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

### 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:**

<u>Academic Program Description</u>: 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.

<u>Course Description</u>: 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.

**<u>Program Vision:</u>** 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: University of Baghdad Faculty/Institute: College of Science Scientific Department: Physics Academic or Professional Program Name: Bachelor of Physics Final Certificate Name: Bachelor of Physics Academic System: semester Description Preparation Date: 2–4–2024 File Completion Date: 2–4–2024

Signature

Head of Department Name: Prof. Dr. Mohammed Kadhim Jawad Date: Signature: Normanne: Scientific Associate Name: Prof. Dr. Namir I. A. Haddad Date:

The file is checked by: Prof. Dr.Israa Ali Zaidan

Department of Quality Assurance and University Performance Director of the Quality Assurance and University Performance Department:

Date: ( 1stan-Signature:

Approval of the Dean: Asset. Prof. Dr.Raed Falih Hassan

#### 1. Program Vision

The College of Science seeks to prepare graduates in the field of physical sciences to work in government departments and benefit from specialization in the practical and applied field

#### 2. Program Mission

Working to prepare and graduate leading scientific and leadership competencies in the field of physics and to develop the balance of knowledge in the field of branches of physics to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, emphasizing social and cultural values and responding to the requirements of the local market.

#### 3. Program Objectives

1– Understand and understand physics, solve physics problems, and develop solutions to them.

2- Dealing with physical problems and developing solutions to them

3- Understanding mathematical methods and techniques in solving problems in

physical sciences

#### 4. Program Accreditation

Does the program have program accreditation? And from which agency?

#### Nothing

#### 5. Other external influences

Is there a sponsor for the program? Nothing

#### 6. Program Structure Credit Program Number of Percentage **Reviews**\* Structure Courses hours Support or related learning activity 9 16% Institution 19 Requirements Basic 4 17 8% College Requirements Core learning activities 32 68% Department 180 Requirements Elective 4 24 8% Summer Training Nothing 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
2023-2024 First/First Course	PHY 1101	Mechanics and properties of Matter (1)	2	2
	PHY 1102	Electricity	2	2
	UOB 103	Computer Skill (1)	1	2
	UOB 104	Democracy and Human Right	2	
	COS 1105	Mathematic (1)	2	
	UOB 101	Arabic Language (1)	2	2
2023-2024 First/Second Course	PHY 1207	Mechanics and properties of Matter (2)	2	2
	PHY 1208	Magnetism	2	2
	PHY 1209	Geometrical Optics	2	2
	COS 1210	Mathematics (2)	2	
	COS 1211	General Chemistry	2	2
	UOB 102	English Language (1)	2	2
2023-2024 Second/ First Course	PHY 2313	Modern Physics (1)	2	2
	PHY 2314	Heat and Thermodynamic	2	2
	PHY 2315	Analytical Mechanic (1)	2	
	PHY 2316	Analog Electronics	2	2
	UOB 208	Crime of the Baath regime in iraq	2	

	UOB 206	English language (2)	2	
	UOB 205	Arabic Language (2)	2	2
2023-2024 Second/ Second Course	PHY 2420	Modern Physics (2)	2	2
	PHY 2421	Thermodynamic and Statistical	2	2
	PHY 2422	Analytical Mechanic (2)	2	
	PHY 2423	Digital Electronics	2	2
	COS 2424	Mathematics (3)	2	
	UOB 207	Computers Skill (2)	1	2
2023-2024 Third/ First Course	PHY 3526	Molecular Physics	2	
	РНҮ 3527	Physical Optics	2	2
	PHY 3528	Quantum Mechanics (1)	3	
	PHY 3529 Material Physics (1)		2	2
	PHY 3530	Laser Physics (1)	2	2
	PHY 3531	Optional (1)	2	
	PHY 3531-1	Photo Physics		
	PHY 3531-2	Solar Energy Applications		
	РНҮ 3531-3	Elementary Particles		
	PHY 3531-4	Thin Films Physics		
	РНҮ 3531-5	Powder Physics		
	РНҮ 3531-6	High Voltage Physics		
2023-2024 Third/ Second Course	PHY 3632	Mathematical Physics	2	
	PHY 3633	Quantum Mechanics (2)	3	
	PHY 3634	Material Physics (2)	2	2
	UOB 309	Scientific Research Methodology	1	
	PHY 3636	Laser Physics (2)	2	2
	PHY 3637	Optional (2)	2	
	PHY 3637-1	Renewable Energy		
	PHY 3637-2	Optical Fiber		
	РНҮ 3637-3	Radiation Physics		
	PHY 3637-4	Detector Physics		
	PHY 3637-5	Biomaterials		1
	РНҮ 3637-6	Electrical Discharge Physics	2	
2023-2024 Fourth/ First Course	PHY 4738	Nuclear Physics (1)	2	2
	PHY 4739	Solid State Physics (1)	2	2

	PHY 4740	Electromagnetic Theory (1)	2	2
	PHY 4741	Research Project (1)	2	2
	PHY 4742	Optional (3)	2	
	PHY 4742-1	Spectroscopy		
	РНҮ 4742-2	Nonlinear Optics		
	РНҮ 4742-3	Medical Physics		
	PHY 4742-4	Semiconductors		
	РНҮ 4742-5	polymer Physics		
	РНҮ 4742-6	Plasma Diagnostic Methods		
	PHY 4743	Nano Physics	2	2
2023-2024 Fourth/ Second Course	PHY 4844	Nuclear Physics (2)	2	2
	PHY 4845	Solid State Physics (2)	2	2
	РНҮ 4846	Electromagnetic Theory (2)	2	2
	PHY 4847	Plasma Physics	2	
	PHY 4848	Research Project (2)	2	
	PHY 4849	<b>Optional</b> (4)	2	
	PHY 4849-1	Molecular Techniques and Instrumentation		
	РНҮ 4849-2	Photonics		
	РНҮ 4849-3	Nuclear Models		
	PHY 4849-4	Superconductivity		
	PHY 4849-5	Surface Physics		
	РНҮ 4849-6	Plasma Applications		

8. Expected learning	outcomes of the program
Knowledge	
	1. Keeping pace with the development of physics according to the
	requirements of the labor market
	2. Communicate with and develop everything that is new or useful
Skills	
	1. The ability to understand physics and apply it practically.
	2. Dealing with crises and physical problems.
	3. Building mathematical and quantitative foundations for students in
	the Physics Department
Ethics	
	Developing students' abilities to share ideas

#### 9. Teaching and Learning Strategies

- 1- Explaining the scientific material to students in detail.
- 2- Students' participation in solving mathematical problems
- 3- Discussion and dialogue about vocabulary related to the topic

### 10. Evaluation methods

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outco	ome
	Quizzes	4	10% (10)	3,6 and 10,13	LO #1, #2 and #10, #11	
Formative assessment	Assignments	4	10% (10)	2,5 and 10, 13	LO #3, #4 and #6, #7	
	Projects / Lab.	1	10% (10)	Continuous	All	
	Report	1	10% (10)	13	LO #5, #8 and #10	
Summative	Midterm Exam	2hr	10% (10)	8	LO #1 - #7	
assessment	Final Exam	3hr	50% (50)	16	All	
Total assessment			100% (100 Marks)			

aculty Members									
Academic Rank	s	specialization	Spec Requireme ills ( applica	ents/Sk (if	Number of the teachin staff				
	General	Special			Staff	Lecturer			
Professor (9)	physics	Thin films			Staff				
Professor (6)	physics	Nuclear			Staff				
Professor (5)	physics	Laser and molecular			Staff				
Professor (5)	physics	Laser and Electro optics			Staff				
Professor (12)	physics	Materials			Staff				
Professor (5)	physics	Plasma			Staff				
Assistant Professor (number 7)	physics	Thin films			Staff				
Assistant Professor (6)	physics	Nuclear			Staff				
Assistant Professor (4)	physics	Laser and molecular			Staff				
Assistant Professor (8)	physics	Laser and Electro optics			Staff				
Assistant Professor (6)	physics	Materials			Staff				
Assistant Professor (2)	physics	Plasma			Staff				
Lecturer (3)	physics	Thin films			Staff				
Lecturer (5)	physics	Nuclear			Staff				
Lecturer (3)	physics	Laser and molecular			Staff				
Lecturer (3)	physics	Laser and Electro optics			Staff				
Lecturer	physics	Materials			Staff				
Lecturer (1)	physics	Plasma			Staff				

Assistant teacher (number 1)	physics	Thin films	Staff
Assistant Lecturer (2)	physics	Nuclear	Staff
Assistant Lecturer (2)	physics	Laser and molecular	Staff
Assistant lecturer (2)	physics	Laser and Electro optics	Staff
Assistant Lecturer (4)	physics	Materials	Staff
Assistant Lecturer (2)	physics	Plasma	Staff

#### **Professional Development**

#### Mentoring new faculty members

#### To orient new faculty members, you need to:

1. Guidance and training program: There must be an integrated program to guide and train them on the policies and procedures of the educational institution, effective teaching methods, the use of technology in education, and dealing with students and parents.

2. Educational materials: The necessary educational materials must be provided to help them prepare and deliver lessons effectively.

3. Technical support: There should be technical support available to them in case they encounter technical problems while using technology in education.

4. Reviews and evaluation: Periodic reviews and evaluation of their performance should be provided to identify strengths and weaknesses and provide the necessary guidance and support.

5. Administrative support: They need administrative support to help manage daily business and administrative procedures.

6. Professional development opportunities: Opportunities for professional development and continuous training should be provided to members of the teaching staff to develop their skills and keep pace with the latest innovations in the field of education. Leadership presence: There must be a leadership presence to support, guide and motivate them to achieve their educational goals.

#### Professional development of faculty members

For professional development of faculty members, the following elements must be provided:

1. Training programs and workshops: Providing training programs and workshops in various fields such as modern teaching techniques, curriculum development, educational evaluation, and personal and social skills development.

2. Online learning opportunities: Providing easy and flexible access to online educational courses in various areas such as educational technology, language skills development, and classroom management.

3. Participation in conferences and seminars: Encouraging faculty members to participate in local and international conferences and seminars to exchange experiences and knowledge and follow the latest innovations in the field of education.

4. Performance evaluation and feedback: Providing effective mechanisms to evaluate the performance of faculty members and provide them with feedback to identify strengths and weaknesses and identify areas in which they need development.

5. Motivational and encouragement programs: Create motivational programs that encourage faculty members to continue learning and achieve professional development.

6. Individual guidance: Providing individual guidance sessions for faculty members to discuss their career goals and determine the steps necessary to achieve them.

7. Providing leadership opportunities: Providing opportunities to participate in administrative and leadership activities within the educational institution, which helps them develop leadership and organizational skills.

8. Constructive communication with the Continuing Education Division

#### 12. Acceptance Criterion

The student must have a preparatory certificate within the scientific stream

#### 13. The most important sources of information about the program

- 1. Fundamentals of Physics, by Halliday, Resnick and Wallker.
- 2. Fundamentals of Physics Extended, 10th Edition, David Halliday, Robert Resnick, Jearl Walker. August 2013.
- 3. M. Russell Wehr and James A. Richards "The physics of the atom"
- 4. Mark Waldo Zemansky\_ Richard Dittman Heat and thermodynamics \_ an intermediate textbook (1997, McGraw-Hill
- 5. Electronic devices by Thomas L. Floyed
- 6. Physics of atoms and molecules, B.H. Bransden and C. J. Joachain
- 7. Introduction to modern optics by G. Fowels.
- 8. Introduction to Quantum Mechanics, D. J. Grifiths, second Edition.
- 9. Nuclear Physics Concepts, By Meyerhof.
- 10. Introduction to solid state physics by Charles Kittel
- 11. Introduction to Electrodynamics, by David Griffiths, Prentice-Hall, 1999.
- 12. Nanotechnology and Nanoelectronics, W.R. fahrener, materials, devices, techniques.
- 13.Introduction to Plasma Physics and Controlled Fusion, Third Edition, by F.F. Chen, 2016.

#### 14. Program Development Plan

#### The first stage: assessment of the current situation

1. Conduct a comprehensive evaluation of the current academic program of the Department of Physics.

2. Identify the strengths, weaknesses, opportunities and challenges of the current program.

3. Conduct a survey of the opinions of students, program graduates, and faculty members to determine the areas in which the program needs development.

#### The second stage: setting goals and priorities

1. Setting specific and measurable goals for developing the academic program.

2. Identify priorities and key areas to focus on to improve the program.

#### The third stage: planning and implementation

1. Developing updated educational curricula that include the latest developments and technologies in the field of physical science technologies.

2. Create new educational courses covering modern and advanced topics in physical sciences.

3. Develop practical and laboratory training programs that allow students to apply theoretical concepts in a practical environment.

4. Modernizing and developing laboratory facilities and equipment to be compatible with the latest technologies and standards in the field.

5. Providing external learning opportunities through field visits to the laboratories and facilities of the Physics Department.

#### The fourth stage: evaluation and follow-up

1. Evaluate the developed program through the use of specific evaluation metrics and indicators.

2. Collect feedback from students, faculty, and employers on the effectiveness of the changes introduced.

3. Make additional adjustments and improvements based on evaluation results and feedback.

#### The fifth stage: continuity and continuous development

1. Establishing mechanisms for continuous monitoring and evaluation of the program's performance and ensuring continuity of development.

2. Providing continuous training opportunities for faculty members to maintain their knowledge of the latest developments in the field of physical sciences.

3. Continuous communication with employers to ensure that the program is updated in line with the needs of the labor market and technological developments in the field.

			Pro	gram	Skills	s Out	line								
							Req	uired	progr	am L	earnin	g outco	mes		
Year/Level	Course Code	Course Name	Basic or		Know	ledge			Sł	ills			Etl	hics	
			optional	A1	A2	A3	A4	B1	B2	<b>B</b> 3	B4	C1	C2	<b>C</b> 3	C4
2023-2024 First/First Course	PHY 1101	Mechanics and properties of Matter (1)	Basic	$\checkmark$			V		$\checkmark$	V	$\checkmark$			V	
	PHY 1102	Electricity	Basic							$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$
	UOB 103	Computer Skill (1)	Basic	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$		
	UOB 104	Democracy and Human Right	Basic							$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$
	COS 1105	Mathematic (1)	Basic					$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		
	UOB 101	Arabic Language (1)	Basic			$\checkmark$	$\checkmark$			$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
2023-2024 First/Second Course	PHY 1207	Mechanics and properties of Matter (2)	Basic	V	V	V	V	V	V		V	V	V	V	V
	PHY 1208	Magnetism	Basic				$\checkmark$		$\checkmark$						
	PHY 1209	Geometrical Optics	Basic				$\checkmark$				$\checkmark$	$\checkmark$	$\checkmark$		

Г Г	000 1010	Mathematica (2)			./	./	./	./			.1			./	.1
	COS 1210	Mathematics (2)	Basic	N		V	$\checkmark$	N	N	$\checkmark$	N	$\checkmark$	N	V	N
	COS 1211	General Chemistry	Basic				$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$
	UOB 102	English Language (1)	Basic		$\checkmark$								$\checkmark$		
2023-2024 Second / First Course	PHY 2313	Modern Physics (1)	Basic	V	$\checkmark$	V	$\checkmark$	$\checkmark$	V	$\checkmark$	V	$\checkmark$	$\checkmark$	V	V
	PHY 2314	Heat and Thermodynamic	Basic	V	$\checkmark$	$\checkmark$						$\checkmark$	$\checkmark$	$\checkmark$	
	PHY 2315	Analytical Mechanic (1)	Basic	$\checkmark$	$\checkmark$	$\checkmark$		V		$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	
	PHY 2316	Analog Electronics	Basic		$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$
	UOB 208	Crime of the Baath regime in iraq	Basic					V					$\checkmark$	$\checkmark$	
	UOB 206	English language (2)	Basic	$\checkmark$	$\checkmark$	$\checkmark$		V		$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	
	UOB 205	Arabic Language (2)													
2023-2024 Second /Second Course	PHY 2420	Modern Physics (2)	Basic	V	$\checkmark$	V	$\checkmark$	$\checkmark$	V	$\checkmark$	V	$\checkmark$	$\checkmark$	V	V
	PHY 2421	Thermodynamic and Statistical	Basic	V	V			V		V	$\checkmark$			$\checkmark$	
	PHY 2422	Analytical Mechanic (2)	Basic	$\checkmark$						$\checkmark$			$\checkmark$		

	PHY 2423	Digital Electronics	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$					$\checkmark$		$\checkmark$
	COS 2424	Mathematics (3)	Basic			$\checkmark$					$\checkmark$		$\checkmark$	$\checkmark$	
	UOB 207	Computers Skill (2)	Basic			V		V					V	$\checkmark$	
2023-2024 Third /First Course	PHY 3526	Molecular Physics	Basic		V	$\checkmark$		$\checkmark$				$\checkmark$	~	V	$\checkmark$
	PHY 3527	Physical Optics	Basic						$\checkmark$				$\checkmark$		$\checkmark$
	PHY 3528	Quantum Mechanics (1)	Basic			$\checkmark$			$\checkmark$		$\checkmark$		$\checkmark$		
	PHY 3529	Material Physics (1)	Basic		$\checkmark$	$\checkmark$			$\checkmark$		$\checkmark$				$\checkmark$
	PHY 3530	Laser Physics (1)	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$					$\checkmark$		
	PHY 3531	Optional (1)	Elective	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$					$\checkmark$		
	PHY 3531-1	Photo Physics	Elective										$\checkmark$		$\checkmark$
	PHY 3531-2	Solar Energy Applications	Elective	V		V	$\checkmark$	V		$\checkmark$				$\checkmark$	
	PHY 3531-3	Elementary Particles	Elective	V		V	V	V					V	$\checkmark$	
	PHY 3531-4	Thin Films Physics	Elective		$\checkmark$			$\checkmark$				$\checkmark$	$\checkmark$		$\checkmark$
	PHY 3531-5	Powder Physics	Elective										$\checkmark$		$\checkmark$
	PHY 3531-6	High Voltage Physics	Elective	V		V		V		$\checkmark$					

2023-2024 Third /Second Course	РНҮ 3632	Mathematical Physics	Basic	V	$\checkmark$	$\checkmark$	V	$\checkmark$	$\checkmark$	$\checkmark$			V	$\checkmark$	$\checkmark$
	PHY 3633	Quantum Mechanics (2)	Basic		$\checkmark$		V			$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	
	PHY 3634	Material Physics (2)	Basic	$\checkmark$						$\checkmark$			$\checkmark$		
	UOB 309	Scientific Research Methodology	Basic	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
	PHY 3636	Laser Physics (2)	Basic												$\checkmark$
	PHY 3637	Optional (2)	Elective	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$		$\checkmark$		$\checkmark$
	PHY 3637-1	Renewable Energy	Elective	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	PHY 3637-2	Optical Fiber	Elective	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$					$\checkmark$		
	PHY 3637-3	Radiation Physics	Elective	$\checkmark$			$\checkmark$	$\checkmark$			$\checkmark$		$\checkmark$		$\checkmark$
	PHY 3637-4	Detector Physics	Elective	$\checkmark$			$\checkmark$	$\checkmark$				$\checkmark$	$\checkmark$		
	PHY 3637-5	Biomaterials	Elective	$\checkmark$		$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			
	PHY 3637-6	Electrical Discharge Physics	Elective												
2023-2024 Fourth /First Course	PHY 4738	Nuclear Physics (1)	Basic	V		V	V	V		V			V	V	$\checkmark$
	PHY 4739	Solid State Physics (1)	Basic	$\checkmark$						$\checkmark$			$\checkmark$		

