic motion with the rotating vector, composing two simple perpendicular harmonic motions whose	Lecture	Quiz

			frequency ratio is 2 to 1 - the phenomenon of strikes		
13.	2	Damping vibration	The force that causes vibrations to decay	Lecture	Quiz
14.	2	Decaying harmonic motion	The equation of decaying harmonic motion, solving the equation of decaying harmonic motion	Lecture	Quiz
15.	2	Cases of decaying harmonic motion	state of motion without decay, The state of incomplete motion decay.	Lecture	Quiz
16.	2	Cases of decaying harmonic motion	Critical state of motion. The state of decaying harmonic motion, practical examples of states of decaying harmonic motion, the decay scale.	Lecture	Quiz
17.	2	Acquire related knowledge : Forced vibration and the resonance	Forced vibration Forced oscillations	Lecture	Quiz
18.	2	Acquire related knowledge : Forced motion equation	Study the equation of motion for a decaying vibrator under the influence of a periodic external force	Lecture	Quiz
19.	2	Acquire related knowledge : Forced motion equation	Solve the equation of forced motion.	Lecture	Quiz
20.	2	Acquire related knowledge : The phenomenon of resonance And ringing applications	Resonance, the amplitude of vibration at resonance, the relationship between the resonant frequency and the natural frequencies of the vibrator, practical examples of resonance.	Lecture	Quiz
21.	2	Acquire related knowledge : Transverse waves	Transverse waves Properties of transverse wave motion, speed of the transverse wave in a stretched string	Lecture	Quiz
22.	2	Acquire related knowledge : Mathematical representation of wave, phase and phase difference	Mathematical representation of the wave, its phase and phase difference, the differential equation of the simple harmonic wave, standing waves, the theory of vibration of a stretched string of finite length.	Lecture	Quiz

23.	2	Acquire related knowledge : sound waves	Longitudinal waves (sound waves) The longitudinal wave in a metal rod, the longitudinal wave in a column of fluid.	Lecture	Quiz
24.	2	Acquire related knowledge : Effects on the speed of transmission of sound waves	Longitudinal wave speed in a gas, Laplace correction, effect of temperature on the speed of sound	Lecture	Quiz
25.	2	Acquire related knowledge : Effects on the speed of transmission of sound waves.	The effect of humidity on the speed of sound, pressure changes in the sound wave.	Lecture	Quiz
26.	2	Acquire related knowledge : Longitudinal standing waves in resonance tubes.	The energy density of the sound wave, the standing waves in the resonance tubes, are closed at both ends, open at both ends, open at one end and closed at the other end.	Lecture	Quiz
	2	Acquire related knowledge : Some phenomena related to the propagation of sound.	Doppler phenomenon, sound reflection phenomenon, sound diffraction phenomenon, medical applications.	Lecture	Quiz
	2	Ultrasound waves	Ultrasound , The mechanism of the generation of ultrasound waves, the components of the ultrasound device, the effect of ultrasound waves on living cells, the behavior of ultrasound waves in the human body.	Lecture	Quiz
	2	Ultrasound applications	Some applications of ultrasound.	Lecture	Quiz
			Final Exam		

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Learning and Teaching Resources

Required textbooks (curricular books, if any)

Physics of Sound and Wave Motion, Amjad Abdel Razzaq Karjiya, University of Mosul, second edition, 2000.

Main references (sources)	THE PHYSICS OF VIBRATIONS AND WAVES, H. J. Pan, Sixth Edition, John Wiley & Sons, 2005.
Recommended books and references (scientific journals, reports...)	Acoustics, Heinrich Kuttruff, Taylor & Francis, 2007. Vibrations and Waves, George C. King, WILEY, 2009.
Electronic References, Websites	https://ocw.mit.edu/courses/8-03sc-physics-iii-vibrations-and-waves-fall-2016/

Course Description Form

1. Course Name:					
Advance Electricity and Magnetism					
2. Course Code:					
EDPH22F201					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Dr. Yasir H M yasir.h.m@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of electricity and Magnetism. • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Magnetic Fields	Magnetic Fields	Lecture	Quiz
2.	3	Magnetic Flux	Magnetic Flux	Lecture	Quiz

3.	3	Motion of Charged Particle in Magnetic Field	Motion of Charged Particle in Magnetic Field	Lecture	Quiz
4.	3	The Biot-Savart Law	The Biot-Savart Law	Lecture	Quiz
5.	3	Exam	Exam	Lecture	Quiz
6.	3	Magnetic Force Between Two Parallel Conductors	Magnetic Force Between Two Parallel Conductors	Lecture	Quiz
7.	3	Amperes Law	Amperes Law	Lecture	Quiz
8.	3	Magnetic Field of a Solenoid	Magnetic Field of a Solenoid	Lecture	Quiz
9.	3	The Hall Effect	The Hall Effect	Lecture	Quiz
10.	3	Exam	Exam	Lecture	Quiz
11.	3	Torque On A Current Loop	Torque On A Current Loop	Lecture	Quiz
12.	3	Electric Motors	Electric Motors	Lecture	Quiz
13.	2	Electrical Instruments	Electrical Instruments	Lecture	Quiz
14.	3	Induced Electromotive Force	Induced Electromotive Force	Lecture	Quiz
15.	3	Exam	Exam	Lecture	Quiz
16.	3	Faraday's Law of Induction	Faraday's Law of Induction	Lecture	Quiz
17.	3	Motional Electromotive Force	Motional Electromotive Force	Lecture	Quiz
18.	3			Lecture	Quiz
19.	3			Lecture	Quiz
20.	3			Lecture	Quiz
21.	3			Lecture	Quiz
22.	3			Lecture	Quiz
23.	3			Lecture	Quiz
24.	3			Lecture	Quiz
25.	3			Lecture	Quiz
26.	3			Lecture	Quiz
27.	3			Lecture	Quiz
28.	3			Lecture	Quiz

29.	3			Lecture	Quiz
30.	3		Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	College Physics
Main references (sources)	<ul style="list-style-type: none"> • Serway, R. A., Faughn, J. S., and Vuille, C. (2006). College Physics Thomson-Brooks/Cole.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	1) MultiSim 11. 2) https://www.electronicstutorials.ws/

Course Description Form

1. Course Name:					
English Language					
2. Course Code:					
EDPH22F210					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
1 Credit Hour					
7. Course administrator's name (mention all, if more than one name)					
Name: Abdulazeez Taha Ahmed Al-Sheikh Ahmed Email: abdulazeez.ahmed@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of the English Language. • The student is able to solve all the various problems related to the subject. • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	1	Present simple of "be"	Affirmative and Negative forms	Lecture	Quiz