	PHY 4740	Electromagnetic Theory (1)	Basic			$\checkmark$	$\checkmark$				$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$
	PHY 4741	Research Project (1)	Basic	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$		$\checkmark$		$\checkmark$
	PHY 4742	Optional (3)	Elective	$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	
	PHY 4742-1	Spectroscopy	Elective								$\checkmark$	$\checkmark$			
	PHY 4742-2	Nonlinear Optics	Elective	$\checkmark$								$\checkmark$			
	PHY 4742-3	Medical Physics	Elective	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			
	PHY 4742-4	Semiconductors	Elective	$\checkmark$	$\checkmark$			$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			
	PHY 4742-5	polymer Physics	Elective	$\checkmark$	$\checkmark$			$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			
	PHY 4742-6	Plasma Diagnostic Methods	Elective	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	V					$\checkmark$	$\checkmark$	$\checkmark$
	PHY 4743	Nano Physics	Basic	$\checkmark$		$\checkmark$		$\checkmark$			$\checkmark$	$\checkmark$		$\checkmark$	
2023-2024 Fourth /Second Course	PHY 4844	Nuclear Physics (2)	Basic	V	V	V		$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	V	V	V
	PHY 4845	Solid State Physics (2)	Basic		$\checkmark$	$\checkmark$		V					$\checkmark$	$\checkmark$	$\checkmark$
	PHY 4846	Electromagnetic Theory (2)	Basic		$\checkmark$	$\checkmark$		V			$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$
	PHY 4847	Plasma Physics	Basic							$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$

• Please tick the boxes corresponding to the individual program learning outcomes under evaluatio

PHY 4848	Research Project (2)	Basic	$\checkmark$						$\checkmark$		$\checkmark$	$\checkmark$		$\checkmark$
PHY 4849	Optional (4)	Elective	$\checkmark$						$\checkmark$	$\checkmark$				
PHY 4849-1	Molecular Techniques and Instrumentation	Elective	V	V	V	V	V	V	V	V		V	V	
PHY 4849-2	Photonics	Elective							$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		
PHY 4849-3	Nuclear Models	Elective	$\checkmark$			$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
PHY 4849-4	Superconductivity	Elective	$\checkmark$			$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
PHY 4849-5	Surface Physics	Elective	$\checkmark$						$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$
PHY 4849-6	Plasma Applications	Elective	$\checkmark$			$\checkmark$	$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$		$\checkmark$



1. Course Name:	
	Atomic Physics I
2. Course Code:	
	PHY 2313
3. Semester / Year:	
First	semester /Second Stage
4. Description Preparation	
5 Arreitable Attendenes Fam	2024-4-2
5. Available Attendance Form	ns:
Weekly	Fotal) / Number of Units (Total)
30 hours	(Total) / Number of Offits (Total)
50 11001 5	
7. Course administrator's n	name (mention all, if more than one name)
Name: Dr. Mohammed Abdullah I	Hameed
Email: mohammed.a@sc.uobaghd	ad.edu.iq
8. Course Objectives	
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teaching and Learning Str	ategies
Strategy	

Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

#### 10. Course Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Relativity 1.1 The principle of relativity 1.2 Inertial system of coordinates	Theoretical	General questions +Exam
2	2 hours	Chapter2	<ul><li>1.3 Galilean</li><li>transformation</li><li>1.4 Einstein's special</li><li>theory of relativity</li></ul>	Theoretical	General questions +Exam
3	2 hours	Chapter3	<ul><li>1.5 Lorentz</li><li>transformation</li><li>1.6 Inverse Lorentz</li><li>transformation</li></ul>	Theoretical	General questions +Exam
4	2 hours	Chapter4	1.7Lengthcontractions1.8 time dilation	Theoretical	General questions +Exam
5	2 hours	Chapter5	<ul><li>1.9 Transformation of velocity</li><li>1.10 Change of mass with velocity</li></ul>	Theoretical	General questions +Exam
6	2 hours	Chapter6	<ul><li>1.11 Mass energy equivalence</li><li>1.12 Example of relativistic calculation</li></ul>	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	Atomc view of electricity 2.1 Electrical discharges 2.2 Thomson's measurements of q/m	Theoretical	General questions +Exam
9	2 hours	Chapter8	<ul><li>2.3 Electron charge (Milikan's oil drop experiment)</li><li>2.4 Mass of the electron</li></ul>	Theoretical	General questions +Exam

10	2	Chapter9	2.5	Mas	SS Theoretical	General
	hours		-	oscopy otropic mass		questions +Exam
11	2 hours	Chapter10	The at radiati 3.1 particl	omic view of on Waves of	Theoretical Or	General questions +Exam
12	2 hours	Chapter11	3.3 El	ectrodynamics ermal radiatio		General questions +Exam
13	2 hours	Chapter12	absorp radiati	on ack body	d Theoretical of	General questions +Exam
14	2 hours	Chapter1	3.8 Pla	Wien an sh-Jeans law's ank's law sion quantized		General questions +Exam
15	2 hours	Chapter13	law displae	tefan-Boltzma and Wie cement law hotoelectric		General questions +Exam
16	2 hours	Chapter14	Final	Exam	Theoretical	
Distrik prepa	outing the ration, dai	Evaluation score out of 100 ac ly oral, monthly, or and Teaching F	r written ex		•	lent such as dail
Requir	ed textboo	ks (curricular books	s, if any)	2- Richard ''] 3- M.C. Lo	Wehr and James A The physics of the a I T. Wridner and R Elementry modern ovell and A. J. Aven Physcal properties of	tom'' Robert L. Sells physics'' ry
Main r	eferences	(sources)		Mode	ern Physics Boo	ks
	mended		references	none		
•		s, reports)				
	nic Roforo	nces, Websites				

Course Name:
Heat and Thermodynamic
Course Code:
PHY 2314
Semester / Year:
First semester /Second Stage
Description Preparation Date:
2024-4-2
lable Attendance Forms:
kly
ber of Credit Hours (Total) / Number of Units (Total)
ours
Course administrator's name (mention all, if more than one
Course administrator's name (mention all, if more than one
e: Dr.Hussein Khazal Rasheed
e: Dr.Hussein Khazal Rasheed il: Hussein.k@sc.uobaghdad .edi.iq
Course Objectives         tives       Teaching students the basic principles of physics. 2. Prepa
specialists in the field of general physics and its pract applications, which bears the responsibility of studying country's need for development and progress and capable meeting the needs of the job market in state institutions industry sectors. 3. Preparing an educated generation armed science and adopts it as a sound basis to bring about rad changes and assign scientific knowledge and scientific meth in thinking, analysis and adaptation with the developmen technologies, to keep up with the expansion of human need: Effective contribution for deepening and documenting connection of the university with the society through implementation of advisory counseling, training and developm of teaching and administrative staff. 5. The service of prepa graduates specialized in physics who contribute to developm in the country. 6. Meeting the needs of various sectors with his qualified personals in the field of physics. 7. Encouraging distinguished in this field to work as teaching assistants in department to be part of the academic teaching staff in the fut
Teaching and Learning Strategies
Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Temperature and the Zeroth Law of Thermodynamics Thermometers and the Celsius Temperature Scale	Theoretical	General questions +Exam
2	2 hours	Chapter2	The Constant-Volume Gas and the Absolute Temperate Macroscopic Description of an Ideal Gas, Thermal Expansion of Solids and Liquids	Theoretical	General questions +Exam
3	2 hours	Chapter3	Thermodynamic equilibrium Hydrostatic systems Mathematical theorem	Theoretical	General questions +Exam
4	2 hours	Chapter4	Stretch wire, Surfaces ,Electrochemical cell, Dielectric slab, Paramagnetic rod Intensive and extensive coordinated	Theoretical	General questions +Exam
5	2 hours	Chapter5	Work,Quasi static process ,Work in changing volume of hydrostatic system P-V diagram	Theoretical	General questions +Exam
6	2 hours	Chapter6	Hydrostatic work depend on the path Calculation of ∫PdV for quasi- static process Quasi – static isothermal expansion or compression of an ideal gas Quasi static isothermal increase of pressure on a solid	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	Work in changing the length of a wire Work in changing the area of a surface film Work in moving charge with an electrochemical cell Work in changing total polarization of	Theoretical	General questions +Exam

	_				
			Work in changing		
			the total		
			magnetization of a		
			paramagnetic solid		
9	2	Chapter8	Application of the	Theoretical	General
	houro		first law of		questions +Exam
	hours		thermodynamics		+Exam
			Energy of an		
			isolated system		
			Specific heat		
			Joules law		
10	2	Chapter9	Relation between	Theoretical	General
			the two specific		questions
	hours		heats		+Exam
			Ratio of the specific		
			heats		
			Expression for work		
11	2	Chapter10	Relations between	Theoretical	General
			Tand V , and T and P		questions
	hours		Reversible adiabatic		+Exam
			process		
			Derive $PV^{\gamma} =$		
			constant		
			Free expansion		
12	2	Chapter11	Conservation of	Theoretical	General
			energy : calorimetry		questions +Exam
	hours		Latent Heat		+Exam
			Energy Transfer		
			Mechanisms:		
			Thermal conduction		
			Convection		
			Radiation		
13	2	Chapter12	The Kinetic Theory	Theoretical	General questions
	hours		of Gases		+Exam
	liours		Molecular Model of		
			an Ideal Gas		
			Molar Specific Heat		
			of an Ideal Gas Distribution of		
		Chanter 1	Molecular Speeds	Theoretical	General
14	2	Chapter1	The Equipartition of	Theoretical	questions
	hours		Energy Adiabatic Processes		+Exam
			for an Ideal Gas		
		Chapter 12	The Boltzmann	Theoretical	General
15	2	Chapter13	Distribution Law	Theoretical	questions
	hours				+Exam
		Chapter14	Mean Free Paths	Theoretical	
16	2	Chapter14	Exam	Theoretical	
10	-				

#### 23. 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

24. Learning and Teaching Resources				
Required textbooks (curricular books, if any)	Mark Waldo Zemansky_ Richard Dittma Heat and thermodynamics _ an intermedi textbook (1997, McGraw-Hill			
Main references (sources)	None			
Recommended books and references (scientific journals, reports)	none			
Electronic References, Websites	none			

1. Course Name:					
Analytical Mechanics (1)					
2. Course Code:					
PHY 2315					
3. Semester / Year:					
First semester /Second Stage					
4. Description Preparation Date:					
2024-4-2					
5. Available Attendance Forms: Weekly					
Weekly           6. Number of Credit Hours (Total) / Number of Units (Total)					
30 hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Raad Mohammed					
Email: <u>raad.m@sc.uobaghdad.edu.iq</u>					
8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in the field					
of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.					
9. Teaching and Learning Strategies					
Strategy Type something like: The main strategy that will be adopted in delivering this module is encourage students' participation in the exercises, while at the same time refining and expand their critical thinking skills. This will be achieved through classes, interactive tutorials and considering types of simple experiments involving some sampling activities that are interess to the students					
10. Course Structure					
Week         Hours         Required Learning         Unit or subject         Learning         Evaluation					
Outcomes name method method					

1	2	Chapter1	Vectors, the Scalar	Theoretical	General
1	2	Chapterr	Product and Vector		questions
	hours		Product, Moment of a		+Exam
			Force, Triple Products, the Transformation		
			Matrix.		
2	2	Chapter2	Derivative of a Vector,	Theoretical	General
2		1	Position Vector of a		questions
	hours		Particle, Velocity and		+Exam
			Acceleration in Rectangular Coordinates.		
•	-	Chapter3	Velocity and	Theoretical	General
3	2	Chapters	Acceleration in Plane		questions
	hours		Polar Coordinates,		+Exam
			Cylindrical and Spherical		
			Coordinates, Newton's		
		Chantard	Law of Motion. Rectilinear Motion:	Theoretical	General
4	2	Chapter4	Uniform Acceleration	Theoretical	questions
	hours		Under a Constant Force,		+Exam
	nouro		Forces that Depend on		
			Position: The Concepts of		
			Kinetic and Potential		
			Energy.	Theoretical	Conservat
5	2	Chapter5	Velocity-Dependent Forces: Fluid Resistance	Theoretical	General
	hours		and Terminal Velocity,		questions +Exam
	nours		Vertical Fall Through a		+ LAdin
			Fluid: Numerical		
			Solution.		
6	2	Chapter6	General motion of	Theoretical	General
			particle in 3D, 2D, The		questions
	hours		Potential Energy Function in Three-		+Exam
			Dimensional Motion: The		
			Del Operator.		
7	2		Exam	Theoretical	Exam
•	_				
	hours				
8	2	Chapter7	Forces of the Separable	Theoretical	General
-			Type: Projectile Motion,		questions
	hours		The Harmonic Oscillator in Two and Three		+Exam
			In Two and Three Dimensions, Motion of		
			Charged Particles in		
			Electric and Magnetic		
			Fields.		
9	2	Chapter8	Constrained Motion of a	Theoretical	General
			Particle, Noninertial		questions
	hours		Reference Systems,		+Exam
			Accelerated Coordinate Systems and Inertial		
			Forces.		
10	2	Chapter9	Rotating Coordinate	Theoretical	General
10	2	Chapters	Systems. Dynamics of a		questions
	hours		Particle in a Rotating		+Exam
			Coordinate System,		
			Effects of Earth's		
			Rotation.		

11		Chapter10	Motion of a Projectile in	Theoretical	General
11	2	Chapter 10	a Rotating Cylinder, The	Theoretical	questions
	hours		Foucault Pendulum,		+Exam
			Gravitation and Central		
			Forces.		
12	2	Chapter11	Gravitational Force	Theoretical	General
	-	-	between a Uniform		questions
	hours		Sphere and a Particle,		+Exam
			Kepler's Laws of		
			Planetary Motion.		
13	2	Chapter12	Kepler's Second Law:	Theoretical	General
	hours		Equal Areas Kepler's First Law: The Law of		questions +Exam
	nours		Ellipses, Kepler's Third		+L'Adili
			Law: The Harmonic Law.		
14	2	Chapter1	Potential Energy in a	Theoretical	General
14	2	Chapterr	Gravitational Field:		questions
	hours		Gravitational Potential,		+Exam
			Potential Energy in a		
			General Central Field.		
15	2	Chapter13	Orbital Energies in an	Theoretical	General
	_		Inverse-Square Field,		questions
	hours		Energy Equation of an		+Exam
			Orbit in a Central Field.	Theoretical	
16	2	Chapter14	Exam	Theoretical	
	hours				
	-				
11.	Course	Evaluation			
Distrib	uting the	score out of 100 accor	ding to the tasks assign	ned to the stude	nt such as dailv
	-	ly oral, monthly, or wr			y
• •					
12.	Learning	and Teaching Reso	ources		
Require	d texthoo	ks (curricular books, if a	any) Analyti	cal mechanic	s (Fowlus
rtequire			Cassida		~ (
Main ro	ferences	(sources)		· y / ·	
			none		
Recom	nended	books and refe	rences		

none

none

Electronic References, Websites

(scientific journals, reports...)

1. Course N	
	Analogue Electronics
2. Course C	Code:
	PHY 2316
3. Semeste	r / Year:
	First semester /Second Stage
4. Descript	ion Preparation Date:
	2024-4-2
5. Available	e Attendance Forms:
Weekly	
6. Number	of Credit Hours (Total) / Number of Units (Total)
30 hours	5
7. Course	administrator's name (mention all, if more than one name)
Name: Di	r. Estabraq Talib Abdullah
Email: Es	tabraqtalib@sc.uobaghdad.edu.iq
8. Course C	
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teaching	and Learning Strategies
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation	
		Outcomes	name	method	method	
1	2 hours	Chapter1	Intrinsic Semiconductor Extrinsic Semiconductor (N- and P-Type).	Theoretical	General questions +Exam	
2	2 hours	Chapter2	P-N Junction (Diode) Construction - Biasing (forward and reverse); I- V Curve.	Theoretical	General questions +Exam	
3	2 hours	Chapter3	The application of diodes (half wave and full wave rectifier).	Theoretical	General questions +Exam	
4	2 hours	Chapter4	Clipper and clamber circuits	Theoretical	General questions +Exam	
5	2 hours	Chapter5	Power Supply.	Theoretical	General questions +Exam	
6	2 hours	Chapter6	Special diodes	Theoretical	General questions +Exam	
7	2 hours		Exam	Theoretical	Exam	
8	2 hours	Chapter7	Amplifications and Voltage Amplifiers - Definition of amplifications and gain - Basic Characteristics of an ideal voltage amplifiers - Amplifications elements:Theoretical		General questions +Exam	
9	2 hours	Chapter8	Amplifications elements.Transistor - Construction Transistorconfigurations		General questions +Exam	
10	2 hours	Chapter9	configurations		General questions +Exam	
11	2 hours	Chapter10	Load line analysis and Q- point Thermal stability Ge		General questions +Exam	
12	2 hours	Chapter11	Small signal commonTheoreticalGeneralemitter voltage amplifier.question		General questions +Exam	
13	2 hours	Chapter12	Field Effect Transistor (FET) Junction Field Effect Transistor (JFET) -	Theoretical	General questions +Exam	

			Commo Charact JFET si paramet circuits analysis	ction Circuits - on drain circuits : eristic Curves - nall signal ters - Biasing and bias line s - Voltage er and calculations				
14	2 hours	Chapter1	Metal Oxide Semiconductor Field Effect Transistor (MOSFET) - Depletion Type (D-MOSFET) and Construction.		Theoretical	General questions +Exam		
15	2 hours	Chapter13	Modes of operations, Characteristic Curves, Bias Circuits and Applications		Theoretical	General questions +Exam		
16	2 hours	Chapter14	Final E		Theoretical			
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								
12. Learning and Teaching Resources								
Require	d textboo	ks (curricular books, if a	Electronic devices by Thomas L. Floyed					
Main references (sources)				Electronic and instrumentation by Gupta				
Recomn (scientif		books and refe s, reports…)	none					
Electron	Electronic References, Websites							

1. Course Name:						
Crime of the Baath regime in Iraq						
2. Course Code:						
UOB 206						
3. Semester / Year:						
First semester /Second Stage						
4. Description Preparation Date:						
2024-4-2 5. Available Attendance Forms:						
Weekly						
6. Number of Credit Hours (Total) / Number of Units (Total)						
30 hours						
50 110015						
7. Course administrator's name (me	ntion all, if more than one name)					
Name: Mohanad Ahmed Yaseen						
Email: mohannad.ahmed@sc.uobaghdad.edu.iq						
8. Course Objectives						
Course Objectives	<ul> <li>1- ان الأجيال الحالية لم تعيش فترة الدكتاتورية والكثير منهم لايعرف</li> </ul>					
	معاناة الشعب والجرائم التي ارتكبها النظام المقبور .					
	<ul> <li>-2بيان مدى سوء حكم النظام الشمولي والذي لم يقتصر فقط على</li> </ul>					
	داخل العراق بل على دول المجاور له					
	-3توعية الطلبة على الأضرار الكبيرة التي احدثها النظام البائد					
	والجرائم التي ارتكبها بحق الشعب العراقي.					
	−4أظهار الاضرار الاقتصادية والاجتماعية والتتموية التي أحدثها					
	النظام السابق.					
	-5بيان مدى وحشية النظام البائد والإعدامات الجماعية.					
	<b>−6</b> بيان الاساليب القمعية التي مارسها النظام البائد والتهجير					
	القصري.					
	-7كبح الحريات العامة وتدهور مستوى الاعلام والثقافة.					
	-8توضيح الأضرار البيئية والزراعية التي ظهرت آثارها في السنوات الإسماعية الإسرار					
	السابقة والحالية.					
	-9بيان مدى سوء حكم النظام الشمولي والذي لم يقتصر فقط على					
	داخل العراق بل على دول المجاورة ايضا. -10 لن المدن بن تديير هذه الدارة لمحدفة تاريخ تاله المقدة					
	-10ان الهدف من تدريس هذه المادة لمعرفة تاريخ تلك الحقبة السودام					
	السوداء. -11الهدف من هذه المادة ان الحكم في العراق لن يدوم باستخدام					
	أدوات العنف والقوة مهما كانت مفرطة .والعراق يجب ان يحكم بنظام					
	الواف العلف والموه مهما خالف معرف .والعراق يدب أن يحتم بستام					

سياسي يحترم العراقيين ومعتقدات ودياناتهم وقومياتهم وان يؤمن بالتعدد في المجتمع العراقي

#### 9. Teaching and Learning Strategies

#### Strategy

-1التعرف على الجرائم النظام البائد في كبح الحريات العامة

-2دراسة الانظمة السياسية في العراق نبذة تاريخية

-3معرفة ابرز انتهاكات النظام البعثي للحقوق والحريات

-4معرفة اثر سلوكيات النظام البعثي المقبور على المجتمع العراقي

–5التوضيح للاجيال الحالية حقيقة حقبة تاريخية سوداء في تأريخ العراق المعاصر التي شهدت الظلم والاستبداد

–6الاطلاع على وحشية واستبداد وقمع النظام البائد للشعب العراقي

-7معرفة ان الظلم والاستبداد والحكم الدكتاتوري لن يدوم مهما كانت قسوته

- 8تعليم الطلبة وارشادهم على النظام السياسي الصحيح لحكم هذا الشعب الطيب. والذي يجب ان يبتعد عن الدكتاتورية

والظلم وان يكون مبنى على العدالة واحترام التعددية الدينية والمذهبية والقومية

- 9توعية الطلبة الى حجم الدمار والتلوث البيئي الذي احدثته الحروب واستخدام اسلحة محرمة دوليا

–10بيان مدى قسوة النظام البعثي وقمعه للشعب والمقابر الجماعية التي ضمت رفاة آلاف الشهداء الأبرياء

-11توعية الطلبة الى ماقام به النظام السابق من تهجير ابناء هذا البلد وكفائته العلمية والادبية

10. Course Structure					
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2	Chapter1	مقدمة عن انتهاكات الحقوق	2 ساعة	1
	hours		والحريات		
2	2	Chapter2	نبذة وصفية عن الانظمة	2 ساعة	2
	hours		السياسية في العراق		
3	2	Chapter3	انتهاكات النظام البعثي للحقوق	2 ساعة	3
	hours		والحريات العامة		
4	2	Chapter4	اثر سلوكيات النظام البعثي في	2 ساعة	4
	hours		المجتمع وتسلطه على الدولة		
5	2	Chapter5	اثر المرحلة الانتقالية في محاربة	2 ساعة	5
	hours		السياسة الاستبدادية		
6	2	Chapter6		2 ساعة	6
	hours		الميدان النفسي والاجتماعي		
7	2		F	2 ساعة	7
	hours		Exam		
8	2	Chapter7	51 . H H	2 ساعة	8
	hours		الدين والدولة		

9	2	Chapter8		2 ساعة	9	
	hours		عسكرة المجتمع والثقافة والاعلام			
10	2	Chapter9	اثر القمع والحروب على البيئة	2 ساعة	10	
10	- hours		الر الملك والمروب على البيك. والسكان			
11	2	Chapter10		2 ساعة	11	
11	_	Chapterro	التلوث البيئي واستعمال الاسلحة			
	hours	<u> </u>	المحرمة دوليا	2 ساعة	10	
12	2	Chapter11	سياسة الارض المحروقة وتجفيف	2 ساعة 2	12	
	hours		الاهوار			
13	2	Chapter12	المقابر الجماعية وتدمير البيئة	2 ساعة	13	
	hours		الزراعية			
14	2			2 ساعة	14	
	hours		final Exam			
11. (	Course E	Evaluation				
Distribu	iting the	score out of 100 accor	ding to the tasks assig	gned to the stude	ent such as daily	
prepara	tion, dail	ly oral, monthly, or wr	itten exams, reports .	etc	-	
12. L	_earning	and Teaching Reso	ources			
Require	d textbool	ks (curricular books, if a	any) إرة التعليم	جرائم حزب البعث البائد 2023/جمهورية العراق/وزارة التعليم		
		,	والتخطيط	يث العلمي/دائرة الدراسات	العالي والبد	
Main references (sources)			None	None		
Recomn	nended	books and refe	rences			
(scientifi	c journals	s, reports…)	None	<b>)</b>		
Electron	ic Refere	nces, Websites	Wiki	pedia		

1. Course Na	me:
	English Language (2)
2. Course Co	de:
	UOB 206
3. Semester	/ Year:
	First semester /Second Stage
4. Descriptio	n Preparation Date:
5 Available	2024-4-2 Attendance Forms:
Weekly	
	Credit Hours (Total) / Number of Units (Total)
30 hours	
7. Course ad	dministrator's name (mention all, if more than one name)
Name: Dr. M	Authana Hameed Khalaf
Email: <u>muth</u>	ana.khalaf@sc.uobaghdad.edu.iq
8. Course Ob	jectives
Course Objectives	<ul> <li>a pre-intermediate level course aiming to build and further improve language proficiency for second year students/ college of science,</li> <li>1. Listening Objectives: <ul> <li>Understand and respond appropriately to a variety of spoken English in familiar contexts.</li> <li>Comprehend main ideas, specific details, and implied information in spoken texts.</li> <li>Develop listening strategies to enhance understanding.</li> </ul> </li> <li>2. Speaking Objectives: <ul> <li>Engage in conversations on a range of topics using appropriate vocabulary and grammar.</li> <li>Express opinions, preferences, and experiences.</li> <li>Develop speaking strategies for effective communication, such as turn-taking and seeking clarification.</li> </ul> </li> <li>3. Reading Objectives: <ul> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and implied information in written texts.</li> <li>Develop reading strategies for comprehension and vocabulary acquisition.</li> </ul> </li> <li>4. Writing Objectives: <ul> <li>Write coherent paragraphs and short texts on different topics.</li> <li>Express ideas clearly and logically using appropriate grammar and vocabulary.</li> </ul> </li> </ul>

	<ul> <li>Develop writing strategies for organization, coherence, and accuracy.</li> <li>Grammar and Vocabulary Objectives: <ul> <li>Develop a solid understanding and usage of a wide range o grammatical structures appropriate for the pre-intermediate level.</li> <li>Expand vocabulary knowledge to include a broader range of words idiomatic expressions, and collocations.</li> <li>Apply grammar and vocabulary knowledge to express onesel accurately and effectively.</li> <li>Pronunciation and Intonation Objectives:</li> <li>Improve pronunciation accuracy of individual sounds, stres patterns, and intonation.</li> <li>Use appropriate rhythm, stress, and intonation for effective communication.</li> <li>Recognize and produce connected speech features to enhance fluency and naturalness.</li> <li>Cultural Awareness Objectives:</li> <li>Develop an understanding of cultural practices, customs, and socia norms in English-speaking countries.</li> <li>Demonstrate cultural sensitivity and adapt communication accordingly.</li> <li>Recognize the impact of culture on language use and communication styles.</li> </ul> </li> </ul>
- <b>-</b>	
9. Tea Strategy	ching and Learning Strategies Learner training is essential to the achievement of the Learning
	Learner training is essential to the achievement of the Learning Outcomes.
	Learner training is essential to the achievement of the Learning Outcomes. 1. Listening and Speaking:
	Learner training is essential to the achievement of the Learning Outcomes.
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading:</li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading: <ul> <li>Read and understand a variety of texts, including articles, stories, and</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading: <ul> <li>Read and understand a variety of texts, including articles, stories, and</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and specific information from the texts.</li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading: <ul> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and specific information from the texts.</li> <li>Apply reading strategies to infer meaning from context and make</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading: <ul> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and specific information from the texts.</li> <li>Apply reading strategies to infer meaning from context and make predictions.</li> <li>Writing: <ul> <li>Write coherent and well-organized paragraphs and short texts on various</li> </ul> </li> </ul></li></ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>1. Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and specific information from the texts.</li> <li>Apply reading strategies to infer meaning from context and make predictions.</li> <li>Writing: <ul> <li>Write coherent and well-organized paragraphs and short texts on various topics.</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading: <ul> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and specific information from the texts.</li> <li>Apply reading strategies to infer meaning from context and make predictions.</li> <li>Writing: <ul> <li>Write coherent and well-organized paragraphs and short texts on various topics.</li> <li>Express ideas and opinions clearly and concisely.</li> </ul> </li> </ul></li></ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading: <ul> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and specific information from the texts.</li> <li>Apply reading strategies to infer meaning from context and make predictions.</li> </ul> </li> <li>Writing: <ul> <li>Write coherent and well-organized paragraphs and short texts on various topics.</li> <li>Express ideas and opinions clearly and concisely.</li> <li>Demonstrate control of grammar, vocabulary, and sentence structures</li> </ul> </li> </ul>
	<ul> <li>Learner training is essential to the achievement of the Learning Outcomes.</li> <li>Listening and Speaking: <ul> <li>Understand and respond appropriately to a range of everyday spoken English in familiar contexts.</li> <li>Engage in conversations and discussions on a variety of topics using appropriate language and strategies.</li> <li>Comprehend and extract information from spoken texts, such as interviews, dialogues, and narratives.</li> </ul> </li> <li>Reading: <ul> <li>Read and understand a variety of texts, including articles, stories, and informational passages.</li> <li>Comprehend main ideas, details, and specific information from the texts.</li> <li>Apply reading strategies to infer meaning from context and make predictions.</li> <li>Writing: <ul> <li>Write coherent and well-organized paragraphs and short texts on various topics.</li> <li>Express ideas and opinions clearly and concisely.</li> </ul> </li> </ul></li></ul>

• Understand and use a wide range of grammatical structures and tenses,
including present perfect, past simple, future forms, and conditionals.
• Expand vocabulary knowledge to include a broader range of words, idiomatic expressions, and collocations.
• Apply grammar and vocabulary in context to enhance communication skills.
Pronunciation and Intonation:
• Develop accurate pronunciation of individual sounds and common word stress patterns.
• Use appropriate intonation and stress patterns to convey meaning effectively.
• Understand and produce connected speech features, such as linking sounds and contractions.
Cultural Awareness:
• Gain insights into cultural practices, traditions, and customs in English- speaking countries.
• Develop intercultural competence and sensitivity in communication.
• Understand cultural influences on language use and behavior.

10. C	ourse St	ructure			
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Getting toknow youp6TensesPresent, past, future p6QuestionsWhere were you born?What do you do? p6Question wordsWho?, Why?,How much? p7Right word, wrong wordVerbs of similar meaningspeak/talk, say/tellAdjectives and nounsthat gotogetherPrepositionsto, from, at, about, of, on,in, etc.Words with twomeaningsI met my husband on ablind date.Dates are good for you.p12Social expressionsHave a good weekend!Same to you.	Theoretical	General questions +Exam
2	2 hours	Chapter2	p13 Whatever makes you happy p14	Theoretical	General questions +Exam

			Present tensesPresent SimpleShe lives alone in Bristol.p14Present ContinuousShe's planning p14have/have gotHe has his own company.I've got an idea for p15Things I like doingplay gameshave a lie-inget up late p17Making conversationWhat a lovely day it istoday!Are you having a goodtime in London?Have a good weekend!p21		
3	2 hours	Chapter3	What's in the news?	Theoretical	General questions +Exam
			p22 Past tenses Past Simple How far did he walk? I had a shower last night. p23 Past Continuous I was having a shower when p23 Adverbs drive carefully speak furiously work hard p28 Saying when What's the date today? It's June the twentysecond. When did you last go to the cinema? Two weeks ago. p29		
4	2 hours	Chapter4	Eat, drink, and be merry! p30 Quantity much and many How much milk? How many eggs? p31 some and any some apples, any bananas p31 a few, a little, a lot/lots of p31 something / someone / somewhere p32 Articles a shopkeeper, an old village, the perth of England Up	Theoretical	General questions +Exam
			village, the north of England, He came by bus. p32		

			Food		
			apples, beer, bread, cake p36 Shopping newsagent's, chemist's, off-licence p36 Can you come for dinner?		
			Would you like some more rice? Could you pass the salt, please? How would you like your coffee? This is delicious! p37		
5	2	Chapter5	Looking forward	Theoretical	General questions
	hours		p38 Verb patterns want/hope to do like/enjoy doing looking forward to doing 'd like to p38 Future forms going to, will and Present Continuous I'm going to stay with a friend. I'll call or text you. I'm working late this evening. p40 Phrasal verbs – literal move back take away grow up p44 Phrasal verbs – idiomatic give up take off look after p44 Expressing doubt and certainty Of course he will. He might do. Mmm maybe. I doubt it. No abarce p45		+Exam
6	2 hours	Chapter6	No chance. p45The way I see itp46What like?What's your teacher like?p46Comparative andsuperlative adjectivesbig, bigger, biggestgood, better, best p47as asIt isn't as hot as Dubai.p47Relative pronounswho/that/which/wherep110Synonyms and antonymslovely, beautifulbrilliant, terrible p52What's on?	Theoretical	General questions +Exam

			How much is it to go in the museum?		
			Is it open on Sunday?		
			What film is suitable for children? p53		
7	2			Theoretical	Exam
/			Exam		
	hours				
8	2	Chapter7	Living history	Theoretical	General questions
	hours		p54		+Exam
			<b>Present Perfect</b> John has lived there for		
			three		
			years. p55 for and since		
			for two hours		
			since six o'clock p55 ever and never		
			Have you ever been?		
			I've never been to South America. p56		
			Present Perfect or Past		
			Simple		
			Have you had an ordinary job?		
			I worked in a restaurant.		
			p57 Word endings		
			Jobs		
			philosopher, historian, economist p57		
			Nouns and adjectives		
			<i>competition, famous</i> p57 Word stress		
			danger, dangerous		
			<i>invite, invitation</i> p57		
			Agree with me! It's wonderful, isn't it?		
			You come from		
			Scotland, don't you? It wasn't easy, was it?		
			You've lived here for		
			years, haven't you? p61		
9	2	Chapter8	Girls and boys	Theoretical	General
			p62		questions +Exam
	hours		have to		+Exam
			She has to train hard. I don't have to train every		
			day.		
			<i>Do you have to work at weekends?</i> p63		
			should		
			You should show him this letter. p64		
			must		
			<i>He must get professional</i> <i>help.</i> p64		
			Things to wear		
			belt, cap, boots, jumper,		
			<i>make-up</i> p68 Materials		

			cotton p68		
			Situations job interview, party, beach holiday p68		
			At the doctor's a sore throat, flu, food poisoning I've got a fever.		
			My body aches. My glands are swollen. p69		
10	2 hours	Chapter9	Time for a story p70 Past Perfect They had walked twenty miles. p71 Narrative tenses They saw a bear. They were looking for work. p71 Joining sentences although, because when, while, before, after, as, until, as soon as p72 Feelings angry, nervous, delighted, stressed p76 Exclamations with so and such I was so scared! It was such a shock! We had such terrible weather! I've got so much work! p77	Theoretical	General questions +Exam
11	2 hours	Chapter10	Our interactiveworldp78PassivesMobile phones are used byalmost6 billion people.The first mobile phonecall was madein 1973.Camera phones have beensold since2002.Landline telephones willbe replacedby mobile phones. p79Words that go togetherNoun + nountext message,businessman p81Verb + nountake notes,send a text message p81Adverb + adjectivewell-known,	Theoretical	General questions +Exam

			badly-behaved p81 On the phone 07700 900333 Can I speak to Patrick, please? I'm calling because Sorry, you're breaking up p85		
12	2 hours	Chapter11	Life's what you make it! p86 Present Perfect Continuous He's been making programmes since 2007. How long has she been working there? p87 Present Perfect Simple versus Continuous He's made three programmes. He's been teaching for three years. p87 Birth, marriage, death pregnant, born engaged, divorced funeral, died of p92 Good news, bad news Congratulations! That's fantastic news! What a shame! I'm so sorry.	Theoretical	General questions +Exam
13	2 hours	Chapter12	p93 Just wondering  p94 First conditional if + will If it's sunny, we'll go for a picnic. We won't go out if it rains. p95 going to and might What are you going to do tonight? I might go out p95 Second conditional if + would If I had a brother, I'd play with him. If I were you, I'd stop smoking. p96 Prepositions connected to on a date listen to think about p100 Thank you and goodbye! It's late. I must be going now. Thank you for a lovely	Theoretical	General questions +Exam

		evening. My pleasure!		
14 2 hours	Chapter1	p101Living in a stately homeLiving historyChatsworth House andthe family who call ithome p58A family historyDavid Taylor Bewsfrom Perth, Australiaresearches his familyhistory p60What do you think?Stately homesAristocracyInherited wealth p58Talking about youHave you ever? p57The lives of yourgrandparents p60What do you think?Family history p60A biographyOrdering paragraphs:Two KennedysResearching facts abouta famousperson and writing abiography	Theoretical	General questions +Exam
15 2 hours	Chapter13	p111Families with all boys orallgirlsSons and daughtersThe parents of fourdaughters swap homeswith the parents of foursons p66Heptathlon championAn interview withJessica Ennis – Britain'sfirst world heptathlonchampion p65What do you think?Talking about successfulpeople p65Pros and cons of all-girlor all-boy familiesThe ideal family p66Dress person XDescribing an outfit p68Letters and emailsFormal and informalexpressionsDear Sir or Madam,Yours sincerely,Hi Cathy,Love SteveWriting a formal letter toalanguage school and anemail to	Theoretical	General questions +Exam

16	2 hours	Chapter14	Final	Exam	Theoretical	
11. (	Course I	Evaluation				
	0	score out of 100 a ly oral, monthly, c	0	0		nt such as daily
12. Learning and Teaching Resources						
Required textbooks (curricular books, if any) Main references (sources)			The core textbook is Soars, John and Liz, (2011), New Headway Plus Pre-Intermediate Student's Book, Special Edition, Oxford University Press New Headway Plus provides an integrated skills course with each unit divided into grammar, vocabulary, skills work and everyday English segments			
Recomr (scientif		books and s, reports…)	references	none		
Electronic References, Websites			published by Ox website at <u>www</u> Headway Plus, S	ity Press: The New ford University Pre <u>oup.com</u> and search Special Edition, pre- glish language teach he course.	ss. Visit their n for "New -Intermediate" or	