2.	1	Present simple of “be”	Questions and Short answers	Lecture	Quiz
3.	1	Definite and Indefinite Articles	a/an and the	Lecture	Quiz
4.	1	Subject Pronouns	Subjects and their pronouns	Lecture	Quiz
5.	1	Part of Speech	Adjectives	Lecture	Quiz
6.	1	Position of Adjectives: nationality, and color Adjectives	Two positions of Adjectives	Lecture	Quiz
7.	1	Part of Speech	Noun	Lecture	Quiz
8.	1	Plural of Nouns	Adding (s) and (es) to pluralize nouns.	Lecture	Quiz
9.	1	Comprehension	Reading Passage	Lecture	Quiz
10.	1	Comprehension	Reading Passage	Lecture	Quiz
11.	1	Wh-questions	What, who, why, when, where.	Lecture	Quiz
12.	1	Prepositions of Time	In – On – At.	Lecture	Quiz
13.	1	Imperatives	Affirmative and Negative	Lecture	Quiz
14.	1	Go + ing	Talking about Sports and free time activities	Lecture	Quiz
15.	1	There is/ there are.	Affirmative and negative	Lecture	Quiz
16.	1	There is/ there are.	Questions and short answers	Lecture	Quiz
17.	1	Preposition of Place	In, On, Next to, Between,	Lecture	Quiz
18.	1	Preposition of Place	Behind, Under, In from of,	Lecture	Quiz
19.	1	Can for Ability	Affirmative and Negative	Lecture	Quiz
20.	1	Use of (Let us/ Let’s)	Let’s learn English	Lecture	Quiz
21.	1	Present continuous (ing)	Affirmative and Negative	Lecture	Quiz
22.	1	Present continuous (ing)	Questions and answers	Lecture	Quiz
23.	1	Object pronouns	Me, you, him, her, it, us, them.	Lecture	Quiz
24.	1	Like, Love, Hate + ing form	I like reading	Lecture	Quiz
25.	1	Use one/ones/ for substitutions	Using them instead of repeating countable nouns	Lecture	Quiz
26.	1	Would like + noun	Polite form of “want”	Lecture	Quiz
27.	1	Comprehension	Reading passage	Lecture	Quiz
28.	1	Comprehension	Reading passage	Lecture	Quiz

29.		Some and Any with plural nouns	Affirmative and negative	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, etc...

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Grammar One
Main references (sources)	Grammar One
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://www.eltbody.com/item_spec.php?item=307002&cat

Course Description Form

1. Course Name:					
Optics Lab.					
2. Course Code:					
EDPH22F202					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Lab					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours Total hours (69)					
7. Course administrator's name (mention all, if more than one name)					
Name: Zeyad Tareq Ahmed Ragheed M. Ibrahim Odai Falah Ameen Ivan Bahnam Karomi Email: ivanbahnam@uomosul.edu.iq Asmaa Zaki Khalil					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> • Know how to deal with different optical components • Deal with lenses, mirrors, telescopes, filters and other optics tools and apparatus. • Know how to deal with different light sources • Knowledge of the use of interference and diffraction phenomena in measuring several physical quantities 			
9. Teaching and Learning Strategies					
Strategy		Experimental work in lab and dealing with the equipment and various optical tools.			
10. Course Structure					
Week	H o ur	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

	s				
1.	3	Health and safety	Instructions	Experimentally	----
2.	3	Health and safety	Instructions	Experimentally	-----
3.	3	Measure the focal length of a positive lens	Focal length of a convex lens using the displacement method	Experimentally	Report with discussion
4.	2	Measure the power of a negative lens	Determine the power of a negative lens using a positive lens	Experimentally	Report with discussion
5.	2	Determine the radius of curvature of the lens surfaces and calculate the its refractive index	Use the Boys method to measure the radii of the surface of a biconvex lens as well as calculate the refractive index of the lens material	Experimentally	Report with discussion
6.	3	Measurement of the refractive index of a liquid	Determine the refractive index of a liquid using a convex lens and a plane mirror	Experimentally	Report with discussion
7.	3	Measure the magnification of the microscope	Study the magnification power (M) of a compound microscope	Experimentally	Report with discussion
8.	3	Review	Reviewing the previous experiments	Experimentally	-----
9.	3	First set test	Experimental test	Experimentally	Test
10	3	Calculating the radius of curvature of the eye lens	Study of the relationship of the resolving power (R) of the eye or telescope as a function of the wavelength of light	Experimentally	Report with discussion
11	3	Determine the wavelengths of invisible rays in the mercury light spectrum	Finding the wavelengths of invisible rays in the spectrum of mercury using a Roland reflective concave diffraction grating	Experimentally	Report with discussion
12	3	Investigating Malus' law and studying different types of polarization	Investigating Malus' law and studying different types of polarization	Experimentally	Report with discussion
13	3	Measure the radii of small particles	Determining the radii of small particles using the phenomenon of optical interference	Experimentally	Report with discussion
14	3	Measure the wavelength of single-wavelength light	Distribution of optical density in the Fraunhofer diffraction model resulting from a narrow slit.	Experimentally	Report with discussion
15	3	Review	Reviewing the previous experiments	Experimentally	-----

16	3	Second set test	Experimental test	Experimentally	Test
17	3	Determination of monochromatic wavelength (sodium light)	Determine the wavelength of sodium light using Newton's rings method	Experimentally	Report with discussion
18	3	Measure the thickness of a thin plate	Measuring the thickness of a thin plate using the phenomenon of interference in an air layer of variable thickness	Experimentally	Report with discussion
19	3	Determine the wavelength of a monochromatic source (sodium light) using a light-permeable diffraction grating	Determine the wavelength of a monochromatic source (sodium light)	Experimentally	Report with discussion
20	3	Determine the wavelength of helium-neon laser light by light interference	Determine the wavelength of helium-neon laser light	Experimentally	Report with discussion
21	3	Study of the properties of a helium-neon laser beam	Study of the properties of a helium-neon laser beam	Experimentally	Report with discussion
22	3	Review	Reviewing the previous experiments	Experimentally	-----
23	2	Third set test	Experimental test	Experimentally	Test
24					

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Geometrical Optics: Lectures in Optics, Volume 2 By: George Asimellis
Main references (sources)	Modern Geometrical Optics By: Richard Dittion / Module lectures
Recommended books and references (scientific journals, reports...)	Optics express, Applied optics.
Electronic References, Websites	https://ocw.mit.edu/courses/2-71-optics-spring-2009/resources/lecture-1-course-organization-introduction-to-optics/

Course Description Form

1. Course Name:	
Advance Electricity and Magnetism laboratory, second stage	
2. Course Code:	
EDPH22F201	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
1/9/2023	
5. Available Attendance Forms:	
Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Credit Hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Mohammed Ibrahim Ismael Email: mohammedalsalihi@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The program aims to provide practical application for students and provide them with all basic concepts Knowledge of the special laws of physics experiments. Know the graph and extract the values of physical parameters from the graph . Teaching students the concepts of electrical circuit analysis, such as Kirchhoff's laws, superposition theory, analysis of resistor networks, the theory of alternating current circuits, and the characteristics of resonant circuits.
9. Teaching and Learning Strategies	
Strategy	Theoretical lecture, dialogue and discussions, daily assignments, quiz