3. S 4. D 5. A		Code: er / Year		uobic Language (2)		
3. S 4. D 5. A	emeste			LIOB 205		
4. D 5. A		er / Year		LIOB 205		
4. D 5. A		er / Year		00B 203		
5. A			•			
5. A			First se	emester /Second Sta	ige	
	Descript	tion Pre	paration Da			
	vailabl	e Attend	ance Forms	2024-4-2		
v	Veekly			•		
	~	of Credi	t Hours (To	tal) / Number of Uni	ts (Total)	
3	0 hour	S				
7 (	<b>NUIRCO</b>	adminic	trator's no	me (mention all if t	nore then a	
	_	r. Leqaa fal		me (mention all, if r	nore than c	ne name)
		-		.uobaghdad.edu.iq		
		Objective				
Course O	bjective	5	كل مفصل وتطبيقي	م خلال تطبيق قواعد اللغة العربية بشا	ملاء والتعبير الصحيح	1-تعلم مهارات الكتابة والا
				وما	مماء وكدفية التعامل مع	على نصوص عربية. 2- لفهم الجمع وأنواع الاس
						3- لفهم العدد واستعماله بن
				äteshilet		للتفريق بين الضاد والظاء. 4- للتفريق ومعرفة استعما
				۶۹ التطويد.		4- تسعرين ومعرف المتعم 5-التمييز بين العلامات الاه
				، كل أداة ومعناها في التعبير 6-	ستعمال الأدوات وعمل	. تعلم ا
9. T	eachine	g and Le	arning Strat	tegies		
Strategy						
		بيلاغة اللغة		أفضل أن تكون مساوية لعدد أسابيع اا ع وسبب اختلافها وقائمة بالمصطلحا		
		**			إنواعها.	العربية تعلم كتابة الهمزة و 2-وصف عمل الجمل الفعلي
					م والواع الإلغان	
10. Co	urse St	ructure				
Week	Hours	Require	d Learning	Unit or subject	Learning	Evaluation
		Outcom	es	name	method	method
1	2	Chapter		علامات الترقيم والتنقيط	Theoretical	General questions
	hours			والنواسخ		+Exam

2	2	Chapter2		Theoretical	General
	hours		المشتقات.		questions +Exam
3	2 hours	Chapter3	الجملة الاسمية	Theoretical	General questions +Exam
4	2 hours	Chapter4	الجملة الفعلية	Theoretical	General questions +Exam
5	2 hours	Chapter5	الفرق بين الضاد والظاء	Theoretical	General questions +Exam
6	2 hours	Chapter6	التاء المربوطة والتاء المفتوحة	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	الهمزة وانواعها العدد	Theoretical	General questions +Exam
9	2 hours	Chapter8	الجمع	Theoretical	General questions +Exam
10	2 hours	Chapter9	العلامات الاصلية والعلامات الفرعية	Theoretical	General questions +Exam
11	2 hours	Chapter10	اعلام عراقيون بدر شاكر السياب والجواهري	Theoretical	General questions +Exam
12	2 hours	Chapter11	العطف	Theoretical	General questions +Exam
13	2 hours	Chapter12	حروف الجر	Theoretical	General questions +Exam
14	2 hours	Chapter1	الاسم المؤنث والاسم المذكر	Theoretical	General questions +Exam
15	2 hours	Chapter13	الحذف والزيادة, الأسماء المنصوبة	Theoretical	General questions +Exam
16	2 hours	Chapter14	Final Exam	Theoretical	
11.	Course	Evaluation			
	0		ccording to the tasks assign r written exams, reports		lent such as daily
12.	Learning	and Teaching F	Resources		
Require	ed textboo	ks (curricular books	ج ابن عقیل (s, if any	الدروس العربية وشر	جامع

Main references (sources)	Electromagnetic theory (book). 2000.vol.1
Recommended books and references (scientific journals, reports)	none
Electronic References, Websites	none

		Outcomes	name	method	method
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
10. Co	ourse St	ructure			
			at are interesting to the studen		
		and expanding their	tts' participation in the exerci critical thinking skills. This and by considering types of s	will be achieved t	hrough classes,
Strategy	,		The main strategy that will b		
		g and Learning Strat	tegies		
R 8. ( Course (	Name: n Email: z Course ( Objective	Pr. zainab hadi Mahmood         ainab.mahmood@sc.u         Objectives         s       Teaching students         field of general phy         of studying the c         meeting the needs         Preparing an educa         to bring about rad         methods in thinkin         to keep up with the         deepening and do         through the implent         teaching and admining         in physics who convarious sectors w         Encouraging the d         department to be p	the basic principles of phys ysics and its practical application ountry's need for developm of the job market in state in the generation armed with sc dical changes and assign sc g, analysis and adaptation wit the expansion of human need cumenting the connection of mentation of advisory counse nistrative staff. 5. The service ntribute to development in the with highly qualified person listinguished in this field to art of the academic teaching a	ics. 2. Preparing spe- tons, which bears the ent and progress a stitutions and indus- tence and adopts it a ientific knowledge h the development o eds. 4. Effective co f the university wi ling, training and d of preparing gradua e country. 6. Meetin hals in the field o work as teaching as	ecialists in the e responsibility nd capable of stry sectors. 3. s a sound basis and scientific f technologies, ontribution for th the society evelopment of tes specialized ng the needs of of physics. 7.
	30 hour	,	(a) / Number of Om	is (10tal)	
	Weekly	of Credit Hours (To	tal) / Number of Uni	ts (Total)	
		e Attendance Forms	•		
4. I	Descrip	tion Preparation Da	2024-4-2		
			emester /Second Sta	ige	
3. 5	Semeste	er / Year:	, <u>10</u> , 10,		
			PMa 207		
2. (	Course	Code:			
•			Mathematic III		

		0	0	Theoretical	Concrel
1	2	Concept of function	Concept of function	Theoretical	General questions
	hours	and inverse	and inverse		+Exam
	nours	function	function		
2	2	The logarithm	The logarithm	Theoretical	General
	la a sura	function and	function and		questions +Exam
	hours	exponential	exponential		+Exam
		function	function		
3	2	A review for the	derivatives	Theoretical	General
5		derivatives' laws,			questions
	hours	and add the			+Exam
		definitions of the			
		trigonometric			
		functions and the			
		inverse of			
		trigonometric functions with their			
		derivatives		Theoretical	General
4	2	Solve some	derivatives	Theoretical	questions
	hours	examples on the			+Exam
		subject (A review			
		for the derivatives'			
		laws, and add the			
		definitions of the			
		trigonometric			
		functions and the			
		inverse of			
		trigonometric			
		functions with their			
		derivatives)			
5	2	Hyperbolic	Hyperbolic	Theoretical	General
C		functions and the	functions		questions
	hours	inverse of			+Exam
		Hyperbolic			
		functions with their			
		derivatives			
6	2	Solve some	Hyperbolic	Theoretical	General
U		examples on the	functions		questions
	hours	subject "Hyperbolic	Turretions		+Exam
		functions and the			
		inverse of			
		Hyperbolic			
		functions with their			
		derivatives"			
-			Integration	Theoretical	Exam
7	2	Integration	Integration	Theoretical	LAuff
	hours			Theoretical	General
8	2		exam	Theoretical	questions
	hours				+Exam

9	2 hours	Application of finite Integration	Applio Integr	cation of finite ration	Theoretical	General questions +Exam
10	2 hours	Application of finite Integration	Applio Integr	cation of finite ration	Theoretical	General questions +Exam
11	2 hours	Integration methods by part	Integral		Theoretical	General questions +Exam
12	2 hours	Integration methods by partial fraction (part 1)	Integral		Theoretical	General questions +Exam
13	2 hours	Integration methods by partial fraction (part 2)	Integral		Theoretical	General questions +Exam
14	2 hours	Integration methods power Trigonometric			Theoretical	General questions +Exam
15	2 hours	example	integral		Theoretical	General questions +Exam
16	2 hours		exam		Theoretical	
Distribu prepara	iting the stition, dail	Evaluation score out of 100 accor y oral, monthly, or wr and Teaching Reso	itten ex	ams, reports		nt such as daily
Required	d textbool	ks (curricular books, if a	any)	ادة كتب الرياضيات	عة من قبل مدرس الم	المحاضرات المطبو
Main references (sources)			كتاب الرياضيات ( Thomas _ calculus ) التفاضل والتكامل والهندسة التحليلية : تأليف توماس حسبان التفاضل والتكامل : تأليف برسل			
Recommended books and references (scientific journals, reports)			2012. 2 .Thomas. (	•	7th Edition, y. R. L., "Calcu y", 6th Editio	
Electron	ic Refere	nces, Websites				

1. Course Name:       Analogue Electronics / Lab.         2. Course Code:       PHY 2316         3. Semester / Year:       First semester /Second Stage         4. Description Preparation Date:       20244-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name: Dr. Estabrag Talib Abdullab         Email: Estabragalit@sc.ubabtdat.edu.iq       8. Course Objectives         Teaching students the basic principles of physics 2. Preparing systematin progress and capable of physics and its practical applications, which basis the responsibility of studying the country's need for development and progress and capable of more systems 3. Propting an educated generation and actives resonability of studying the country's need for development and includery sectors 3. Propting an educated generation and actives resonability of studying the country's need for development of teaching and administrative staff. 5. The service of preparing systematic methods in thinking, analysis and adaptation with the development of teaching and administrative staff. 5. The service of preparing areducates generative at the subscript with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing and countering the country's. 6. Meeting the second rous sectors with highly qualified personabilis the field of physics with esciety through the implementation of advisory counseling, training and development of teaching and decountering this module is to encourage students' partic		
2. Course Code:       PHY 2316         3. Semester / Year:       First semester /Second Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name: Dr. Estabraq Talib Abdullah         Email:       Estabraq Talib Abdullah         Email:       Estabraq Talib Abdullah         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bacis the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring abour radical changes and asign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologics, to keep up with the society through the implementation of advisory consensing, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute development in the context, 4. Effective contribution for depening and documenting the contrary. 6. Meeting the needs of various sectors with highly qualified presonals in the field of physics. 7. Encornaging the distinguished in this field to werk as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strateg	1. Course l	Name:
PHY 2316         3. Semester / Year:         First semester /Second Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Estabraq Taib Abdullah         Email: Estabraqalib@sc.uobashdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing a evelopment and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated general physics and its practical applications, which bears the responsibility of studying the courty's need for development of the university with the expansion of human needs. 4. Effective contribution for deepening and adaptition with the development of the university with the expansion of human needs. 4. Effective contribution for deepening and adaptitisch in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage		Analogue Electronics / Lab.
3. Semester / Year:         First semester /Second Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Estabraq Talib Abdulah         Email: Estabraqtalib@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowidge and scientific methods in thinking, analysis and adaption with the development of teaching sits. 7. Encouraging the distailshed in this field to work as teaching assistants in the department to be part of the academic teaching sits. 7. The service of preparing graduates specialized in physics. 4. Effective contribution tor decepting and downmenting the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of mysics. 7. Encouraging the distailshed in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies		

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	6 hours	none	Introduction of Analog Equipment's	Practical	General questions
2	6 hours	none	Introduction of Analog Electronic Components	Practical	Solve on the board
3	6 hours	none	STUDY OF THE CHARACTERISTICS OF A DIODE AND THE CHARECTERISTIC OF ZENER DIODE (Part 1)	Practical	Graph paper exam
4	6 hours	none	STUDY OF THE CHARACTERISTICS OF A DIODE AND THE CHARECTERISTIC OF ZENER DIODE (Part 2)	Practical	Daily exam and assessment report
5	6 hours	none	Power Supply - Half Rectifier	Practical	Daily exam and assessment report
6	6 hours	none	Power Supply - Full Rectifier	Practical	Daily exam and assessment report
7	6 hours	none	Exam	Practical	Daily exam and assessment report
8	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS	Practical	Daily exam and assessment report
9	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Part 1)	Practical	Daily exam and assessment report
10	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Part 2)	Practical	Daily exam and assessment report
11	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Output Circuit) (Part 1)	Practical	Daily exam and assessment report
12	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Output Circuit) (Part 2)	Practical	Daily exam and assessment report

13	ნ hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Input Circuit)	Practical	Daily exam	
14	6 hours	none	DESIGN OF A COMMON EMITTER AMPLIFIER (Part 1)	Practical	Exam	
15	6 hours	none	DESIGN OF A COMMON EMITTER AMPLIFIER (Part 2)	Practical	Exam	
16	6	none	Final Exam	Practical		
	hours					
11. (	Course E	Evaluation				
	0		ding to the tasks assig itten exams, reports		lent such as daily	
12. l	_earning	and Teaching Reso	ources			
Required textbooks (curricular books, if any)			any) Electron	Electronic devices by Thomas L. Floyed		
Main references (sources)			Electror	nic and instrume	ntation by Gupta	
Recommended books and references (scientific journals, reports)			none			
Electron	ic Refere	nces, Websites	none			

1. Course Name:				
Heat and Thermodynamic/ lab.				
2. Course Code:				
PHY 2314				
3. Semester / Year:				
First semester /Second Stage				
4. Description Preparation Date:				
2024-4-2 5. Available Attendance Forms:				
Weekly				
6. Number of Credit Hours (Total) / Number of Units (Total)				
30 hours				
7. Course administrator's name (mention all, if more than one name)				
Name: Dr.Hussein Khazal Rasheed				
Email: Hussein.k@sc.uobaghdad .edi.iq				
8. Course Objectives				
<b>Course Objectives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.				
9. Teaching and Learning Strategies				
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students				
10. Course Structure				

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	6 hours	none	Introduction to the laboratory experiments	Practical	Practical
2	6 hours	none	Measuring the true expansion coefficient of water	Practical	Practical
3	6 hours	none	Measuring the apparent expansion coefficient of water	Practical	Practical
4	6 hours	none	Measuring the coefficient of linear expansion of metals	Practical	Practical
5	6 hours	none	The specific heat of a liquid by cooling method	Practical	Practical
6	6 hours	none	Thermal conductivity coefficient of a well- conductive material (Searl)	Practical	Practical
7	6 hours	none	Exam	Practical	Practical
8	6 hours	none	Thermal conductivity coefficient of a non- conducting material (Li disk)	Practical	Practical
9	6 hours	none	Calculating atmospheric pressure by Boyle's method	Practical	Practical
10	6 hours	none	Satisfying of Charles ' law of the dependence of temperature on volume at constant pressure	Practical	Practical
11	6 hours	none	Satisfying of Gay- Lussac Charles' law of the dependence of temperature on pressure at constant volume	Practical	Practical
12	6 hours	none	Calibration of the thermocouple and its use as a thermometer	Practical	Practical
13	6 hours	none	Determination of water vapor pressure curve	Practical	Practical
14	6 hours	none	Maxwell -Boltzmann distribution law	Practical	Practical
15	6 hours	none	Reviewing the experiments	Practical	Practical

16	6	none	Final Exam	Practical	Practical
	hours				
11. (	Course I	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					
12. Learning and Teaching Resources					
Require	Required textbooks (curricular books, if any) Mark Waldo Zemansky_ Richard Ditt Heat and thermodynamics _ an interm textbook (1997, McGraw-Hill				cs _ an intermedi
Main ref	erences	(sources)	none		
Recomn (scientifi		books and refe s, reports…)	none		
Electron	ic Refere	nces, Websites	none		

1. Cours	se Name:
	Practical physics I(modern physics I)
2. Cours	se Code:
	PHY 2313
3. Seme	ester / Year:
	First semester /Second Stage
4. Descr	ription Preparation Date:
	2024-4-2
	able Attendance Forms:
Week	
	per of Credit Hours (Total) / Number of Units (Total)
30 ho	ours
	so administrator's name (mention all, if more than one name)
	se administrator's name (mention all, if more than one name)
	l: samar.o@sc.uobaghdad.edu.iq
8. Cours	se Objectives
Course Object	the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
	ning and Learning Strategies
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	6 hours	introduction	Introduction to a modern physics	Theoretical	General questions +Exam
2	6 hours	Graph	laboratoryTeach students howto graph	Theoretical	General questions +Exam
3	6 hours	Graph	Graph test	Theoretical	General questions +Exam
4	6 hours	Experiment (1)	The back scattering For Beta particles	Theoretical	General questions +Exam
5	6 hours	Experiment (2)	Photoelectric Effect	Theoretical	General questions +Exam
6	6 hours	Experiment (3)	Calculating the electron to mass ratio (e/m) (Thomsen method)	Theoretical	General questions +Exam
7	6 hours	Experiment (4)	Millikan's Oil Drop	Theoretical	Exam
8	6 hours	Experiment (5)	Determination of Rydberg Constant	Theoretical	General questions +Exam
9	6 hours	Experiment (6)	Light Absorption coefficient by using photo cell	Theoretical	General questions +Exam
10	6 hours	Experiment (7)	Determination of the first excitation potential for Helium	Theoretical	General questions +Exam
1	6 hours	Experiment (8)	The Characteristics of Geiger's Counter	Theoretical	General questions +Exam
2	6 hours	Explanation of experiments for students who are absent with an official excuse	All the experiments	Theoretical	General questions +Exam
13	6 hours	Review of experiments before taking the final exam	All the experiments	Theoretical	General questions +Exam
14	6 hours	Exam of the all experiments	Semester exam	Theoretical	General questions +Exam

15	6 hours	Exam of the all experiments	Final exam		Theoretical	General questions +Exam
16	6	introduction			Theoretical	
	hours					
11. (	Course E	Evaluation				
	-	score out of 100 accor ly oral, monthly, or wr	-	-		nt such as daily
12. L	_earning	and Teaching Reso	ources			
Require	d textbool	ks (curricular books, if a	any)		ihi al- khafaja" prac d stage " 1978	tical physics for
Main ref	erences (	(sources)		Talab r 1980	nahi al- khafaja" at	omic physics ",
Recomn (scientifi		books and refe s, reports…)	rences	sheet lab.	Experiments	
Electron	ic Refere	nces, Websites		Videos s internet	howing the Exper	imental via the

1. Course Name:	
	Atomic Physics II
2. Course Code:	
	PHY 2420
3. Semester / Year:	
S	econd semester / Second Stage
4. Description Prepara	
5. Available Attendance	2024-4-2 • Forms:
Weekly	
	urs (Total) / Number of Units (Total)
30 hours	
7. Course administrate	or's name (mention all, if more than one name)
Name: Dr. Mohammed Ab	dullah Hameed
Email: <u>mohammed.a@sc.u</u>	obaghdad.edu.iq
8. Course Objectives	
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teaching and Learning	ng Strategies
encourage student expanding their c	ke: The main strategy that will be adopted in delivering this module is to is' participation in the exercises, while at the same time refining and ritical thinking skills. This will be achieved through classes, interactive onsidering types of simple experiments involving some sampling activities to the students

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	The atomic modelsof Rutherford andBohr1.1 Introduction1.2 The Rutherfordmodel of the atom	Theoretical	General questions +Exam
2	2 hours	Chapter2	1.3 Spectrum ofhydrogen gas1.3Spectrum of hydrogengas1.4 Boher model oftheory of atoms	Theoretical	General questions +Exam
3	2 hours	Chapter3	1.5 Energylevelsofhydrogen atom1.6 Binding energy	Theoretical	General questions +Exam
4	2 hours	Chapter4	1.7 Ionization potentials of hydrogen atom Many electron atoms	Theoretical	General questions +Exam
5	2 hours	Chapter5	1.8 Quantum numbers 1.10 Pauli exclusion principle	Theoretical	General questions +Exam
6	2 hours	Chapter6	Electron shells and chemical activity and Examples	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	X-rays           3.1 Discovery           3.2 Production of x-rays	Theoretical	General questions +Exam
9	2 hours	Chapter8	3.3 The nature of x-rays 3.4 X-rays diffraction	Theoretical	General questions +Exam
10	2 hours	Chapter9	3.5 Mechanism of x-ray production 3.6 X-ray energy	Theoretical	General questions +Exam
11	2 hours	Chapter10	3.7 X-ray spectra of the elementsatomic number 3.8 Compton scattering	Theoretical	General questions +Exam
12	2 hours	Chapter11	Structure of solids 2.1 Introduction 2.2 Atomic bonding - Ionic bonding - Covalent bonding	Theoretical	General questions +Exam
13	2 hours	Chapter12	- Metallic bonding - Vander wall's bonding	Theoretical	General questions +Exam

14	2 hours	Chapter1	2.3 Uni 2.4 Mil	t cell ler indices	Theoretical	General questions +Exam
15	2 hours	Chapter13	- La directio	stal structure attice planes and on comic packing	Theoretical	General questions +Exam
16	2 hours	Chapter14	The at           of Rut           Bohr           1.2 Int           1.2 The	tomic models therford and roduction Rutherford of the atom	Theoretical	
Distrib prepara	uting the ation, dai	Evaluation score out of 100 acc ly oral, monthly, or y and Teaching Re	written ex	-		lent such as daily
Require	d textboo	ks (curricular books,	if any)	"The 2- Richard T "Ele 3- M.C. Love	Yehr and James physics of the a Wridner and F mentry modern ll and A. J. Aver vscal properties	tom" cobert L. Sells physics" ry
Main re	ferences	(sources)		Modern	n Physics Boo	ks
Recomr (scientif		books and re s, reports…)	eferences	none		
(	-	· ,				

13.       Course Name:       Heat and Thermodynamic         14.       Course Code:       PHY 2421         15.       Semester / Year:       Second semester / Second Stage         16.       Description Preparation Date:       2024-4-2         17.Available Attendance Forms:       Weekly         18.Number of Credit Hours (Total) / Number of Units (Total)       30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed       Email: Hitsein L@sc.uobaphdad.edi.ig         20.       Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialitists in the reponsibility of studying the country's need for development and properiation arend with science and depart and colspan="2">Adoption market in state institutions and industry sectors. 3. Preparing specialitists in the reponsibility of studying the country's need for development of technolises to the preparing gatadiates in the reponsibility of st		•
14.       Course Code: PHY 2421         15.       Semester / Year: Second semester / Second Stage         16.       Description Preparation Date: 2024-4-2         17. Available Attendance Forms: Weekly       2024-4-2         18. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein kbazal Rasheed Email: Hussein k@sc.uobaghdal.edi.iq         20.       Course Objectives         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the courty's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific rective contribution for deepening and documenting the connection of the university with the society hough the implementation of advisory conscienting, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participatio	13.	Course Name:
PHY 2421         15.       Seemester / Year:         Second semester / Second Stage         16.       Description Preparation Date:         2024-4-2         17. Available Attendance Forms:         Weekly         18. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed         Email: Hussein & & sc.aobaghdal.cdi.iq         20.          Course Objectives         Course Objectives         Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the coursy's need for development and progress and capabe of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a south basis to bring about fadical changes and assign scientific hendols in thinking, analysis and adopts it as a south basis to bring about fadical changes and sasign scientific hendols in thinking, analysis and adoptistized in physics who contributo for development of teaching and development of teac		Heat and Thermodynamic
PHY 2421         15.       Seemester / Year:         Second semester / Second Stage         16.       Description Preparation Date:         2024-4-2         17. Available Attendance Forms:         Weekly         18. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed         Email: Hussein & & sc.aobaghdal.cdi.iq         20.          Course Objectives         Course Objectives         Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the coursy's need for development and progress and capabe of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a south basis to bring about fadical changes and assign scientific hendols in thinking, analysis and adopts it as a south basis to bring about fadical changes and sasign scientific hendols in thinking, analysis and adoptistized in physics who contributo for development of teaching and development of teac	14.	Course Code:
Second semester / Second Stage         16.       Description Preparation Date: 2024-4-2         2024-4-2         17. Available Attendance Forms: Weekly         18. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19.         Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed Email: Hussein.k@sc.uobaghdad.edi.iq         20.         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for depending and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to wrik as teaching assistants in the department to be part of the academic teaching saff in the future. <t< td=""><td></td><td></td></t<>		
16.       Description Preparation Date: 2024-4-2         17. Available Attendance Forms: Weekly         18. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed Email: Hussein k@sc.uobaghdad .edi.iq         20.       Course Objectives         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing and educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and daptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking analysis and industry sectors. 7. Encouraging the distinguished in the society florough the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics A: Encouraging the disting and development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the disting and evelopment in the country. 6. Meeting the needs of various sectors with bight presonals in the field of physics. 1. Encouraging the disting assistants in th	15.	Semester / Year:
2024-4-2         17. Available Attendance Forms: Weekly         18. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19. Course administrator's name (mention all, if more than one name) Name: Dr.Hussein Khazal Rasheed Email: Hussein.k@sc.uobaghdad.edi.iq         20. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage student's participation in the exercises, whi		Second semester / Second Stage
2024-4-2         17. Available Attendance Forms: Weekly         18. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19. Course administrator's name (mention all, if more than one name) Name: Dr.Hussein Khazal Rasheed Email: Hussein.k@sc.uobaghdad.edi.iq         20. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage student's participation in the exercises, whi	16.	Description Preparation Date:
Weekly         18.Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed         Email: Hussein.k@sc.uobaghdad.edi.iq         20.       Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connervisor of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics No contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refi		
18.Number of Credit Hours (Total) / Number of Units (Total)         30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed         Email: Hussein.k@sc.uobaghdad.edi.iq         20.       Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connertion of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinkin	17.Avai	lable Attendance Forms:
30 hours         19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed         Email: Hussein.k@sc.uobaghdad.edi.iq         20.       Course Objectives         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and adomistrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activitites that are interesting to the students <td>Wee</td> <td>kly</td>	Wee	kly
19.       Course administrator's name (mention all, if more than one name)         Name: Dr.Hussein Khazal Rasheed       Email: Hussein.k@sc.uobaghdad.edi.iq         20.       Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		
Name:       Dr. Hussein Khazal Rasheed         Email:       Hussein.k@sc.uobaghdad.edi.iq         20.       Course Objectives         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and adaptist in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through laces, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	30 h	ours
Name:       Dr. Hussein Khazal Rasheed         Email:       Hussein.k@sc.uobaghdad.edi.iq         20.       Course Objectives         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and adaptist in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through laces, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	10	Course administratoria come (mention all if more than one
Name:       Dr. Hussein Khazal Rasheed         20.       Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		
Email: Hussein.k@sc.uobaghdad.edi.iq         20.       Course Objectives         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and sating assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students'		
20.       Course Objectives         Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive turorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		_
Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         21.       Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		
Considered of production of the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. Vho contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.21.Teaching and Learning StrategiesStrategyType something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	21.	Teaching and Learning Strategies
22. Course Structure	Strategy	encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting
	22. Course	e Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation	
		Outcomes	name	method	General questions +Exam	
1	2 hours	Chapter1	Heat Engines and the Second Law of Thermodynamics	Theoretical		
2	2 hours	Chapter2	ReversibleandIrreversibleProcessesThe Carnot Engine	Theoretical	General questions +Exam	
3	2 hours	Chapter3	Gasoline and Diesel Engines Heat Pumps and Refrigerators Entropy	Theoretical	General questions +Exam	
4	2 hours	Chapter4	Entropy Changes in Irreversible Processes	Theoretical	General questions +Exam	
5	2 hours	Chapter5	Total Differential of a Dependent Variable Total Differential of the Internal Energy Enthalpy, Helmholtz Energy, and Gibbs Energy	Theoretical	General questions +Exam	
6	2 hours	Chapter6	Closed Systems. Open Systems Maxwell Equations	Theoretical	General questions +Exam	
7	2 hours		Exam	Theoretical	Exam	
8	2 hours	Chapter7	Expressions for Heat Capacity Surface Work Criteria for Spontaneity	Theoretical	General questions +Exam	
9	2 hours	Chapter8	The Clayperon equation	Theoretical	General questions +Exam	
10	2 hours	Chapter9	General Relation of du,	Theoretical	General questions +Exam	
11	2 hours	Chapter10	General Relation of dh	Theoretical	General questions +Exam	
12	2 hours	Chapter11	General Relation of ds	Theoretical	General questions +Exam	

13	2	Chapter12	TdS e	quations	Theoretical	General
	hours					questions +Exam
14	2 hours	Chapter1	Cp, Cv	al relation of r relation	Theoretical	General questions +Exam
15	2 hours	Chapter13	The Jo coeffi	oule–Thomson cient	Theoretical	General questions +Exam
16	2 hours	Chapter14	Final	Exam	Theoretical	
23. (	Course I	Evaluation				
	-	score out of 100 accor y oral, monthly, or wr	-	-		ent such as daily
24. l	_earning	and Teaching Reso	ources			
Require	d textboo	ks (curricular books, if a	any)		_ an intermedia nd engineering app Cengel and Mecha and chemistry ,	el A. Boles Second Edition
Main ref	ferences	(sources)		None		
Recomn (scientifi		books and refe s, reports…)	rences	none		
Electron	ic Refere	nces, Websites		none		

1. Cours	se Name:
	Analytical Mechanics (2)
2. Cours	se Code:
	PHY 2422
3. Seme	ster / Year:
	Second semester / Second Stage
4. Descr	ription Preparation Date:
	2024-4-2
5. Availa	able Attendance Forms:
Week	ly
6. Numb	per of Credit Hours (Total) / Number of Units (Total)
30 ho	urs
7. Cours	se administrator's name (mention all, if more than one name)
Name	2: Dr. Raad Mohammed
Email	: <u>raad.m@sc.uobaghdad.edu.iq</u>
8. Cours	e Objectives
Course Object	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teach	ning and Learning Strategies
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students
10. Course	Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation	
		Outcomes	name	method	method	
1	2 hours	Chapter1	Dynamics of Systems of Particles, Center of Mass and Linear Momentum of a System, Angular Momentum and Kinetic Energy of a System.	Theoretical	General questions +Exam	
2	2 hours	Chapter2	Motion of Two Interacting Bodies: The Reduced Mass, The Restricted Three-Body Problem, Collisions, Oblique Collisions and Scattering: Comparison of Laboratory and Center of Mass Coordinates.	Theoretical	General questions +Exam	
3	2 hours	Chapter3	Motion of a Body with Variable Mass: Rocket Motion, Center of Mass of a Rigid Body, Rotation of a Rigid Body about a Fixed Axis: Moment of Inertia.	Theoretical	General questions +Exam	
4	2 hours	Chapter4	Calculation of the Moment of Inertia, The Physical Pendulum, The Angular Momentum of a Rigid Body in Laminar Motion, Examples of the Laminar Motion of a Rigid Body.Theoretical 		General questions +Exam	
5	2 hours	Chapter5	Impulse and Collisions Involving Rigid Bodies, Motion of Rigid Bodies in 3D, Rotation of a Rigid Body about an Arbitrary Axis: Moments and Products of Inertia— Angular Momentum and Kinetic Energy.	Theoretical	General questions +Exam	
6	2 hours	Chapter6	Kinetic Energy.Principal Axes of a RigidBody, Euler's Equationsof Motion of a RigidBody, Free Rotation of aRigid Body: GeometricDescription of theMotion.		General questions +Exam	
7	2 hours		Exam Theoretical		Exam	
8	2 hours	Chapter7	que		General questions +Exam	
9	2 hours	Chapter8	The Energy Equation and Nutation, The Gyrocompass, Why Lance Doesn't Fall Over (Mostly), Lagrangian	Theoretical	General questions +Exam	

			Mechani	cs, Hamilton's		
			Variation	nal Principle: An		
		Chantar	Example	zed Coordinates,	Theoretical	General
10	2 hours	Chapter9	Calculat	ing Kinetic and Energies in	Theoretical	questions +Exam
			Coordina			
	•	Chapter10	Example	e's Equations of	Theoretical	General
11	2	Chapter 10		For Conservative	incorcucar	questions
	hours		Systems			+Exam
			Applicat	ons of e's Equations,		
				zed Momenta:		
			<u> </u>	e Coordinates.		
12	2	Chapter11		f Constraint:	Theoretical	General
				e Multipliers, bert's Principle:		questions +Exam
	hours			zed Forces, The		+Exam
				nian Function:		
				i's Equations.		
13	2	Chapter12		Energy and um: Stability,	Theoretical	General
	hours			on of a System		questions +Exam
	liouis			e Degree of		
				about a Position		
		Class to ul	of Stable Equilibrium.		Theoretical	General
14	2	Chapter1	Coupled Harmonic Oscillators: Normal		Theoretical	questions
	hours		Coordinates, General			+Exam
			Theory of Vibrating			
		01 ( 12	Systems.		Theoretical	General
15	2	Chapter13		n of a Loaded Linear Array of	Theoretical	questions
	hours	Coup Oscil		Harmonic		+Exam
				ors, Vibration of a		
			Wave Ec	bus System: The		
16	2	2 Chapter14		am	Theoretical	
10		Chapterr				
	hours					
11.	Course	Evaluation				
Distrib	uting the	score out of 100 accor	ding to t	he tasks assign	ed to the stud	ent such as daily
prepar	ation, dai	ly oral, monthly, or wr	itten exa	ams, reports	etc	
12.	Learning	and Teaching Reso	ources			
Require	ad toythoo	ke (ourrigular books, if	anv)	Analyti	cal mechani	cs (Fowlus
Require		ks (curricular books, if a	any)	Cassida		
Main references (sources)				none		
Recom	mended	books and refe	rences			
		s, reports)	101000	none		
<b>`</b>		,				
1 10 04 00	nic Ratara	nces, Websites		none		

1. Course Name:						
		Analogue Electronics				
2. Cours	2. Course Code:					
		PHY 2423				
3. Seme	ster / Year	:				
		Second semester / Second Stage				
4. Descr	iption Prej	paration Date:				
		2024-4-2				
		ance Forms:				
Week	<i>.</i>					
6. Numb	er of Credi	t Hours (Total) / Number of Units (Total)				
30 ho	urs					
7. Cours	se adminis	strator's name (mention all, if more than one name)				
	: Dr. Estabraq					
	-	@sc.uobaghdad.edu.iq				
	e Objective					
	-					
Course Objectives		Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.				
9. Teach	ling and Le	arning Strategies				
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students						
10. Course	Structure					

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Introduction to Digital Electronics	Theoretical	General questions +Exam
2	2 hours	Chapter2	Logic gates	Theoretical	General questions +Exam
3	2 hours	Chapter3	Combinational logic Circuits	Theoretical	General questions +Exam
4	2 hours	Chapter4	Applications	Theoretical	General questions +Exam
5	2 hours	Chapter5	Boolean algebra	Theoretical	General questions +Exam
6	2 hours	Chapter6	Simplicity logic equations using Boolean algebra	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	Arithmetic Logic Circuits: Addition (Half adder, full adder, binary adder)	Theoretical	General questions +Exam
9	2 hours	Chapter8	Subtraction (half subtractor, full subtractor, binary subtractor)	Theoretical	General questions +Exam
10	2 hours	Chapter9	RS flip-flop and D flip- flop	Theoretical	General questions +Exam
11	2 hours	Chapter10	JK flip-flop and T flip-flop	Theoretical	General questions +Exam
12	2 hours	Chapter11	Master-Slave flip-flop and Preset and Clear	Theoretical	General questions +Exam
13	2 hours	Chapter12	Simplifying Logic Equations using Karnaugh Maps	Theoretical	General questions +Exam
14	2 hours	Chapter1	AND-OR network and OR-AND network	Theoretical	General questions +Exam
15	2 hours	Chapter13	NAND-NAND network and NOR-NOR network	Theoretical	General questions +Exam
16	2 hours		Final exam	Theoretical	

### 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 .... etc

12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)	Digital Fundamental by Thomas L. Floyd				
Main references (sources)	Theory And Problem Of Digital Principles by Roger L. Tokheim				
Recommended books and references (scientific journals, reports)	none				
Electronic References, Websites	none				

1. Cour	rse Name:	
	Computer	r Skill (2)
2. Cour	rse Code:	
	UOB	3 207
3. Sem	ester / Year:	
	Second semeste	er / Second Stage
4. Desc	cription Preparation Date:	
5 1	2024	1-4-2
	lable Attendance Forms:	
Wee		mbor of Units (Total)
	ber of Credit Hours (Total) / Nu	moer of Units (Total)
30 h	ours	
		ntion all, if more than one name)
	le: Mela Ghazi Abdul-Haleem	
Ema	il: <u>a.mela@sc.uobaghdad.edu.iq</u>	
8. Cour	rse Objectives	
Course Objec	ctives	This module provides an introduction to essential computer skills. In this module, students will learn,
		<ul> <li>computer literacy, including hardware and software fundamentals in theory as well as practical.</li> <li>various office applications (Microsoft Word, Excel, and PowerPoint), where students will use these software applications to create a current resume, and slide presentation.</li> <li>basic computer knowledge and skills required to obtain an understanding of computer hardware, software, Internet, and web search.</li> </ul>
9. Teac	ching and Learning Strategies	
Strategy	devices, enabling them 2. Manage and organize including creating, rena 3. Efficiently employ Mic ease.	be able to: hardware, software components, and peripheral to use computers confidently. e files and folders on a computer effectively, aming, moving, and deleting files and folders. crosoft Office to execute fundamental tasks with and communicate via email, while understanding

		Upon finishing the co	ourse, students will be aware	e of the ethical a	nd security considerat
10. C	ourse St		s, promoting safe and respor	isible digital beha	vior.
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Computer Fundamentals. Characteristics of Computers, Block Diagram of Computer: Input Unit, Storage Unit, Memory size, Output Unit, Arithmetic Logical Unit, Control Unit, Central Processing Unit, Data Representation: Binary Number System.	Theoretical	1
2	2 hours	Chapter2	Memory: Types, Units of memory, RAM, ROM, Secondary storage devices – HDD, Flash Drives, Optical Disks: DVD I/O Devices – Keyboard, Mouse, LCDs, Scanner, Plotter, Printer and Latest I/O devices in market	Theoretical	2
3	2 hours	Chapter3	MS Windows: Desktop, My Computer, Files and folders using windows explorer; Control Panel, Searching Files and folders	Theoretical	3
4	2 hours	Chapter4	MS Word: Introduction, Environment, Help, Creating and Editing Word Document. Saving Document, Working with Text: Selecting, Formatting, Aligning and Indenting	Theoretical	4
5	2 hours	Chapter5	MS Word: Finding Replacing Text, Bullets and Numbering, Header and Footer, Working with Tables, Properties Using spell checker, Grammar, AutoCorrect Feature, Synonyms and Thesaurus	Theoretical	5
6	2 hours	Chapter6	MS Word: Graphics: Inserting Pictures, Clipart, Drawing Objects, Using Word Art. Setting page size and margins; Printing documents. Mail Merge Practical	Theoretical	6
7	2 hours		Exam	Theoretical	7

8	2	Chapter7	MS-Excel: Environment,	Theoretical	8
-			Creating, Opening, and		
	hours		Saving Workbook. Range of Cells. Formatting		
			Cells, Functions:		
			Mathematical, Logical,		
			Date, Time, Auto Sum		
9	2	Chapter8	MS-Excel: Formulas.	Theoretical	9
-			Graphs: Charts. Types		
	hours		and Chart Tool Bar.		
			Printing: Page Layout, Header and Footer Tab		
10	•	Chapter9	MS PowerPoint:	Theoretical	10
10	2	Chapters	Environment, Creating	Theoretical	10
	hours		and Editing presentation,		
			Auto content wizard,		
			using built-in templates		
11	2	Chapter10	MS PowerPoint: Types of	Theoretical	11
	<b>k</b> er i i		Views: Normal, Outline,		
	hours		Slide, Slide Sorter, Slide Show, Creating		
			customized templates;		
			formatting presentations		
			Graphics: AutoShapes,		
			adding multimedia		
			contents, printing slides		
12	2	Chapter11	Internet: Basic Internet	Theoretical	12
			terms: Web Page,		
	hours		Website, Home page,		
			Browser, URL, Hypertext, ISP,		
19	2	Chapter12	Web Server Applications:	Theoretical	13
13	2	Chapter12	WWW, e-mail, Instant		
	hours		Messaging, Internet		
			Telephony,		
			Videoconferencing, Web		
			Browser and its		
1.4	•		environment Computer Ethics and	Theoretical	14
14	2		Societal Impact:	Theoretical	11
	hours		Computer ethics		
			encompass a collection of		
			moral principles that		
			regulate the utilization of		
			computers. It reflects		
			society's perspectives regarding the use of		
			computer hardware and		
			software. These ethical		
			considerations address a		
			range of critical issues,		
			including privacy		
			concerns, intellectual		
			property rights, and the		
			broader societal impact of		
			computer technology.	Theoretical	
15	2		Duaranta	Theoretical	
	hours		Preparatory week		
	nouro				
	-	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