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Enabling students to read an unknown resistance using the time method, Ohm's law, comparison, and the direct method.	How to read an unknown resistance and measure it practically	Conduct a practical experiment in the laboratory	Quiz
2.	3	Learn how to connect elements in series and parallel.	Implementing the laws of connecting elements (resistors, capacitors, coils) in series and parallel	Lecture	Quiz
3.	3	Knowing the conversion and arrangement of resistors from delta form to star form and vice versa	Arrange the resistors in delta and star form	Lecture	Quiz
4.	3	Kirchhoff's first law for current and the second law for voltage	Practical implementation of Kirchhoff's laws for DC circuits	Lecture	Quiz
5.	3	Realizing the superposition theory practically	Superposition theory	Lecture	Quiz
6.	3	Review the first course with practical experiments	review		
7.	3		Testing the first course with practical experiments		Quiz
8.	3	Learn about using O.R.C and making some measurements	Cathode ray oscilloscope O.R.C	Lecture	Quiz
9.	3	Students learned how to mix two sine waves and take advantage of the phase model to measure the resistance, capacitance, or inductance of a coil	Lissajous figures	Lecture	Quiz
10.	3	Calculating the inductance of the L coil. Studying the change in inductance with frequency	Inductive will	Lecture	Quiz
11.	3	Calculating capacitance amplitude and studying the change of capacitive impulse with frequency	The capacity will	Lecture	Quiz

12.	3	Calculate resonant frequency and bandwidth	Series ringing	Lecture	Quiz
13.	3	Calculate resonant frequency and bandwidth	Parallel ringing	Lecture	Quiz
14.	3	review	Review the second course with practical experiments	Lecture	Quiz
15.	3		Testing the first course with practical experiments		Quiz

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Electrical and Magnetic Laboratory Experiments, Fawad Nimr Ajeel (2011) College of Science, Dhi Qar University
Main references (sources)	Electrical and magnetic laboratory experiments by Dr. Mona Abdel Karim Al-Khashab and Dr. Mumtaz Muhammad Saleh
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Advance Electricity and Magnetism laboratory, second stage	
2. Course Code:	
EDPH22F201	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
1/9/2023	
5. Available Attendance Forms:	
Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Credit Hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Zahraa Mohammed Hussein Email: zahraa.m.hussein@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The program aims to provide practical application for students and provide them with all basic concepts Knowledge of the special laws of physics experiments. Know the graph and extract the values of physical parameters from the graph . Teaching students the concepts of electrical circuit analysis, such as Kirchhoff's laws, superposition theory, analysis of resistor networks, the theory of alternating current circuits, and the characteristics of resonant circuits.
9. Teaching and Learning Strategies	
Strategy	Theoretical lecture, dialogue and discussions, daily assignments, quiz

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Enabling students to read an unknown resistance using the time method, Ohm's law, comparison, and the direct method.	How to read an unknown resistance and measure it practically	Conduct a practical experiment in the laboratory	Quiz
2.	3	Learn how to connect elements in series and parallel.	Implementing the laws of connecting elements (resistors, capacitors, coils) in series and parallel	Lecture	Quiz
3.	3	Knowing the conversion and arrangement of resistors from delta form to star form and vice versa	Arrange the resistors in delta and star form	Lecture	Quiz
4.	3	Kirchhoff's first law for current and the second law for voltage	Practical implementation of Kirchhoff's laws for DC circuits	Lecture	Quiz
5.	3	Realizing the superposition theory practically	Superposition theory	Lecture	Quiz
6.	3	Review the first course with practical experiments	review		
7.	3		Testing the first course with practical experiments		Quiz
8.	3	Learn about using O.R.C and making some measurements	Cathode ray oscilloscope O.R.C	Lecture	Quiz
9.	3	Students learned how to mix two sine waves and take advantage of the phase model to measure the resistance, capacitance, or inductance of a coil	Lissajous figures	Lecture	Quiz
10.	3	Calculating the inductance of the L coil. Studying the change in inductance with frequency	Inductive will	Lecture	Quiz
11.	3	Calculating capacitance amplitude and studying the change of capacitive impulse with frequency	The capacity will	Lecture	Quiz

12.	3	Calculate resonant frequency and bandwidth	Series ringing	Lecture	Quiz
13.	3	Calculate resonant frequency and bandwidth	Parallel ringing	Lecture	Quiz
14.	3	review	Review the second course with practical experiments	Lecture	Quiz
15.	3		Testing the first course with practical experiments		Quiz

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Electrical and Magnetic Laboratory Experiments, Fawad Nimr Ajeel (2011) College of Science, Dhi Qar University
Main references (sources)	Electrical and magnetic laboratory experiments by Dr. Mona Abdel Karim Al-Khashab and Dr. Mumtaz Muhammad Saleh
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Research Approach					
2. Course Code:					
EDPH22F308					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Amir Fadel Hameed					
Email: @uomosul.edu.iqaimers					
8. Course Objectives					
<ul style="list-style-type: none"> • For the student to become familiar with scientific research methods • For the student to become familiar with research sources and references, libraries and their history • The student must have the characteristics of a researcher • That the student acquires the skill of research techniques 					
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	the student gets to know the concept of scientific research, information and	General introduction to	Lecture	Quiz

		knowledge	the material		
2.	2	The student gets to know the concept of human thinking	Human thinking and its stages of development	Lecture	Quiz
3.	2	The student realizes the importance of scientific research	The meaning of science and scientific research	Lecture	Quiz
4.	2	That the student realizes the importance of the steps of scientific research	Research problem	Lecture	Quiz
5.	2	The student should know the importance of the structure of scientific research	Steps of the scientific method + research structure	Lecture	Quiz
6.	2	The student should know the types of scientific research	Scientific research, information	Lecture	Quiz
7.	2	The student gets to know definitions and concepts	Knowledge: definitions and concepts	Lecture	Quiz
8.	2	For the student to become familiar with scientific research institutions in Iraq, the Arab world, and the world.	The reality of scientific research in Iraq, the Arab world and the world.	Lecture	Quiz
9.	2	The student should know the ethics of the researcher.	Scientific research ethics: researcher ethics, supervisor ethics.	Lecture	Quiz
10.	2	The student should know the ethics of the researcher.	Composition and writing: concept, origins, types.	Lecture	Quiz
11.	2	The student gets to know the steps of writing scientific research and the student identifies the components of scientific research	Steps for writing scientific research.	Lecture	Quiz
12.	2	For the student to know the characteristics of good research	Specifications of good research, dissertation and university dissertation.	Lecture	Quiz
13.	2	The student gets to know the concept of the curriculum. It distinguishes between research methods and methods.	Scientific research methods: concept and types	Lecture	Quiz
14.	2	The student should distinguish between sources and references.	Sources of scientific research and documentation: concept, types,	Lecture	Quiz

			methods.		
15.	2	The student will be familiar with the controls for publishing in local and international magazines.	Quotation and plagiarism and ways to detect and avoid it.	Lecture	Quiz
16.	2	The student should know the concepts of citation and documentation.	Publishing research in international journals.	Lecture	Quiz
17.	2	The student knows the meaning of investigation	Manuscript texts definition and value.	Lecture	Quiz
18.	2	The student knows the meaning of investigation	Verification of texts: Steps to verify the manuscript.	Lecture	Quiz
19.	2	The student will learn the strategy of searching on the Internet.	Internet search strategy	Lecture	Quiz
20.	2	The student identifies the symbols and indexes used when transcribing texts.	Subscription to academic search engines	Lecture	Quiz
21.	2	For the student to become familiar with sample collection methods	Types of samples	Lecture	Quiz
22.	2	For the student to become familiar with the methods of questionnaire design	The questionnaire	Lecture	Quiz
23.	2	The student gets to know the methods of designing experimental research	Experimental research	Lecture	Quiz
24.	2	The student gets to know the methods of designing descriptive research	Descriptive research	Lecture	Quiz
25.	2	The student gets to know the methods of designing historical research	Historical research	Lecture	Quiz
26.	2	The student gets to know the methods of designing comparative research	Comparative research	Lecture	Quiz
27.	2	The student should distinguish between experimental research and comparative research	The difference between experimental research and comparative research	Lecture	Quiz
28.	2	The student should distinguish between longitudinal and	The difference	Lecture	Quiz

		cross-sectional studies	between a longitudinal and cross-sectional study		
29.	2	To be able to perform general applications	General applications	Lecture	Quiz
30.		Semester exam			