12. Learning and Teaching Resources				
Required textbooks (curricular books, if any)	No			
Main references (sources)	No			
Recommended books and references (scientific journals, reports)	Wikipedia			
Electronic References, Websites	Wikipedia			

	urse Sti Hours	ructure Required Learning Outcomes	Unit or subject name	Learning method	Evaluation
10. Co Week			Unit or subject	Learning	Evaluation
10. Co	urse St	ucture			
		expanding their critical thin tutorials and by considering that are interesting to the stuc	types of simple experiment		
ласуу		Type something like: The mencourage students' particip			
9. T Strategy	eaching	and Learning Strate	egies		
8. C Course C	Course (	Dbjectives Teaching students the b general physics and its the country's need for de job market in state insti armed with science and assign scientific knowle with the development o Effective contribution f with the society throu development of teachin specialized in physics needs of various secto Encouraging the distin department to be part of	pasic principles of physics. practical applications, whice evelopment and progress are tutions and industry sectors d adopts it as a sound basic edge and scientific method f technologies, to keep up ver- for deepening and document of the implementation of g and administrative staff. who contribute to develop prise with highly qualified programmers of the sector of function of the academic teaching states	th bears the respon- nd capable of meet a. 3. Preparing an a s to bring about n s in thinking, anal- with the expansion nting the connection f advisory couns 5. The service of ment in the coun- personals in the f work as teachin	nsibility of studying ting the needs of the educated generation radical changes and lysis and adaptation of human needs. 4. on of the university seling, training and preparing graduates ttry. 6. Meeting the field of physics. 7.
	_	r. Muthana Hameed Khalaf uthana.khalaf@sc.uobaghdad	.edu.iq		
	_	administrator's nam	ne (mention all, if	more than o	one name)
3	0 hour	S			
		of Credit Hours (Tota	al) / Number of Uni	its (Total)	
	Veekly	e Attendance Forms.			
	•	e Attendance Forms:	2024-4-2		
4. D	) escript	tion Preparation Dat	,	-	
5.0	cincsic	1	semester / Second	Stage	
3 5	emeste	r / Year:	PMa 208		
2. C	Course (	Code:			
1. C	lourse l	vanie.	Mathematic IIII		

	-		1		
1	2 hours	Vector and the geometry of space	Vector	Theoretical	General questions +Exam
2	2 hours	Length of vector , Equation of sphere, u	Vector	Theoretical	General questions +Exam
3	2 hours	Dot product	Vector	Theoretical	General questions +Exam
4	2 hours	Cross product	Vector	Theoretical	General questions +Exam
5	2 hours	equation of line and plane (part1)	equation of line and plane	Theoretical	General questions +Exam
6	2 hours	equation of line and plane (part2)	equation of line and plane	Theoretical	General questions +Exam
7	2 hours	Chain Rule of partial derivative (part 1)	Chain Rule of partial derivative	Theoretical	Exam
8	2 hours	exa	m		
9	2 hours	Chain Rule of partial derivative (part 2)	Chain Rule of partial derivative	Theoretical	General questions +Exam
10	2 hours	Gradient	Application of finite Integration	Theoretical	General questions +Exam
11	2 hours	Direction derivative (part 1)	Direction derivative	Theoretical	General questions +Exam
12	2 hours	Direction derivative (part 2)	Direction derivative	Theoretical	General questions +Exam
13	2 hours	Extrema value and saddle point (part 1)	Extrema value and saddle point	Theoretical	General questions +Exam
14	2 hours	Extrema value and saddle point (part 2)	Extrema value and saddle point	Theoretical	General questions +Exam
15	2 hours	example	example	Theoretical	General questions +Exam

				Theoretical	
16	2	Final exan	ו	Theoretical	
	hours				
11. (	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 etc				
12. l	12. Learning and Teaching Resources				
Require	d textbool	ks (curricular books, if any)	1 .Stewart. J. "	Calculas", 7th E	dition, 2012.
			2 .Thomas. G.	B. & Finney. R	. L., "Calculas
			and Analytic G	eometry", 6th Ed	lition, 1984.
Main ref	erences (	(sources)			
Recomn	nended	books and reference	•		
(scientifi	cientific journals, reports)				
Electron	ic Refere	nces, Websites	none		

1. (	Cours	se Na	ame:			
			Anal	ogue Electronics / Lab	•	
2. (	2. Course Code:					
				PHY 2316		
3. 3	Seme	ster	/ Year:			
			Second	semester / Second S	Stage	
4. ]	Descr	riptic	on Preparation Da	2024-4-2		
5.	Availa	able	Attendance Forms			
	Week	ly				
6. ]	Numb	ber of	f Credit Hours (Tot	tal) / Number of Uni	ts (Total)	
	30 ho	urs				
7. (	Cours	se a	dministrator's nar	me (mention all, if I	more than on	e name)
			Estabraq Talib Abdullah			
			braqtalib@sc.uobaghdad.e	edu.iq		
8. 0	Cours	e Ot	ojectives	basic principles of physics. 2		
			the country's need for of job market in state inst armed with science ar assign scientific know with the development of Effective contribution with the society thro development of teachi specialized in physics needs of various sect Encouraging the dist	s practical applications, which development and progress and titutions and industry sectors and adopts it as a sound basis ledge and scientific methods of technologies, to keep up we for deepening and document ough the implementation of ng and administrative staff. If who contribute to develop ors with highly qualified p inguished in this field to of the academic teaching staff.	d capable of meetin, . 3. Preparing an edu s to bring about rad s in thinking, analys with the expansion of ting the connection advisory counseli 5. The service of pre- ment in the country ersonals in the fiel work as teaching	g the needs of the lacated generation lical changes and is and adaptation f human needs. 4. of the university ng, training and eparing graduates 7. 6. Meeting the ld of physics. 7.
9	Teach	ning a	and Learning Strat	egies		
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students						
10. Co	ourse	Stru	cture			
Week	Hour	rs F	Required Learning	Unit or subject	Learning	Evaluation
		C	Dutcomes	name	method	method
	144					

1	6	none	Introduction of Analog	Practical	General
1	-		Equipment's		questions
	hours				
2	6 hours	none	Introduction of Analog Electronic Components	Practical	Solve on the board
3	6 hours	none	STUDY OF THE CHARACTERISTICS OF A DIODE AND THE CHARECTERISTIC OF	Practical	Graph paper exam
4	6 hours	none	ZENER DIODE (Part 1) STUDY OF THE CHARACTERISTICS OF A DIODE AND THE CHARECTERISTIC OF	Practical	Daily exam and assessment report
5	6 hours	none	ZENER DIODE (Part 2) Power Supply - Half Rectifier	Practical	Daily exam and assessment report
6	6 hours	none	Power Supply - Full Rectifier	Practical	Daily exam and assessment report
7	6 hours	none	Exam	Practical	Daily exam and assessment report
8	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS	Practical	Daily exam and assessment report
9	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Part 1)	Practical	Daily exam and assessment report
10	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Part 2)	Practical	Daily exam and assessment report
11	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Output Circuit) (Part 1)	Practical	Daily exam and assessment report
12	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Output Circuit) (Part 2)	Practical	Daily exam and assessment report
13	6 hours	none	TRANSISTOR COMMON EMITTER CHARACTERISTICS (Input Circuit)	Practical	Daily exam

14	6 hours	none	DESIGN OF A COMMON EMITTER AMPLIFIER (Part 1)	Practical	Exam	
15	б hours	none	DESIGN OF A COMMON EMITTER AMPLIFIER (Part 2)	Practical	Exam	
16	6 hours	none	Final Exam	Practical		
11. 0	11. Course Evaluation					
		score out of 100 accor y oral, monthly, or wr			ent such as daily	
12. L	earning	and Teaching Reso	ources			
Required	d textbool	ks (curricular books, if a	any) Electro	nic devices by The	omas L. Floyed	
Main ref	erences (	(sources)	Electro	nic and instrumen	tation by Gupta	
Recommended books and references (scientific journals, reports)			none			
Electron	ic Refere	nces, Websites	none			

				-		
1. (	Cours	se Na	me:			
			Heat an	nd Thermodynamic/	lab.	
2. (	Cours	se Co	de:			
				PHY 2421		
3. 9	Seme	ster	/ Year:			
			Second	semester / Second S	Stage	
4. ]	Descr	riptio	n Preparation Da	ite:		
~	1	1 1		2024-4-2		
			Attendance Forms	•		
	Week	-	Credit Hours (To	tal) / Number of Uni	ta (Total)	
	$\frac{1}{30}$ ho		Credit Hours (10	tal) / Number of Uni	is (Total)	
	50 110	uis				
7. (	Cour	se ad	dministrator's nar	me (mention all, if r	more than on	e name)
_	_		Iussein Khazal Rasheed	,		/
J	Email	: Huss	ein.k@sc.uobaghdad .edi	.iq		
8. (	Cours	e Ob	ojectives			
the country's need for development and progress and capable of meeting the need job market in state institutions and industry sectors. 3. Preparing an educated get armed with science and adopts it as a sound basis to bring about radical chan assign scientific knowledge and scientific methods in thinking, analysis and ad- with the development of technologies, to keep up with the expansion of human m Effective contribution for deepening and documenting the connection of the un with the society through the implementation of advisory counseling, trainin development of teaching and administrative staff. 5. The service of preparing gr specialized in physics who contribute to development in the country. 6. Mee needs of various sectors with highly qualified personals in the field of phy Encouraging the distinguished in this field to work as teaching assistants department to be part of the academic teaching staff in the future.					tical changes and is and adaptation f human needs. 4. of the university ng, training and eparing graduates 7. 6. Meeting the Id of physics. 7.	
9	Teach	ning a	· · · · ·			
9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interac tutorials and by considering types of simple experiments involving some sampling activi that are interesting to the students					ne refining and sses, interactive	
10. Co	ourse	Strue	cture			
	. Course Structure					
Week	Hour	SR	equired Learning	Unit or subject	Learning	Evaluation

				-	
1	6	none	Introduction to the	Practical	Practical
	hours		laboratory		
	nours		experiments		
2	6	none	Measuring the heat	Practical	Practical
	hours		of vaporization of a		
	nours		liquid by electrical		
			method		
3	6	none	Measurement of	Practical	Practical
	hours		saturated vapor		
	nours		pressure of a rapidly		
			evaporating liquid		
			such as alcohol		
4	6	none	Calculate the ratio of	Practical	Practical
	hours		the thermal		
	liouis		conductivity		
			coefficients of two		
			inferior materials	Draget 1	Due d'al
5	6	none	joule equivalent	Practical	Practical
	hours				
-				Practical	Practical
6	6	none	Thermal conductivity	Tractical	Tractical
	hours		coefficient of glass		
7	6	none		Practical	Practical
/	U	none	Exam		
	hours				
8	6	none	The specific heat of a	Practical	Practical
Ū	-		poorly conductive		
	hours		body by mixing		
			method		
9	6	none	The change of	Practical	Practical
	hauna		viscosity coefficient		
	hours		of a liquid with		
			temperature		
10	6	none	Measuring energy in	Practical	Practical
	hours		terms of voltage and		
	nours		current and		
			comparing it with the		
			energy of water		
11	6	none	Converting	Practical	Practical
	hours		mechanical energy to		
			thermal energy	Practical	Practical
12	6	none	Finding the	Fractical	Fractical
	hours		efficiency of solar collector		
				Practical	Practical
13	6	none	Study the characteristics of heat	Fractical	Fractical
	hours				
			pump Magguring the	Practical	Practical
14	6	none	Measuring the	Fractical	Fractical
	hours		volume expansion		
			coefficient of liquids		

15	ճ hours	none	Review the experiments Final Exam		Practical	Practical
16	ნ hours	none			Practical	Practical
11. Course Evaluation						
	-	score out of 100 accor y oral, monthly, or wr	-	-		ent such as daily
12. L	earning	and Teaching Reso	ources			
Required textbooks (curricular books, if any)			thermodynamics McGraw-Hill Thermodynamics edition, Younis A. Thermod	_ an intermedia and engineering a Cengel and Mec ynamics and ch		
Main ref	erences (	(sources)		none		
Recommended books and references (scientific journals, reports)			none			
Electron	ic Refere	nces, Websites		none		

1 Cour	Nomo.	
	se Name:	ractical physics I(modern physics I I) / Lab
2. Cours		ractical physics (modern physics 1 1)/ Eab
2. Cours	se coue.	PHY 2420
3 Sama	ster / Yea	
J. Jenie		Second semester / Second Stage
4. Descr	ription Pre	paration Date: 2024-4-2
5. Avail	able Attend	lance Forms:
Week	dy	
6. Numb	per of Cred	it Hours (Total) / Number of Units (Total)
30 ho	ours	
7 Cours		strataria nome (montion all if more than one name)
	e: Samar In	strator's name (mention all, if more than one name)
		@sc.uobaghdad.edu.iq
	e Objective	
		Teaching students the basic principles of physics. 2. Preparing specialists in the
Course Objectives		field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teach	ning and Le	earning Strategies
encourage expanding tutorials and		hing like: The main strategy that will be adopted in delivering this module is to students' participation in the exercises, while at the same time refining and their critical thinking skills. This will be achieved through classes, interactive d by considering types of simple experiments involving some sampling activities resting to the students
10. Course	Structure	

Week	Hours	Required	Unit or subject	Learning	Evaluation
		Learning	name	method	method
		Outcomes			
1	6	introduction	E. 14L D. H.	Find the	Find the
-	-		Find the Rydberg constant	Rydberg	Rydberg
	hours		constant	constant	constant
2	6	Graph	Backscattering of a	Backscattering of a beta	Backscattering
	hours		beta particle	particle	of a beta particle
3	6	Graph		Measure the	Measure the
5	-	1	Measure the ionization	ionization	ionization
	hours		potential using	potential using	potential using
			Frank-Hertz tube	Frank-Hertz	Frank-Hertz
4	6	Experiment (1)		tube	tube
4	-		Spectrum of	Spectrum of	Spectrum of
	hours		helium atom	helium atom	helium atom
5	6	Experiment	T 1	Inverse square	Inverse square
	hours	(2)	Inverse square law	law	law
6	6	Experiment		Planck's	Planck's
•	hours	(3)	Planck's constant	constant	constant
				constant	
7	6		Midterm Exam	Midterm	Midterm
	hours			Exam	Exam
8	6	Experiment			
	hours	(4)	Stefan's law	Stefan's law	Stefan's law
9	6	Experiment		Find the	Find the
,	-	(5)	Find the stopping potential	stopping	stopping
	hours		potential	potential	potential
10	6	Experiment	T:	Light	Light
	hours	(6)	Light absorption coefficient using	absorption coefficient	absorption coefficient
			half thickness	using half	using half
				thickness	thickness
11	6	Experiment	Determination to	Determination of the charge of an	Determination of
	hours	(7)	<b>Determination</b> of the charge of an electron by	the charge of an electron by	the charge of an
			Millikan experiment	Millikan	electron by Millikan experiment
12	6	Explanation of		experiment	
14		experiments for	Determining the	Determining the wavelengths Hα,	Determining the Wavelengths Hα, Hβ
	hours	students who are	wavelengths Hα , Hβ , and Hγ from Balmer series of	$H\beta$ , and $H\gamma$ from	, and Hy from
		absent with an	Hydrogen atom	Balmer series of Hydrogen atom	Balmer series of Hydrogen atom
1.0		official excuse Review of		nyur ogen atom	ingui ogen atom
13	6	experiments before		Black body	Black body
	hours	taking the final	Black body radiation	radiation	radiation
		exam			

14	6 hours	Exam of the all experiments	Diffraction of electrons in a polycrystalline lattice (Debye-Scherrer diffraction)		Diffraction of electrons in a polycrystalline lattice (Debye- Scherrer diffraction)	Diffraction of electrons in a polycrystalline lattice (Debye- Scherrer diffraction)	
15	ნ hours	Exam of the all experiments	Rutherford dispersed		Rutherford dispersed	Rutherford dispersed	
16	6 hours		Final exam		Theoretical		
11. (	11. Course Evaluation						
	0	score out of 100 acco ly oral, monthly, or v	0		0	ent such as daily	
12. L	earning	and Teaching Re	source	S			
Required	d textboo	ks (curricular books, i	if any)		Talab nahi al- khafaja" practical physics for the sec stage " 1978		
Main ref	erences	(sources)		Talab nahi al- khafaja" atomic physics ", 1980			
Recommended books and references (scientific journals, reports)			sheet la	b. Experiments			
Electron	ic Refere	nces, Websites		Videos	showing the Experim	ental via the internet	

1. Course Name:						
	Molecular Physics					
2. Course Code:						
	РНҮ 3525					
3. Semester / Year:						
First semester/ Third Stage						
4. Description Prepara	ition Date:					
	2024-4-2					
5. Available Attendance	e Forms:					
	Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)						
	30 hours					
7. Course administrate	or's name (mention all, if more than one name)					
Name: Dr. Firas Jawad Kadhin	n					
Dr. Zainb Sabeh Sadik						
Email: Firas.Kadhim@sc.uobaghda	d edu ia					
	alound					
8. Course Objectives						
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job					

which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.