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<p>The methodological book in Arabic</p> <p>Educational and psychological guidance in educational institutions</p> <p>Written by: Dr. Rafida Al-Hariri, Dr. Samir Al-Imami</p>
Main references (sources)	<p>1- Theoretical trends in counseling. Jalal Kayed Damra, 1st edition, Safaa Publishing and Distribution House, Amman, Jordan</p> <p>2. Basics in Psychological Counseling, Mahmoud Abdullah Saleh, Saudi Arabia - Riyadh, Dar Al-Marikh, 1989.</p> <p>3. Applications in educational supervision, Dr. Ahmed Jamil Ayesh, 1st edition, Dar Al-Masirah for Publishing and Distribution, Jordan - Amman,</p>
Recommended books and references (scientific journals, reports...)	Journal of Psychological Counseling: A peer-reviewed scientific journal published by the "Psychological

	Counseling Center," Ain Shams .University, Volume 76, 2023
Electronic References, Websites	http://www.rameztaha.net/tadreat%20a%20seha%20a%20nafs%20tm http://www.eawraq.com/news.php?action=view&id=69 http://www.cocegypt.8m.com/page2.htm

Course Description Form

1. Course Name:					
English Language					
2. Course Code:					
EDPH22F410					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
1 Credit Hour					
7. Course administrator's name (mention all, if more than one name)					
Name: Abdulazeez Taha Ahmed Al-Sheikh Ahmed Email: abdulazeez.ahmed@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of the English Language. • The student is able to solve all the various problems related to the subject. • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	1	Present simple	Affirmative and negative	Lecture	Quiz

2.	1	Present simple	Questions and answers	Lecture	Quiz
3.	1	Present continuous (ing)	Affirmative and Negative	Lecture	Quiz
4.	1	Present continuous (ing)	Question and answer	Lecture	Quiz
5.	1	Past simple	Affirmative and negative	Lecture	Quiz
6.	1	Past simple	Questions and answers	Lecture	Quiz
7.	1	Part of Speech	Noun	Lecture	Quiz
8.	1	Plural of Nouns	Adding (s) and (es) to pluralize nouns.	Lecture	Quiz
9.	1	Comprehension	Reading Passage	Lecture	Quiz
10.	1	Comprehension	Reading Passage	Lecture	Quiz
11.	1	Subject Pronouns	Subjects and their pronouns	Lecture	Quiz
12.	1	Present simple of “be”	Affirmative and Negative forms	Lecture	Quiz
13.	1	Present simple of “be”	Questions and Short answers	Lecture	Quiz
14.	1	Part of Speech	Adjectives	Lecture	Quiz
15.	1	Position of Adjectives: nationality, and color Adjectives	Two positions of Adjectives	Lecture	Quiz
16.	1	Comparison of adjectives 1	Adding er/est	Lecture	Quiz
17.	1	Comparison of adjectives 2	Using more/most	Lecture	Quiz
18.	1	Definite and Indefinite Articles	a/an and the	Lecture	Quiz
19.	1	Past continuous	Affirmative and negative	Lecture	Quiz
20.	1	Past continuous	Question and answer	Lecture	Quiz
21.	1	Comprehension	Reading passage	Lecture	Quiz
22.	1	Comprehension	Reading passage	Lecture	Quiz
23.	1	Using “Shall”	Offer to do something for someone	Lecture	Quiz
24.	1	Expressing quantity	A lot of/ lots of/ a little/ a few	Lecture	Quiz
25.	1	Using “Should”	Obligation and advice	Lecture	Quiz
26.	1	Present perfect	Affirmative and negative	Lecture	Quiz
27.	1	Present perfect	Question and answers	Lecture	Quiz
28.	1	So and Neither	So and Neither	Lecture	Quiz
29.	1	Ing form	Gerund	Lecture	Quiz

30.			Final Exam		
1. Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, etc...					
2. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Grammar Two/Grammar Three		
Main references (sources)			Grammar Two/Grammar Three		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			https://www.eltbooks.com/item_spec.php?item=307003&cat https://www.eltbooks.com/item_spec.php?item=307004&cat		

Course Description Form

1. Course Name:					
Solid state physics					
2. Course Code:					
EDPH22F404					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Ghazwan Ghazi Ali Email: dr.ghazwan39@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of quantum mechanical theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Fundamental of crystal structure	Crystal structure	Lecture	Quiz

2.	2	W-S primitive cell	Properties of the W-S primitive cell	Lecture	Quiz
3.	2	Fill factor	Calculation of the Fill factor	Lecture	Quiz
4.	2	Example of Fill factor	Example of Fill factor	Lecture	Quiz
5.	2	Crystal symmetric	Type of Crystal symmetric	Lecture	Quiz
6.	2	Calculation of Madlonic constant in three dimension	Solve the Madlonic constant in three dimension	Lecture	Quiz
7.	2	X-ray diffraction	Define X-ray diffraction	Lecture	Quiz
8.	2	Experimental methods to study of X-ray diffraction	Types of Experimental methods to study of X-ray diffraction	Lecture	Quiz
9.	2	Reciprocal lattice	Reciprocal lattice	Lecture	Quiz
10.	2	Elastic scattering of waves	Elastic scattering of waves	Lecture	Quiz
11.	2	Ewald construction	Ewald construction	Lecture	Quiz
12.	2	Brillouin Zone	Define of Brillouin Zone	Lecture	Quiz
13.	2	Lattice dynamic	Define of Lattice dynamic	Lecture	Quiz
14.	2	Lattice dynamic in one dimension	Calculation of Lattice dynamic in one dimension	Lecture	Quiz
15.	2	Lattice dynamic in two dimension	Calculation of Lattice dynamic in two dimension	Lecture	Quiz
16.	2	Classical theory	What's the Classical theory	Lecture	Quiz
17.	2	Einstein theory	Calculation of Einstein	Lecture	Quiz

			theory		
18.	2	Deby theory	Calculation of Deby theory	Lecture	Quiz
19.	2	Thermal properties of Solid state	Calculation of Thermal properties of Solid state	Lecture	Quiz
20.	2	Electrical properties of Solid state	Calculation of Electrical properties of Solid state	Lecture	Quiz
21.	2	Free electron gas	Define Free electron gas	Lecture	Quiz
22.	2	Elastic scattering of waves	Define Elastic scattering of waves	Lecture	Quiz
23.	2	Phonon and photon properties	Phonon and photon properties	Lecture	Quiz
24.	2	Comparison between Einstein and Deby theory	Comparison between Einstein and Deby theory	Lecture	Quiz
25.	2	Theories of free electron gas	Theories of free electron gas	Lecture	Quiz
26.	2	Drod theory of free electron gas	Define Drod theory of free electron gas	Lecture	Quiz
27.	2	Question solve	Question solve	Lecture	Quiz
28.	2	Question solve	Question solve	Lecture	Quiz
29.	2	Question solve	Question solve	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Solid state physics

Main references (sources)	Charles Kittel, (1974)Introducti to solid state physics
Recommended books and references (scientific journals, reports...)	Elementary solid state physics
Electronic References, Websites	https://archive.org/details/ElementarySolidStatePhysics..Principles AndApplicationsM.A.Omar.compre ssed

Course Description Form

1. Course Name:					
Electromagnetic Theory					
2. Course Code:					
EDPH22F402					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Musab Saleh Mohammed Email: wesamusab67@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of electromagn theory • The student is able to solve all the vari problems related to the subject • Developing the student's knowledge about subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Basics of vector algebra	Vector basics	Lecture	Quiz

2.	2	The electric force between charges	Coulomb's law	Lecture	Quiz
3.	2	Electric field	Calculating the electric field for various types From distribution	Lecture	Quiz
4.	2	Gauss's law	Explanation of Gauss's law	Lecture	Quiz
5.	2	Gauss's law	Various examples of Gauss's law	Lecture	Quiz
6.	2	Electrical potential	Potential calculation for various types of distributions	Lecture	Quiz
7.	2	Electrical potential	Examples of electric potential	Lecture	Quiz
8.	2	Electric dipole	Derivation of potential and field for Electric dipole	Lecture	Quiz
9.	2	Electric dipole	Various examples of Electric dipole	Lecture	Quiz
10.	2	Electrical energy of the field	Calculation of the electrical energy of the field	Lecture	Quiz
11.	2	A conductor within an electric field	Calculate the surface charge density of A conductor within an electric field	Lecture	Quiz
12.	2	An insulator within an electric field	Calculate the potential for an insulator within an electric field	Lecture	Quiz
13.	2	A point charge inside a dielectric fluid	Derivation of the potential of Point charge inside an insulating fluid	Lecture	Quiz
14.	2	Equipotential surfaces and	Clarification and understanding	Lecture	Quiz

		classification of materials	of equipotential surfaces and classification of materials		
15.	2	Boundary conditions for field and displacement vector	Deriving boundary conditions for field and displacement	Lecture	Quiz
16.	2	Boundary conditions for field and displacement vector	Various examples of boundary conditions for field and displacement	Lecture	Quiz
17.	2	Coaxial cable	Derivation of potential and capacitance for coaxial cable	Lecture	Quiz
18.	2	Continuity equation	Deriving Continuity equation	Lecture	Quiz
19.	2	Continuity equation	Applications on Continuity equation	Lecture	Quiz
20.	2	Maxwell's equations	Explain Maxwell's equations	Lecture	Quiz
21.	2	Maxwell's equations	Applications of Maxwell's equations	Lecture	Quiz
22.	2	Wave equation and Poynting vector	Explain Wave equation and Poynting vector	Lecture	Quiz
23.	2	Wave equation and Poynting vector	Various examples of Wave equation and Poynting vector	Lecture	Quiz
24.	2	Magnetic fields of constant currents	Explain Magnetic fields of constant currents	Lecture	Quiz

25.	2	Magnetic fields of constant currents	Constant current magnetic field applications	Lecture	Quiz
26.	2	Bayot Savart Laws	Explain Bayot Savart Laws	Lecture	Quiz
27.	2	Bayot Savart Laws	Applications of the Bayot-Savart laws	Lecture	Quiz
28.	2	Laws of magnetism	Clarification and explanation Laws of magnetism	Lecture	Quiz
29.	2	Laws of magnetism	Applications to the laws of magnetism	Lecture	Quiz
30.			Semester Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Electromagne Theory, written by Ritz Milfo translated by Yahya Abdel Ham Rahman Rustom, University Mosul
Main references (sources)	ELEMENTS ELECTROMAGNETICS MATTHE NO SADIKU New York • Oxfo OXFORD UNIVERSITY PRESS 2018
Recommended books and references (scientific journals, reports...)	Electromagnetism, written by B. Loud, translated by Dr. Ali Mal Ibrahim, Al-Mustansiriya Universit
Electronic References, Websites	https://www.sciencedirect.com/topics/computer-science/electromagnetic-theory

Course Description Form

1. Course Name:	
laser	
2. Course Code:	
EDPH22F405	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
1/9/2023	
5. Available Attendance Forms:	
Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Credit Hours/ 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ragheed Mekhael Ibrahim Email: ragheed.ibrahim@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	<p>The program aims to understand all the basics related by</p> <p>The program aims to understand all the basics related by the light theories , concept of Blackbody radiation, the Blackbody Radiation Theories, the concept of Spontaneous Emission, Stimulated Emission and Absorption Emission, the properties of laser beam. concept of coherence and coherence types, difference between laser and Maser, the Laser Idea, Laser structure, active media, the types of active media. Optical Resonators, the types of Optical Resonators. the concept of pumping and pumping process, (optical, Electrical, chemical thermal pumping). the Emission and absorption condition, the gain condition, the gain coefficient at threshold. The losses in Laser, the active media losses, the relation between Spontaneous Emission to Stimulated Emission. the concept of optical feedback. the relation between pumping power and threshold, laser modes, the types of laser modes, the Dynamics of the Q-Switching Process, the Q-Switching Methods, aser types, the properties of semiconductor laser, the principles of work and structure, the application of laser (medical, optical communication, Material processing, Nuclear fusion. in which</p> <p>That the student be able to support and develop his skills and consolidate all the basic concepts in The field of laser so that the student has a good scientific base and the basis on which to rely if He decides to keep getting higher scores.</p>
9. Teaching and Learning Strategies	

Strategy	Theoretical lecture, dialogue and discussions, daily assignments, quiz
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Light theory	light theory , light theory development, electromagnetic spectrum	Lecture	Quiz
2.	2	Blackbody Radiation Theory	Blackbody Radiation Theory, Stefan boltzman & Rayleigh-Jeans and Planck Radiation Formula, Planck's Hypothesis and Field Quantization	Lecture	Quiz
3.	2	Basic transitions between energy levels	Spontaneous Emission, Absorption and Stimulated Emission Rates	Lecture	Quiz
4.	2	Transition Cross Section, Absorption, and Gain Coefficient	Transition Cross Section, Absorption, and Gain Coefficient	Lecture	Quiz
5.	2	Einstein Thermodynamic Treatment	Einstein Thermodynamic Treatment for both spontaneous and stimulated transitions	Lecture	Quiz
6.	2	Spectral line broadening	Line-Broadening Mechanisms, Homogeneous & Inhomogeneous Broadening.	Lecture	Quiz
7.	2	Maser & Laser Idea	Maser & Laser Idea, Laser components, Laser Beam Properties	Lecture	Quiz
8.	2	Population inversion	Population inversion, threshold condition, gain coefficient at threshold.	Lecture	Quiz
9.	2	Pumping Processes	Pumping Processes, (Four-Level and Three-Level Lasers)	Lecture	Quiz
10.	2	Pump Rate and total Pump Efficiency	Pump Rate and total Pump Efficiency	Lecture	Quiz
11.	2	Optical Resonators	Optical Resonators types, Plane Parallel (Fabry-Perot), Concentric (Spherical) Resonator, Confocal Resonator & Ring Resonator	Lecture	Quiz
12.	2	Stability condition of laser resonator	Stability condition of laser resonator , Unstable Resonators	Lecture	Quiz
13.	2	Cavity Modes	Cavity Modes, types and definitions	Lecture	Quiz
14.	2	theoretical calculation for laser spot size	theoretical calculation for laser spot size	Lecture	Quiz
15.	2	Power & Energy of laser	Power & Energy of laser, laser Efficiency, CW & pulse laser	Lecture	Quiz