#### 9. Teaching and Learning Strategies

<i>.</i>	
Strategy	
	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes,
	and expanding their eritear unixing skins. This will be deneved unough erasses

interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

10. Co	ourse St	ructure			
Week	Hours	Required Learning Outcomes	Unit or subject	Learning method	Evaluation method
1	2 hours	Introduction to atomic physics	Dalton's atom, Electron, Thomson's atom, Proton, Neutron, Penetration of alpha particle through thin gold foil	Theoretical	General questions +Exam
2	2 hours	, Electromagnetic Radiation,	Rutherford's atom, Failure of Thomson's atom, Failure of Rutherford's atom, Bohr's atom, Photon energy, What is Bohr's idea account for?	Theoretical	General questions +Exam
3	2 hours	Electromagnetic Spectrum	Nuclear radii, Nuclear density, Nuclear size,	Theoretical	General questions +Exam
4	2 hours	Chemical Bond, Types of Chemical Bonds	Nomenclature (Nuclide, Isotopes, Isobars, Isomer, Nucleon, Mesons), Mass defect, Binding energy,	Theoretical	General questions +Exam
5	2 hours	,( Ionic Bond, Covalent Bonds, Hydrogen Bonds, van der Waals	Nuclear forces, Properties of nuclear forces, Nuclear separation energy, Chart of Nuclides and nuclear stability, Nuclear abundance	Theoretical	General questions +Exam
6	2 hours	Electronegativity, Bond Polarity and Electronegativity, Polarity of Molecules	Nuclear angular momentum, Nuclear Parity, Magnetic dipole moments,	Theoretical	General questions +Exam
7	2 hours	Electron affinity, Bond Dipole Moments, Molecular Dipole Moments	Electric quadrupole moments, Wave mechanical properties, Types of statistics: (Bose- Einstein statistics and Fermi – Dirac statistics)	Theoretical	Exam
8	2 hours	Molecular orbital theory; magnetism of molecules, HOMO & LOMO	Monthly Exam in Chapters 1, 2 and 3	Theoretical	General questions +Exam
9	2 hours	Molecular spectroscopy- Boron-Openheimer approximation- molecular energy level diagram	Schrodinger wave equation, Bound states in one dimensional systems, Particle in square well	Theoretical	General questions +Exam
10	2 hours	Rotational Spectroscopy of diatomic molecules- classical description and quantum description-	Bound states in three dimensions, Neutron-Proton system: Bound state	Theoretical	General questions +Exam

		rigid rotor model-non- rigid rotor- selection rules of rotational transitions	C	of the deuteron, overview of cross calculation.		
11	2 hours	vibrational Spectroscopy of diatomic molecules- classical and quantum descriptions- harmonic oscillator model- unharmonicity- selection rules of vibrational transitions- vibration of polyatomic molecules ( degree of freedom)	interact Energy Single (	l particle ion: (Maximum Transfer in a Collision, g Power, Range ticle)	Theoretical	General questions +Exam
12	2 hours	Rovibrational spectrum of diatomic molecules- selection rules	Interaction of electrons with matter, Interaction of neutrons with matter (Elastic scattering, Inelastic scattering)		Theoretical	General questions +Exam
13	2 hours	Electronic transitions	Interaction of gamma radiation with matter (Photoelectric effect, Compton scattering, pair production)		Theoretical	General questions +Exam
14	2 hours	Frank-Condon principle	Attenuation of gamma rays Applications and solved problems		Theoretical	General questions +Exam
15	2 hours	Spectroscopic instrumentation	Monthly	y Exam in s 4 and 5	Theoretical	General questions +Exam
11. (	Course I	Evaluation				
	-	score out of 100 accor ly oral, monthly, or wr	-	-		ent such as daily
12. L	_earning	and Teaching Reso	ources			
Require	d textboo	ks (curricular books, if	any)	and C.J.Joach	ain	es, B.H. Bransder
	ferences (		• ~	Molecular spe	ctroscopy", Jac	k D.Graybeal
journals	, reports		entific	Wikipe		
Electron	ic Refere	ences, Websites		Wikipe	dia	

1. Course Name:	
Physical Optics	
2. Course Code:	
PHY 3527	
3. Semester / Year:	
First semester/ Third Stage	
4. Description Preparation Date:	
2024-4-2	
5. Available Attendance Forms:	
Weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours	
7. Course administrator's name (mention all, if more than one name	;)
Name: Dr. Hammad R.Humud	
Dr. Asama Natiq Naji	
Dr. Omar Adnan Ibrahim	
Email: Hammad.Humud@sc.uobaghdad.edu.iq	
Asama.Naje@sc.uobaghdad.edu.iq	
Omar.Ibrahim@sc.uobaghdad.edu.iq	
8. Course Objectives	
<b>Course Objectives</b> Teaching students the basic principles of physics. 2. Preparing specialist in the field of general physics and its practical applications, which bear the responsibility of studying the country's need for development an progress and capable of meeting the needs of the job market in stat institutions and industry sectors. 3. Preparing an educated generatio armed with science and adopts it as a sound basis to bring about radica changes and assign scientific knowledge and scientific methods i thinking, analysis and adaptation with the development of technologies, to deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualifie personals in the field of physics. 7. Encouraging the distinguished in thi field to work as teaching assistants in the department to be part of the academic teaching staff in the future.	rs d n n n o r e d f nt d s s
9. Teaching and Learning Strategies	
Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	- -

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Nature of light ,Historical review,Wave front and rays,Huygens principle,The electromagnetic spectrum , Source of electromagnetic waves	Theoretical	General questions +Exam
2	2 hours	Chapter2		Theoretical	General questions +Exam
3	2 hours	Chapter3	The wave nature of light, Electric constant and speed of light,Speed of light in a medium	Theoretical	General questions +Exam
4	2 hours	Chapter4	Plane harmonic waves and phase velocity, Plane harmonic waves in 1- D, Plane harmonic waves 3- D	Theoretical	General questions +Exam
5	2 hours	Chapter5		Theoretical	General questions +Exam
6	2 hours	Chapter6	alternative ways of representing harmonic eaves, group velocity, electromagnetic theory ( Maxell equation), transverse waves, independence of electric and magnetic field, energy density and flow, examples	Theoretical	General questions +Exam
7	2 hours			Theoretical	Exam
8	2 hours	Chapter7	reflection and refraction	Theoretical	General questions +Exam
9	2 hours	Chapter8	reflection and refraction ,low of reflection and refraction , Fresnel's formulae	Theoretical	General questions +Exam
10	2 hours	Chapter9	Reflected and transmitted energy, Normal incident	Theoretical	General questions +Exam
11	2 hours	Chapter10		Theoretical	General questions +Exam
12	2 hours	Chapter11	Total internal reflection, Reflection from conductor	Theoretical	General questions +Exam

13	2 hours	Chapter12	the supe	rposition	Theoretical	General questions +Exam
14	2 hours	Chapter1	waves ,a harmoni the same superpose waves w phase, au	rposition of ddition of simple c motion along line sition of many ith random ddition of simple c motions at right	Theoretical	General questions +Exam
15	2 hours	Chapter13			Theoretical	General questions +Exam
16	2 hours	Chapter14	Final l	Exam	Theoretical	
Distribu prepara	uting the ation, dai	Evaluation score out of 100 accor ly oral, monthly, or wr Teaching Resources	0	0		ent such as daily
Required	Required textbooks (curricular books, if any)		Introduction to modern optics by G. Fowels.			
Main refe	Main references (sources)			None		
Recommended books and references (scientific journals, reports)			ournals,	Wikipedi	ia	
Electronic	Reference	s, Websites		Wikipedia		

1. Cours	se Name:
	Quantum Mechanics (1)
2. Cours	se Code:
	PHY 3528
3. Seme	ster / Year:
	First semester/ Third Stage
4. Descr	ription Preparation Date:
	2024-4-2
5. Avail	able Attendance Forms:
Week	
	per of Credit Hours (Total) / Number of Units (Total)
30 ho	ours
7 0	
	se administrator's name (mention all, if more than one name)
Name: Dr. W	Vasan Z. Majeed
Email: <u>Wasa</u>	n.majeed@sc.uobaghdad.edu.iq
8. Cours	e Objectives
Course Object	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teach	ning and Learning Strategies
Strategy Type something like: The main strategy that will be adopted in delivering this module is encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interact tutorials and by considering types of simple experiments involving some sampling activi- that are interesting to the students	
10. Course	that are interesting to the students

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	The origin of quantum Mechanic, shortcomings of the old quantum theory	Theoretical	General questions +Exam
2	2 hours	Chapter2	The uncertainty and Complementary principles, the wave- particle duality	Theoretical	General questions +Exam
3	2 hours	Chapter3	Derivation of Schrödinger equation, Interpretation of the wave function	Theoretical	General questions +Exam
4	2 hours	Chapter4	Properties of the wave function, probability, normalization, probability current density, applications	Theoretical	General questions +Exam
5	2 hours	Chapter5	Time-independent Schrödinger equation, stationary states	Theoretical	General questions +Exam
6	2 hours	Chapter6	Simultaneous eigen functions, eigen values and eigen functions	Theoretical	General questions +Exam
7	2 hours		Mid Term Exam	Theoretical	Exam
8	2 hours	Chapter7	Degeneracy, Hermitian operator, expectation values-Variance, Deviations, and Dirac bracket notation		General questions +Exam
9	2 hours	Chapter8	Commute Operators, Ehrenfest Theorem	Theoretical	General questions +Exam
10	2 hours	Chapter9	Solutions of some one- Dimensional Systems, Potential Step	Theoretical	General questions +Exam
11	2 hours	Chapter10	The square well potential, Infinite square well potential	Theoretical	General questions +Exam
12	2 hours	Chapter11	The Harmonic oscillator:TheoreticalPolynomial solution,method of generating theHermite polynomials		General questions +Exam
13	2 hours	Chapter12	Schrödinger equation in three coordinates	Theoretical	General questions +Exam
14	2 hours	Chapter1	The Hydrogen atom, angular momentum,	Theoretical	General questions +Exam
15	2 hours	Chapter13	spin-orbit interaction	Theoretical	General questions +Exam

16	2	Chapter14	Final Ex	am	Theoretical	
	hours					
11. (	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 etc					
12. L	12. Learning and Teaching Resources					
Required	Required textbooks (curricular books, if any)			Introduction to Quantum Mechanics, D. Grifiths, second Edition.		
Main ref	Main references (sources)			Introduction to quantum mechanics, Dick and Wittike		
		hard a state of the		Introduction	to quantum mec	hanics, D. Park
Recomm (scientifi		books and refe s, reports…)	rences	none		
Electron	Electronic References, Websites			Lecture Note Technology	s of Massachuse	etts Institute

1. Cours	se Name:
	Materials Physics (1)
2. Cours	se Code:
	РНҮ 3529
3. Seme	ester / Year:
	First semester/ Third Stage
4. Desci	ription Preparation Date:
	2024-4-2
5. Avail	able Attendance Forms:
	Weekly
6. Numł	per of Credit Hours (Total) / Number of Units (Total)
	30 hours
7. Cour	se administrator's name (mention all, if more than one name)
	Farah Tariq M.Noori
	arah.noorii@sc.uobaghdad.edu.iq
8. Cours	se Objectives
Course Object	<b>tives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teach	ning and Learning Strategies
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students
10. Course	Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation	
		Outcomes	name	method	method	
1	2 hours	Chapter1	introduction to materials science: Levels of Structure, Structure – Property Relationship, Classification of Engineering Materials	Theoretical	General questions +Exam	
2	2 hours	Chapter2	Introduction:Atomic structure, Bohr atomic Electronic and Atomic Structure Compound /Intermediate	General questions +Exam		
3	2 hours	Chapter3	Crystal Structure: Fundamental Terms of Crystallography, Types of Crystal, Relation Between the Interplanar Distance and the Interatomic Distance.	Theoretical	General questions +Exam	
4	2 hours	Chapter4	Crystal Structures of Materials, Simple Cubic Crystal Structure., Body Centred Cubic Structure, Face Centred Cubic Structure or Cubic Close Packed Structure, Hexagonal Closed Packed Structure	Theoretical	General questions +Exam	
5	2 hours	Chapter5	Cohesion between atoms: Classification of Solids, Bonding in Solids, Classification of Bonds	Theoretical	General questions +Exam	
6	2 hours	Chapter6	Crystal Imperfections: Classification of Imperfections, Surface / Interface, Point Defect or Imperfection, Line Imperfection	Theoretical	General questions +Exam	
7	2 hours		Midterm Exam	Theoretical	Exam	
8	2 hours	Chapter7	Surface Defect or Planar Defect, Volume Defect or Bulk Defect, Deformation in Metals	Theoretical	General questions +Exam	
9	2 hours	Chapter8	Classification of Solids on the Basis of Band Theory, Classification of Conducting Materials Classification of Semiconductors, Insulator material	Theoretical	General questions +Exam	
10	2 hours	Chapter9	Microstructural Evolution :Phase Diagram, Classification of alloys, Solid Solutions, Substitutional Solid	Theoretical	General questions +Exam	

				ns, Interstitial olutions,		
11	2 hours	Chapter10	Mechanism of Crystallization, Solidification (or) Freezing, Cooling Curves, Solidification of pure metal : Super cooling, Solidification of Alloys, Nucleation,		Theoretical	General questions +Exam
12	2 hours	Chapter11	Nonferr	ous Alloys, n and its Alloys	Theoretical	General questions +Exam
13	2 hours	Chapter12		on, Role of on, Diffusion ism,	Theoretical	General questions +Exam
14	2 hours	Chapter1	Interstitial Mechanism, Atom Interchange Mechanism, Kirkendall effect		Theoretical	General questions +Exam
15	2 hours	Chapter13	steady and non-steady state diffusion, Fick's I law, Fick's II law, Factors affecting Diffusion,		Theoretical	General questions +Exam
16	2 hours		Final	exam		
11. (	Course I	Evaluation				
prepara	tion, dai	score out of 100 accor ly oral, monthly, or wr and Teaching Rese	itten ex	-		ent such as daily
Require	d textboo	ks (curricular books, if	anv)	Prof. Dr.	Krishan Lal	
Required textbooks (curricular books, if any) Main references (sources)			President, Indian National Science Academy			
Recomn (scientifi		books and refe s, reports…)	rences	none		
Electron	ic Refere	nces, Websites		Wikip	edia	

1. Course Name						
	Photo Physics (elective)					
2. Course Code:						
	PES 411					
3. Semester / Ye	ar:					
First semester/ Third Stage						
4. Description P						
	2024-4-2					
5. Available Atte	ndance Forms:					
	Weekly					
6. Number of Cre	edit Hours (Total) / Number of Units (Total)					
	30 hours					
7. Course admin	nistrator's name (mention all, if more than one name)					
Name: Dr. Firas Jaw	ad Kadhim					
Fmail: Fires K	adhim@sc.uobaghdad.edu.iq					
8. Course Object						
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.					
	Learning Strategies					
Strategy Type something like: The main strategy that will be adopted in delivering this modulencourage students' participation in the exercises, while at the same time refinite expanding their critical thinking skills. This will be achieved through classes, intertutorials and by considering types of simple experiments involving some sampling at that are interesting to the students						

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation	
		Outcomes	name	method	method	
1	2	Chapter1	Review of some basic	Theoretical	General	
-		-	principles of Molecular		questions	
	hours		Physics- Rotation & vibration of molecules		+Exam	
2	2	Chapter2	molecular spectral	Theoretical	General	
4		1	region- degeneracy &		questions	
	hours		multiplicity of the molecular energy states-		+Exam	
			energy level diagram of			
			molecules			
3	2	Chapter3	Some basic principles of	Theoretical	General	
	hours		Photophysics; Luminescence,		questions +Exam	
	liouis		photoluminescence &			
			chemical luminescence,			
			condensed aromatic hydrocarbons			
1	2	Chapter4	The photophysics	Theoretical	General	
4	2		processes; Absorption-		questions	
	hours		quantitative aspects,		+Exam	
			.hot bands, photoluminescence:			
			Fluorescence-			
			quantitative aspects			
5	2	Chapter5	Phosphorescence,	Theoretical	General	
	hours		Delayed fluorescence,		questions +Exam	
		Chantar	Non-radiative processes	Theoretical	General	
6	2	Chapter6	(Uni-molecular	Theoretical	questions	
	hours		processes), internal		+Exam	
			conversion, intersystem			
			crossing, Jabionskii diagram			
7	2		Exam	Theoretical	Exam	
1						
	hours					
8	2	Chapter7	Lifetime and transition	Theoretical	General	
	hours		probability, absorption spectrometers,		questions +Exam	
	lisuis		fluorescence			
			spectrometers,			
			excitation fluorescence spectrum			
9	2	Chapter8	The kinetics of photo-	Theoretical	General	
,		1	luminescence; rate		questions	
	hours		parameters, quantum		+Exam	
10	2	Chapter9	efficiency Lifetime and quantum	Theoretical	General	
10	2		efficiency, Steady-state		questions	
	hours		condition & Transient		+Exam	
		Chapter 10	condition lifetime measurements,	Theoretical	General	
11	2	Chapter10	effect of temperature on	Theoretical	questions	
	hours		lifetime		+Exam	

12	2 hours	Chapter11	process	ecular competing es; collision ty quenching	Theoretical	General questions +Exam
13	2 hours	Chapter12	energy quench concent quench	tration	Theoretical	General questions +Exam
14	2 hours	Chapter 13	self-abs quench	orption ing	Theoretical	General questions +Exam
15	2 hours		Final E	xam	Theoretical	General questions +Exam
11.	Course I	Evaluation				
		score out of 100 accor ly oral, monthly, or wi				ent such as daily
12.	_earning	and Teaching Res	ources			
Require	d textboo	ks (curricular books, if	any)	Photolumines C. A. Parker.	cence of solution	ons-
Main re	Main references (sources)			Photophysics <b>J.B. Birks.</b>	of aromatic mo	lecules-
Recommended books and references (scientific journals, reports)			erences	none		
Electror	ic Refere	nces, Websites		Wikip	edia	

1. Cour	se Name:					
	SOLAR ENERGY APPLICATIONS(elective)					
2. Cour	se Code:					
	PHY3531-2					
3. Semester / Year:						
	First semester/ Third Stage					
4. Desc	ription Preparation Date:					
5 1 4 4 4 1	2024-4-2 lable Attendance Forms:					
J. Aval	Weekly					
	Weekly					
6. Num	ber of Credit Hours (Total) / Number of Units (Total)					
	30 hours					
	se administrator's name (mention all, if more than one name)					
-	e: Dr. Manal Midhat Abdullah					
Emai	il: Manal.m@sc.uobaghdad.edu.iq					
8. Cours	se Objectives					
Course Objec	<b>tives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.					
9. Teac	hing and Learning Strategies					
Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.						