16.	2	Q-Switching	Dynamics of the Q-Switching Process,	Lecture	Quiz
17.	2	Q-Switching	Rotating mirror, Electrooptical Q-Switching, , Acoustooptic Q-Switches	Lecture	Quiz
18.	2	Mode locking	Mode locking	Lecture	Quiz
19.	2	Nonlinear optics	Nonlinear optics, double frequency,	Lecture	Quiz
20.	2	Nonlinear optics	converting efficiency, birefringence	Lecture	Quiz
21.	2	Solid-State Lasers	Solid-State Lasers, Ruby Laser, Nd:YAG & Nd:Glass Lasers	Lecture	Quiz
22.	2	Gas laser	Neutral Atom Lasers (He-Ne Laser) , Ion Lasers (Argon Laser)	Lecture	Quiz
23.	2	Gas laser	Molecular Gas Lasers (CO ₂ Laser)	Lecture	Quiz
24.	2	Dye Lasers	Dye Lasers, Photophysical Properties of Organic Dyes, Characteristics of Dye Lasers	Lecture	Quiz
25.	2	Semiconductor Laser	Principle of Semiconductor Laser Operation, Semiconductor Laser structure	Lecture	Quiz
26.	2	Semiconductor Laser	Properties of Semiconductor Laser, Homojunction & Double-Heterostructure Lasers, Laser Devices and Performances	Lecture	Quiz
27.	2	application of laser,	Medical application of laser, Material processing, Nuclear fusion	Lecture	Quiz
28.	2	application of laser,	Optical communication , Holography, Military	Lecture	Quiz
29.	2	Laser safety	Laser safety	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Siham A. Kandela, Laser Physics with some application , Baghdad University ,1988.
Main references (sources)	Principles of Lasers , 4th Edition , Orazio Svelto, Springer Science and Business Media Inc. 1998.
Recommended books and references (scientific journals, reports...)	*Laser Fundamentals, second Edition , William T. Silfvast , Cambridge University Press, 2004.

	<p>* Lasers Fundamentals and Applications, Second Edition, K. Thyagarajan and Ajoy Ghatak Springer Science and Business Media, LLC , 2010.</p>
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Course Description Form

1. Course Name:					
Nuclear laboratory (Practical)					
2. Course Code:					
Nuclear laboratory (Practical) /EDPH22F401					
3. Semester / Year:2023/2024					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
My presence in the laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours/ 1 Units					
7. Course administrator's name (mention all, if more than one name)					
Name: RAWAH NAJI NAYEEF					
Email: rawahnaji@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> The student learns about the basics of the nuclear laboratory process The student is able to collect basic concepts and theoretical calculations and compare them practical calculations related to nuclear Knowing the graph and extracting the values of physical parameters from the graph Developing the student's knowledge about the subject by adding some recent experiences 			
9. Teaching and Learning Strategies					
Strategy		Practical lecture, dialogue, discussions, making weekly reports, and tests			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3		Learn about experiments, especially the nuclear laboratory, for the two course	Practical	
2.	3	Identify the devices used in experiments nuclear	Use to special devices in the nuclear laboratory	Practical	Report week
3.	3	Identify gamma rays and their interactions with matter	Gamma rays and their interactions with matter	Practical	Report week
4.	3	Know of the energy spectrum of gamma rays and its types	Gamma ray energy spectrum	Practical	Report week

			and its types		
5.	3		Learn about experiments, especially the kicker counter	Practical	
6.	3	Know how to achieve the inverse square law and find the effectiveness of the radioactive source Sr90 practically and theoretically	Experiment with the inverse square law	Practical	Report week
7.	3		Test in the experiment		Quiz
8.	3	Determine the extinction time of the Kayaker counter for the Sr90 radioactive source and find the relationship between the voltage and the extinction time.	Idle time kayaker counter	Practical	Report week
9.	3		Test in the experiment		Quiz
10.	3	Determine the efficiency of the Kayaker counter to count beta particles and gamma rays, where the Co60 radioactive source was used	Efficiency of the Kayaker counter for beta particles and gamma rays	Practical	Report week
11.	3		Test in the experiment		Quiz
12.	3	Finding the endpoint energy of the beta particles in aluminum by knowing the relationship between the range of the beta particles R_β and the endpoint energy E_0	Absorption of beta rays in aluminum and finding the endpoint energy of beta particles	Practical	Report week
13.	3		Test in the experiment	Practical	Quiz
14.	3		Review of experiments for the first course	Practical	
15.	3		Prepare a brief report on the experiments completed in the first course	Practical	Discuss the report
16.	3		Test in the experiment for first course	Practical	Test
17.	3		Learn about scintillation detector experiments	Practical	
18.	3	Learn how to determine the region of relative stability and find the best appropriate operating voltage	Experiment to determine the region of relative stability and the effect of amplifier gain on it	Practical	Report week
19.	3		Test in the experiment	Practical	Quiz
20.	3	Study of the effect of power supply voltage and amplifier gain on the gamma ray power spectrum	Effect of power supply voltage and amplifier	Practical	Report week

		of a scintillation detector	gain on the power spectrum		
21.	3		Test in the experiment	Practical	Quiz
22.	3	Study the spectrum of gamma rays and the two sources, Cs ¹³⁷ and Co ⁶⁰ , determining the location of each peak in the spectrum and calculating the energy characteristic (R) for each light peak.	Analysis of the gamma ray spectrum in the NaI (TL) scintillation detector and measurement of the energy profile	Practical	Report week
23.	3		Test in the experiment	Practical	Quiz
24.	3	Study of the gamma ray spectrum of one or more unknown sources using a multi-channel analyzer (MCA).	Using unknown sources to find the energy and intensity of gamma rays	Practical	Report week
25.	3		Test in the experiment	Practical	Quiz
26.	3		Review of experiments for the second course	Practical	
27.	3		Test in the experiment for second course	Practical	Test
28.	3		Make a brief report on the experiments	Practical	Discuss the report
29.	3		Prepare a brief report on the kicker meter and the flasher meter	Practical	Discuss the report
30.	3		Test in the experiment for two course	Practical	Test

1. Course Evaluation

Submitting reports, daily tests, and class contributions

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)

The book (Experimental Nuclear Physics) written by Dr. (Ali Attiya Abdullah, Dr. Shat Suleiman Al-Darkazli, Eng. Mazen Man Elias) / College of Science / University Baghdad

Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Nuclear laboratory (Practical)					
2. Course Code:					
Nuclear laboratory (Practical) /EDPH22F401					
3. Semester / Year:2023/2024					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
My presence in the laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours/ 1 Units					
7. Course administrator's name (mention all, if more than one name)					
Name: Aya Azad Rasheed Email: aya.azad@uomosul.edu.iq					
8. Course Objectives					
Course Objectives	<ul style="list-style-type: none"> The student learns about the basics of the nuclear laboratory process The student is able to collect basic concepts and theoretical calculations and compare them practical calculations related to nuclear Knowing the graph and extracting the values of physical parameters from the graph Developing the student's knowledge about the subject by adding some recent experiences 				
9. Teaching and Learning Strategies					
Strategy	Practical lecture, dialogue, discussions, making weekly reports, and tests				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3		Learn about experiments, especially the nuclear laboratory, for the two course	Practical	
2.	3	Identify the devices used in experiments nuclear	Use to special devices in the nuclear laboratory	Practical	Report week
3.	3	Identify gamma rays and their interactions with matter	Gamma rays and their interactions	Practical	Report week

			with matter		
4.	3	Know of the energy spectrum of gamma rays and its types	Gamma ray energy spectrum and its types	Practical	Report week
5.	3		Learn about experiments, especially the kicker counter	Practical	
6.	3	Know how to achieve the inverse square law and find the effectiveness of the radioactive source Sr90 practically and theoretically	Experiment with the inverse square law	Practical	Report week
7.	3		Test in the experiment		Quiz
8.	3	Determine the extinction time of the Kayaker counter for the Sr90 radioactive source and find the relationship between the voltage and the extinction time.	Idle time kayaker counter	Practical	Report week
9.	3		Test in the experiment		Quiz
10.	3	Determine the efficiency of the Kayaker counter to count beta particles and gamma rays, where the Co60 radioactive source was used	Efficiency of the Kayaker counter for beta particles and gamma rays	Practical	Report week
11.	3		Test in the experiment		Quiz
12.	3	Finding the endpoint energy of the beta particles in aluminum by knowing the relationship between the range of the beta particles R_β and the endpoint energy E_0	Absorption of beta rays in aluminum and finding the endpoint energy of beta particles	Practical	Report week
13.	3		Test in the experiment	Practical	Quiz
14.	3		Review of experiments for the first course	Practical	
15.	3		Prepare a brief report on the experiments completed in the first course	Practical	Discuss the report
16.	3		Test in the experiment for first course	Practical	Test
17.	3		Learn about scintillation detector experiments	Practical	
18.	3	Learn how to determine the region of relative stability and find the best appropriate operating voltage	Experiment to determine the region of relative stability and the effect of amplifier gain on it	Practical	Report week
19.	3		Test in the experiment	Practical	Quiz

20.	3	Study of the effect of power supply voltage and amplifier gain on the gamma ray power spectrum of a scintillation detector	Effect of power supply voltage and amplifier gain on the power spectrum	Practical	Report week
21.	3		Test in the experiment	Practical	Quiz
22.	3	Study the spectrum of gamma rays and the two sources, Cs ¹³⁷ and Co ⁶⁰ , determining the location of each peak in the spectrum and calculating the energy characteristic (R) for each light peak.	Analysis of the gamma ray spectrum in the NaI (TL) scintillation detector and measurement of the energy profile	Practical	Report week
23.	3		Test in the experiment	Practical	Quiz
24.	3	Study of the gamma ray spectrum of one or more unknown sources using a multi-channel analyzer (MCA).	Using unknown sources to find the energy and intensity of gamma rays	Practical	Report week
25.	3		Test in the experiment	Practical	Quiz
26.	3		Review of experiments for the second course	Practical	
27.	3		Test in the experiment for second course	Practical	Test
28.	3		Make a brief report on the experiments	Practical	Discuss the report
29.	3		Prepare a brief report on the kicker meter and the flasher meter	Practical	Discuss the report
30.	3		Test in the experiment for two course	Practical	Test

1. Course Evaluation

Submitting reports, daily tests, and class contributions

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)

The book (Experimental Nuclear Physics) written by Dr. (Ali Attiya Abdullah, Dr. Shat Suleiman Al-Darkazli, Eng. Mazen Man

	Elias) / College of Science / University Baghdad
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Educational Labrotary.					
2. Course Code:					
EDPH22F406					
3. Semester / Year:					
2023–2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Raad Ahmed Rasool Email: dr.raadrasool@uomosul.edu.iq Name:					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> * The student gets acquainted with basics physics in various branches. * The student be able to make connect between the theoretical and applied parts. * Develop student information about physics adding some modern topics. 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Electrical box	The electrostatics	Lecture	Quiz

2.	3	Electrical box	The magnetic	Lecture	Quiz
3.	3	Electrical box	Electrical current	Lecture	Quiz
4.	3	Electrical box	Induction current	Lecture	Quiz
5.	3	Electrical box	Generators and motors	Lecture	Quiz
6.	3	Electrical box	Transformers	Lecture	Quiz
7.	3	Electrical box	Electrochemical induction	Lecture	Quiz
8.	3	Electrical box	Thermo generators	Lecture	Quiz
9.	3	Mechanical box	Earth's gravitational forces	Lecture	Quiz
10.	3	Mechanical box	Mechanical machines	Lecture	Quiz
11.	3	Mechanical box	Central forces	Lecture	Quiz
12.	3	Mechanical box	Facts about liquids	Lecture	Quiz
13.	2	Mechanical box	Facts about atmospheric pressure	Lecture	Quiz
14.	2	Mechanical box	The voice	Lecture	Quiz
15.	2	The heating box	Laws of heat	Lecture	Quiz
16.	2	The heating box	Thermal transitions	Lecture	Quiz
17.	2	The heating box	Heat quantity and specific heat	Lecture	Quiz
18.	2	The heating box	Heat quantity and specific heat	Lecture	Quiz
19.	2	The heating box	Boiling and evaporation	Lecture	Quiz
20.	2	The heating box	Different questions	Lecture	Quiz
21.	2	The light box	Mirrors and their defects	Lecture	Quiz
22.	2	The light box	The nature of light	Lecture	Quiz
23.	2	The light box	Reflection and refraction of light	Lecture	Quiz
24.	2	The light box	Covariance method	Lecture	Quiz
25.	2	The light box	Glass lenses	Lecture	Quiz
26.	2	The light box	Optical projectors	Lecture	Quiz
27.	2	The light box	Telescopes and microscopes	Lecture	Quiz
28.	2	The light box	prisms and colors	Lecture	Quiz

29.	2	The light box	Scattering light	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	A guide to experiments with each box
Main references (sources)	Principles, experiments and concepts in general physics by Prof. dr. Raad Ahmed Rasool
Recommended books and references (scientific journals, reports...)	General physics-authored by Dr. Amjad A. ka and Dr. Shaker Jaber Shaker.
Electronic References, Websites	College physics – Raymond A. Serway & Jerry S. Faughn - 6 th Edition – Thomson – books/ cole – 2011

Course Description Form

1. Course Name:					
Quantum Mechanic					
2. Course Code:					
EDPH22F403					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
1/9/2023					
5. Available Attendance Forms:					
Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Credit Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Marwan Hafeeh Younus Email: Marwan.hafed@uomosul.edu.iq Name: lubna haqi ismael lubna.haqi_ismael178@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • The student learns the basics of quantum mechanical theory • The student is able to solve all the various problems related to the subject • Developing the student's knowledge about the subject by adding some modern topics 		
9. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments, quiz			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1.	2	Fundamentals of quantum mechanics	Influences and exchange of influences	Lecture	Quiz
2.	2	Hermitian effect	Properties of the Hermitian effect	Lecture	Quiz
3.	2	Hermitian effect	Properties of the Hermitian effect	Lecture	Quiz
4.	2	Expected value	Examples of expected value	Lecture	Quiz
5.	2	Expected value	Examples of expected value	Lecture	Quiz
6.	2	Schrödinger equation	Solve the time-dependent Schrödinger equation	Lecture	Quiz
7.	2	Schrödinger equation	Solve the time-dependent Schrödinger equation	Lecture	Quiz
8.	2	Applications of the Schrödinger equation	The free particle and the particle inside the box in one dimension and in three dimensions	Lecture	Quiz
9.	2	Applications of the Schrödinger equation	The free particle and the particle inside the box in one dimension and in three dimensions	Lecture	Quiz
10.	2	Reflectance and transmittance	Through low voltage with limited height	Lecture	Quiz
11.	2	Reflectance and transmittance	Through low voltage with limited height	Lecture	Quiz
12.	2	Harmonic oscillator	Solve the harmonic oscillator equation	Lecture	Quiz
13.	2	Harmonic oscillator	Solve the harmonic oscillator equation	Lecture	Quiz
14.	2	Harmonic oscillator	Comparison between quantum theory and classical theory	Lecture	Quiz
15.	2	Harmonic oscillator	Comparison between quantum theory and classical theory	Lecture	Quiz
16.	2	An atom has a single electron	Solve the differential equation	Lecture	Quiz
17.	2	An atom has a single electron	Solve the differential equation	Lecture	Quiz

18.	2	Angular momentum	Comparison between quantum theory and classical theory	Lecture	Quiz
19.	2	Angular momentum	Comparison between quantum theory and classical theory	Lecture	Quiz
20.	2	Approximation methods	Perturbation theory: first approximation: the dissolved state and the non-dissolved state	Lecture	Quiz
21.	2	Approximation methods	Perturbation theory: first approximation: the dissolved state and the non-dissolved state	Lecture	Quiz
22.	2	Approximation methods	Applications to perturbation theory	Lecture	Quiz
23.	2	Approximation methods	Applications to perturbation theory	Lecture	Quiz
24.	2	Approximation methods	Covariance method	Lecture	Quiz
25.	2	Approximation methods	Covariance method	Lecture	Quiz
26.	2	Scattering theory	Comparison between classical and quantum scattering	Lecture	Quiz
27.	2	Scattering theory	Comparison between classical and quantum scattering	Lecture	Quiz
28.	2	Scattering theory	Calculating the differential and total cross-sectional area	Lecture	Quiz
29.	2	Scattering theory	Calculating the differential and total cross-sectional area	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Quantum Mechanic
Main references (sources)	Basic Quantum Mechanic
Recommended books and references (scientific journals, reports...)	Quautum mechanics and spectroscopy:another workbook:M.Kuno
Electronic References, Websites	https://www.google.com/search?q=quantum+mechanics+pdf+notes&oq=Quautum+mechanics+pdf&aqs=chrome.2.69i57j0i13i512l9.5499j0j15&sourceid=chrome&ie=UTF-8

Course Description Form

1. Course Name:	
Nuclear physics	
2. Course Code:	
EDPH22F401	
3. Semester / Year:	
2023–2024	
4. Description Preparation Date:	
1/9/2023	
5. Available Attendance Forms:	
Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 Credit Hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Rabee Behnam Kheder Email: khayatrabee@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. The student gains an understanding of the fundamental principles of nuclear physics. 2. Acquainting learners with fundamental nuclear physics concepts, including terminology and vocabulary pertaining to nuclear processes, various categories of nuclear particles, and the radiation emitted by radioactive nuclei; investigating nuclear decays in their entirety. 3. Expanding the student's understanding of the subject by incorporating contemporary subjects 4. Theoretical Equation Derivation for Different Nuclear Reactions
9. Teaching and Learning Strategies	
Strategy	Theoretical lecture, dialogue and discussions, daily assignments, quiz

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	Nuclear properties	Nuclear properties Introduction, definitions, units and dimensions in nuclear physics	Lecture	Quiz
2.	3	Nuclear properties	Nuclear properties Binding ratio, binding energy, separation energy, stability valley	Lecture	Quiz
3.	3	Radioactivity	Radioactivity, decay, half-life, total number of radioactive nuclei, units of radioactivity (cures), radioactive effectiveness, absorption dose	Lecture	Quiz
4.	3	Nuclear chain	Nuclear decay, nuclear chains, , alpha decay, , beta decay,	Lecture	Quiz
5.	3	Gamma decay	Gamma decay, energy calculation in gamma decay, interaction of gamma rays with Matter, photoelectric phenomenon, Compton scattering	Lecture	Quiz
6.	3	Electromagnetic transition probability	Nuclear decay Pair production, Electromagnetism, selection rules	Lecture	Quiz
7.	3	Nuclear reactions	Nuclear reactions Introduction, types of nuclear reactions, Nuclear, exergonic reactions, exergonic	Lecture	Quiz

			reactions, Threshold energy		
8.	3	Accelerators	Nuclear reactions Accelerators and nuclear reactors	Lecture	Quiz
9.	3	Nuclear models	Nuclear models Introduction, liquid drop model, shell potential and distribution model Nucleons	Lecture	Quiz
10.	3	Nuclear models	Nuclear models Liquid drop model, meaning of nuclear fission	Lecture	Quiz
11.	3	Elementary particles	elementary particles Forces of nature, classification of elementary particles, types of interactions	Lecture	Quiz
12.	3	Quark theory	elementary particles Conservation laws, quark theory	Lecture	Quiz
13.	3	Radiation sources	Risks of nuclear radiation, Radiation sources, depleted uranium, and methods for detecting it	Lecture	Quiz
14.	3	Astronuclear	Astronuclear physics. Nuclear fission in stars	Lecture	Quiz
15.	3	Astronuclear	Astronuclear physics, helium combustion, heavy element combustion	Lecture	Quiz
16.	3			Lecture	Quiz
17.	3			Lecture	Quiz
18.	3			Lecture	Quiz
19.	3	Angular momentum	Comparison between quantum theory and classical theory	Lecture	Quiz
20.	3	Approximation methods	Perturbation theory: first approximation:	Lecture	Quiz

			the dissolved state and the non-dissolved state		
21.	3	Approximation methods	Perturbation theory: first approximation: the dissolved state and the non-dissolved state	Lecture	Quiz
22.	3	Approximation methods	Applications to perturbation theory	Lecture	Quiz
23.	3	Approximation methods	Applications to perturbation theory	Lecture	Quiz
24.	3	Approximation methods	Covariance method	Lecture	Quiz
25.	3	Approximation methods	Covariance method	Lecture	Quiz
26.	3	Scattering theory	Comparison between classical and quantum scattering	Lecture	Quiz
27.	3	Scattering theory	Comparison between classical and quantum scattering	Lecture	Quiz
28.	3	Scattering theory	Calculating the differential and total cross-sectional area	Lecture	Quiz
29.	2	Scattering theory	Calculating the differential and total cross-sectional area	Lecture	Quiz
30.			Final Exam		

1. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Nuclear physics
Main references (sources)	Nuclear physics
Recommended books and references (scientific)	Nuclear physics by kaplan

journals, reports...)	
Electronic References, Websites	https://www.youtube.com/watch?v=5yvv-tEq4Yo