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2	2 hours	Chapter2	Forms of energy	Theoretical	2
3	2 hours	Chapter3	the sun and the electromagnetic spectrum, the sun parameters	Theoretical	3
4	2 hours	Chapter4	the radiation on earth	Theoretical	4
5	2 hours	Chapter5	the radiation measurements instruments,	Theoretical	5
6	2 hours	Chapter6	the transmission, absorption, and reflection through a transparent medium	Theoretical	6
7	2 hours		exam	Theoretical	7
8	2 hours	Chapter7	Solar cells (theory and applications)	Theoretical	8
9	2 hours	Chapter8	solar collectors (theory, types, and applications)	Theoretical	9
10	2 hours	Chapter9	wind energy (windmills theory and applications)	Theoretical	10
11	2 hours	Chapter10	solar cookers, and solar drying ( description, advantages, and applications)	Theoretical	11
12	2 hours	Chapter11	Hydroelectric Power (theory)	Theoretical	12
13	2 hours	Chapter12	biomass energy (theory and applications)	Theoretical	13
14	2 hours	Chapter 13	geothermal energy (theory and advantages)	Theoretical	14
15	2 hours	Chapter 14	wave energy ((theory and applications)	Theoretical	15

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

12.	Learning and	Teaching	Resources
-----	--------------	----------	-----------

Required textbooks (curricular books, if any)	Fundamentals and applications of renewable energy, by Mehhmet Kanoglu/ Mc Graw Hill, 2019, ISBN: 1260455300 / 9781260455304
Main references (sources)	Renewables: The Politics of a Global Energy, by Michael Aklin and Johannes Urpelainen, (The MIT Press), 2018
Recommended books and references (scientific journals, reports)	None
Electronic References, Websites	Introducing renewable energy

1. Cou	rse Name:
	Elementary Particles (elective)
2. Cour	rse Code:
	PHY3531-3
3. Sem	ester / Year:
	First semester/ Third Stage
4. Desc	cription Preparation Date:
5 1 100	2024-4-2 ilable Attendance Forms:
Wee	
	ber of Credit Hours (Total) / Number of Units (Total)
0. 11011	30 hours
	50 110415
7. Cou	rse administrator's name (mention all, if more than one name)
Nam	ie: Dr. Rana Muhi Yas
Ema	il: rana.yas@sc.uobaghdad.edu.iq
8. Cour	rse Objectives
Course Obje	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teac Strategy	Ching and Learning Strategies         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Introduction to Elementary Particles Historical overview of the development of particle physics	Theoretical	1
2	2 hours	Chapter2	Hadrons, leptons and quarks	Theoretical	2
3	2 hours	Chapter3	The fundamental interactions and Feynman diagrams	Theoretical	3
4	2 hours	Chapter4	Quark flavours and baryonic number	Theoretical	4
5	2 hours	Chapter5	Leptonic flavours and lepton number	Theoretical	5
6	2 hours	Chapter6	The quark model	Theoretical	6
7	2 hours		Exam	Theoretical	7
8	2 hours	Chapter7	Mesons and Baryons	Theoretical	8
9	2 hours	Chapter8	The standard model	Theoretical	9
10	2 hours	Chapter9	The electro-weak interaction	Theoretical	10
11	2 hours	Chapter10	Electro-weak unification	Theoretical	11
12	2 hours	Chapter11	The intermediate vector bosons	Theoretical	12
13	2 hours	Chapter12	The interaction between intermediate bosons	Theoretical	13
14	2 hours	Chapter 13	Higgs mechanism	Theoretical	14
15	2 hours	Chapter 14	Properties of the Higgs boson	Theoretical	15

#### 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 .... etc

12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)	Introduction to Elementary Particles. By David Grhffiths.				
Main references (sources)	An Introduction to Particle Physics and the Standard Model				
Recommended books and references (scientific journals, reports)	None				
Electronic References, Websites	Lecture Notes in Elementary Particles				

1. Cours	se Name:
	Thin Film Physics (elective)
2. Cours	se Code:
	PHY3531-4
3. Seme	ester / Year:
	First semester/ Third Stage
4. Desc	ription Preparation Date:
	2024-4-2
5. Avail	able Attendance Forms:
	Weekly
6. Numl	per of Credit Hours (Total) / Number of Units (Total)
	30 hours
7. Cour	se administrator's name (mention all, if more than one name)
Name	e: Dr. Dr. Salma Mahdi Shaban
Emai	l: salma.shaban@sc.uobaghdad.edu.iq
8. Cours	se Objectives
Course Object	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teacl	ning and Learning Strategies
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
10. Course	Structure

Week	Hours	Required	Unit or subject name	Learning	Evaluation
		Learning		method	method
		Outcomes			
1	2	Chapter1	Thin Film Technology:-	Theoretical	1
-		-	Thermal Evaporation,		
	hours		Cathodic Sputtering,		
			Chemical Methods,		
			Chemical Vapor Deposition		
			(CVD), Vacuum-deposition		
		Charter?	Apparatus Thickness Measurement	Theoretical	2
2	2	Chapter2	and Analytical	Theoretical	2
	hours		<b>Techniques:-</b> Electrical		
			Methods, Analytical		
			Techniques, Volume		
			Structure		
3	2	Chapter3	Mechanical Effects In	Theoretical	3
	hours		Thin Films: - Internal		
	nours		Stresses, Mechanical		
			Properties, Adhesion of		
			Films.		4
4	2	Chapter4	Electron Transport	Theoretical	4
	hours		Phenomena In Metals Films:- Electrical		
			Conduction in		
			Discontinuous Films,		
			Electrical Conduction in		
			Continuous Films, Galvan		
			magnetic Size Effects in		
			Thin Film.		
5	2	Chapter5	Electron Transport	Theoretical	5
	hours		Phenomena In Metals		
	liours		<b>Films: -</b> Transport of Hot		
			Electrons, Thermal		
			Conductivity, Thermoelectric Power		
			Thermoelectric Power, Heat Transport across		
			Film-Insulator Interface.		
6	2	Chapter6	Transport Phenomena In	Theoretical	6
6	2		Semiconducting Films:-		
	hours		Mobility; Galvan magnetic		
			Surface Effects; Anisotropy		
			Effects; Quantum Size		
			Effects, Transport		
			Properties of Thick Films,		
7	2		Exam	Theoretical	7
	hours				
	liours				

8	2	Chapter7	Transport Phenomena In	Theoretical	8
5		1	Semiconducting Films: -		
	hours		Photoconduction in		
			Semiconductor Films,		
			Activation Process,		
			Photoconductivity		
			Mechanisms, Field Effect -		
			Thin-film Transistor (TFT).		
9	2	Chapter8	Transport Phenomena In	Theoretical	9
			<b>Insulator Films: -</b>		
	hours		Dielectric Properties (Thin		
			Films, Thick Films,		
			Dielectric Losses),		
			Piezoelectric Films.		
10	2	Chapter9	<b>Electrical Conduction in</b>	Theoretical	10
	houro		<b>Insulator Films: -</b>		
	hours		Conduction Mechanisms,		
			Thermionic (Schottky)		
			Emission,		
11	2	Chapter10	<b>Electrical Conduction in</b>	Theoretical	11
	hours		Insulator Films: -		
	liouis		Quantum-mechanical		
			Tunneling, Theories;		
			Image-force Correction;		
			Temperature-field (TF)		
			Emission; Temperature		
			Dependence.	<b>7D1</b> (* 1	10
12	2	Chapter11	Bulk-limited Conduction:-	Theoretical	12
	hours		Tunnel Emission (Hot-		
			electron Transport), Tunnel		
		Charter 12	Spectroscopy,	Theoretical	13
13	2	Chapter12	Photoeffects in Tunnel Structures:-	Theoretical	15
	hours		Electroluminescence,		
			Photoconduction and		
			Photoemission		
14	2	Oberster 10	Optical Properties Of Thin	Theoretical	14
14	2	Chapter 13	Films:- Thin Film Optics	Theoretical	
	hours		(Reflection and		
			Transmission at an		
			Interface, Reflection and		
			Transmission by a Single		
			Film, Anisotropic and		
			Inhomogeneous Films,		
			Multilayer Films, Optical		
			Absorption).		
15	2	Chapter 14	Optical Properties Of Thin	Theoretical	15
15	2	Chapter 14	Films:- Optical Constants	Theoretical	10
	hours		of Thin Films, Thin Film		
			Absorption and		

	on Phenomena, Optical Systems		
11. Course Evaluation			
Distributing the score out of 100 according to preparation, daily oral, monthly, or written ex	ams, reports	-	
12. Learning and Teaching Resources			
Required textbooks (curricular books, if any)	<ul> <li>(1) Introduction to Nanophysics Prof. J. Raynien Kwo, Department of Physics National Tsing Hua University</li> <li>(2) Nanomaterials &amp; Nanotechnology, Dr. Pallab Ghosh,Department of Chemical Engineering ,IIT Guwahati, Guwahati– 781039,India</li> </ul>		
Main references (sources)	Nanotechnology and Nanoelectronics, W.R. fahrener, materials, devices, techniques		
Recommended books and references (scientific journals, reports)	None		
Electronic References, Websites	Wikiped		

	Course Description Form	
1. Cours	se Name:	
	Powder Physics (elective)	
2. Cours	rse Code:	
	PHY3531-5	
3. Seme	ester / Year:	
	First semester/ Third Stage	
4. Desc	ription Preparation Date:	
<i>–</i> – – – 11	2024-4-2	
	lable Attendance Forms:	
Weel	0	1)
0. INUIIII	ber of Credit Hours (Total) / Number of Units (Tota 30 hours	11)
	50 Hours	
	rse administrator's name (mention all, if more th	nan one name)
	e: Dr.Ban Mazin Muzahem	lan one name)
-		
Emai	il: <u>ban.muzahem@sc.uobaghdad.edu.iq</u>	
8. Cours	se Objectives	
Course Objec	Teaching students the basic principles of specialists in the field of general physics and it which bears the responsibility of studying development and progress and capable of meet market in state institutions and industry se educated generation armed with science and ac to bring about radical changes and assign sc scientific methods in thinking, analysis an development of technologies, to keep up with the needs. 4. Effective contribution for deepening connection of the university with the implementation of advisory counseling, traini teaching and administrative staff. 5. The service specialized in physics who contribute to deve 6. Meeting the needs of various sectors with his in the field of physics. 7. Encouraging the disti work as teaching assistants in the department to teaching staff in the future.	s practical applications, the country's need for ing the needs of the job ctors. 3. Preparing an lopts it as a sound basis ientific knowledge and d adaptation with the the expansion of human g and documenting the society through the ng and development of e of preparing graduates lopment in the country. ghly qualified personals nguished in this field to
	hing and Learning Strategies	
Strategy	Type something like: The main strategy that will be adopted in del encourage students' participation in the exercises, while at the same tin their critical thinking skills. This will be achieved through classes, in considering types of simple experiments involving some sampling act to the students.	ne refining and expanding attractive tutorials and by
10. Course	e Structure	

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Introduction to Powder Metallurgy	Theoretical	1
			Powder Metallurgy materials		
2	2	Chapter2	Powder	Theoretical	2
	hours		Manufacture:		
			a. Mechanical		
			Processes 1. Machining 2.		
			Crushing 3. Milling 4.		
			Shotting		
			5. Graining 6.		
			Atomization 7. Cold		
			Stream Process		
3	2	Chapter3	Powder	Theoretical	3
	hours		Manufacture:		
			chemical reactions, liquid metal		
			atomization and		
			electrolytic		
			deposition.		
4	2	Chapter4	Powder	Theoretical	4
	hours		characterization:		
			particle shape, size and distribution,		
			surface area, Particle		
			porosity, Particle		
			microstructure		
5	2	Chapter5	Particle Size	Theoretical	5
	hours		Measurement		
6	2	Chapter6	Technique Powder preparation:	Theoretical	6
U			mixing and blending,		
	hours		powder lubrication,		
			flow, apparent		
			density,		
_			compressibility	Theoretical	7
7	2		Exam	Theoretical	,
	hours				
8	2	Chapter7	Shaping and	Theoretical	8
	hours		compacting:		
			fundamentals of		

			compacting, cold		
			compacting with		
			dies, design		
			guidelines, isostatic		
			compacting		
9	2	Chapter8	Sintering:	Theoretical	9
	hours		fundamentals and		
			sintering theory,		
			mixed powder, liquid		
			phase sintering, effect of sintering		
			atmospheres,		
			sintering furnaces		
10	2	Chapter9	Factors effecting	Theoretical	10
10			sintering		
	hours				
11	2	Chapter10	Properties of	Theoretical	11
	hours		sintered steel: effect		
			of density, alloying		
			elements, and		
		Chapter 11	impurities Application of	Theoretical	12
12	2	Chapter11		Theoretical	12
	hours		P/M materials:		
			filter; bearings,		
			structural parts,		
			powder forged		
			parts		
		Character 12		Theoretical	12
13	2	Chapter12	Experiments: powder characteristics,	Theoretical	13
	hours		compressibility,		
			sintering, mechanical		
			properties,		
			microstructure		
14	2	Chapter 13	Metal Carbides,	Theoretical	14
	hours		Methods for		
	nours		preparing Metal		
			Carbides		
15	2	Chapter 14	Composite and the	Theoretical	15
	hours		use of metal powder		
			as a filler		
11.	Course I	Evaluation			

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	An Introduction to Extractive Metallurgy, Metallurgy
Main references (sources)	Powder <u>technology Handbook, third</u> Edition
Recommended books and references (scientific journals, reports)	None
Electronic References, Websites	Wikipedia

1. Course Name:				
High Voltages Physics (elective)				
2. Course Code:				
	PHY3531-6			
3. Semester / Yes	ar:			
	First semester/ Third Stage			
4. Description Pr				
5. Available Atter	2024-4-2			
Weekly				
	dit Hours (Total) / Number of Units (Total)			
	30 hours			
	50 11001 5			
7. Course admin	istrator's name (mention all, if more than one name)			
Name: Dr. Tha				
	.Khalaf@sc.uobaghdad.edu.iq			
Linan. <u>Thann</u>	innuale school graduced ing			
8. Course Objecti	ves			
8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.				
¥	_earning Strategies			
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is t encourage students' participation in the exercises, while at the same time refining an expanding their critical thinking skills. This will be achieved through classes, interactiv tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.				
10. Course Structure				

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Introduction: Generation and transmission of electric energy, Voltage stresses, Testing voltages, Power frequency voltages, Lightning impulse voltages, Switching impulses, D.C. voltages, Very low	Theoretical	1
			frequency voltage.		
2	2 hours	Chapter2	Direct voltages, A.C. to D.C. conversion, Electrostatic generators, Alternating voltages, Testing transformers, Series resonant circuits.	Theoretical	2
3	2 hours	Chapter3	Impulse voltages, Impulse voltage generator circuits, Operation, design and construction of impulse generators, Control systems.	Theoretical	3
4	2 hours	Chapter4	Measurement of high voltages: Peak voltage measurements by spark gaps, Sphere gaps, Reference measuring systems, Uniform field gaps, Rod gaps.	Theoretical	4
5	2 hours	Chapter5	Electrostatic voltmeters, Ammeter in series with high ohmic resistors and high ohmic resistor voltage Dividers, Generating voltmeters and field sensors, The measurement of peak voltages, The Chubb– Fortescue method, Voltage dividers and passive rectifier circuits.	Theoretical	5
6	2 hours	Chapter6	Voltage dividing systems and impulse voltage measurements, Generalized voltage generation and measuring circuit, Demands upon transfer characteristics of the measuring system, Fundamentals for the computation of the measuring system, Voltage dividers.	Theoretical	6
7	2 hours		Exam.	Theoretical	7

8	2	Chapter7	Fast digital transient	Theoretical	8
8	2 hours		recorders for impulse measurements, Principles and historical development of transient digital recorders, Errors inherent in digital recorders, Specification of ideal A/D recorder and parameters required for h.v impulse testing.		
9	2 hours	Chapter8	Electrostatic fields and field stress control: Electrical field distribution and breakdown strength of insulating materials.	Theoretical	9
10	2 hours	Chapter9	Fields in homogeneous, isotropic materials, The uniform field electrode arrangement, Coaxial cylindrical and spherical fields, Sphere-to-sphere or sphere-to-plane.	Theoretical	10
11	2 hours	Chapter10	Fields in multi-dielectric, isotropic materials, Simple configurations, Dielectric refraction, Stress control by floating screens.	Theoretical	11
12	2 hours	Chapter11	Numerical methods, Finite difference method (FDM), Finite element method (FEM).	Theoretical	12
13	2 hours	Chapter12	Charge simulation method (CSM), Boundary element method.	Theoretical	13
14	2 hours	Chapter 13	Effect of electrical currents on the human body, Electrical clearances, Safety signs and working, procedures, Capacitive and Inductive Coupling, Floating Objects, Current Loops.	Theoretical	14
15	2 hours	Chapter 14	Safety Earthing, Working earths, Step and Touch Potential, Equipotential Platforms and Voltage Transfer, Safety in the High Voltage Laboratory, Review Questions.	Theoretical	15

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- E. Kuffel, W.S. Zaengl, and J. Kuffel "High Voltage Engineering Fundamentals" Second edition 2000, published by Butterworth-Heinemann.
Main references (sources)	<ol> <li>M.S. Naidu and V. Kamaraju, <i>High Voltage Engineering</i>, Tata McGraw-Hill, 4<sup>th</sup> Edition, 2009.</li> <li>J.P. Holtzhausen, W.L. Vosloo "High Voltage Engineering Practice and Theory", ISBN: 978 - 0 - 620 - 3767 - 7.</li> <li>C.L. Wadhwa, "High Voltage Engineering", Third Edition, New Age International Publishers.</li> </ol>
Recommended books and references (scientific journals, reports)	None
Electronic References, Websites	Wikipedia

encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive		
2. Course Code:       PPP 321         3. Semester / Year:       First semester/ Third Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       2024-4-2         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which basis the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific Application of the university with the scoeiey through the implementation of adviory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduate specialized in physics. 7. Encouraging the disfuguished in this field to work as teaching assistants in the fled of physics. 7. Theorem to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies       Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining an expanding their critical thinking skills. This will be adopted in delivering this module is to encourage students' participation in the e	1. Course N	
PPP 321         3. Semester / Year:         First semester/ Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly       6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours       7. Course administrator's name (mention all, if more than one name)         Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country is need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of teachnologies, to keep up with the society through the implementation of advisory counseling, training and development of teachnologies, to keep up with the society through the implementation of advisory counseling, the distinguished in this field to work as teaching assistants in the development of teachnologies, to keep up with the society through the implementation of advisory counseling, the distinguished in this field to work as teaching assistants in the development of teaching and decumenting the comury. 6. Meet		Virtual Lab.
3. Semester / Year:         First semester/ Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the sponsion of human needs. 4. Effective contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching stuff in the future.         9. Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be a	2. Course C	ode:
First semester/ Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adoptis it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and daptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assist in the department to be part of the academic teaching assist in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy       Type something like: The main str		
4. Description Preparation Date:         2024-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation array with the society through the connection of the university with the society through the connection of the university with the society through the connection of advisory counseling, training and development of technologies, to keep up with the expension of human needs. 4. Effective contribution for deepening and documenting the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies       Type something like: The main strategy that will be adopted in delivering this module is to en	3. Semester	/ Year:
2024-4-2         5. Available Attendance Forms: Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name) Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The mai		First semester/ Third Stage
<ul> <li>5. Available Attendance Forms: Weekly</li> <li>6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours</li> <li>7. Course administrator's name (mention all, if more than one name) Name Dr.</li> <li>Email: saad.mohmmed@sc.uobaghdad.edu.iq</li> <li>8. Course Objectives</li> <li>Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.</li> <li>9. Teaching and Learning Strategies</li> <li>Strategy</li> </ul>	4. Descripti	on Preparation Date:
Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name) Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of the academic teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to ecourage students' participation in the exercises, while at the same time refining an expanding their critical thinking skills. This will be achieved through classes, interactive utorials and by considering types of simple experiments involving some sampling		
6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and exploring classes, interactive utorials and by considering types of simple experiments involving some sampling	5. Available	Attendance Forms:
30 hours         7. Course administrator's name (mention all, if more than one name) Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the scopanion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and example classes, interactive utorials and by considering types of simple experiments involving some sampling	Weekly	
7. Course administrator's name (mention all, if more than one name)         Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeds of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as taching assistants in the department to be part of the academic teaching staff in the future.         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining an expanding their critical thinking skills. This will be achived through classes, interactivu tutorials and by considering types of simple experiments involving some sampling	6. Number of	of Credit Hours (Total) / Number of Units (Total)
Name Dr.         Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the expension of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactivu turoials and by considering types of simple experiments involving some sampling	30 hours	
Email: saad.mohmmed@sc.uobaghdad.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the society through the implementation of advisory counseling, training and development of technologies, to keep up with the society through the implementation of advisory counseling, training and development of technologies, to keep up with the society through the implementation of advisory counseling, training and development of technologies, to keep up with the society of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactivit utorials and by considering types of simple experiments involving some sampling.	7. Course a	administrator's name (mention all, if more than one name)
8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactivu turoials and by considering types of simple experiments involving some sampling	Name D	r.
8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive turvials and by considering types of simple experiments involving some sampling		
8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive turvials and by considering types of simple experiments involving some sampling		
Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy	Email: sa	ad.mohmmed@sc.uobaghdad.edu.iq
specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. 9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining an expanding their critical thinking skills. This will be achieved through classes, interactivu tutorials and by considering types of simple experiments involving some sampling.	8. Course C	bjectives
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling		specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling		
	Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
WEEK	nours		_	-	
		Outcomes	name	method Experimental	method       General
1	2 hours		introduction	simulation	questions +Exam
2	2 hours	First experiment	Photoelectric effect	Experimental simulation	General questions +Exam
3	2 hours	second experiment	Pendulum lab.	Experimental simulation	General questions +Exam
4	2 hours	Third experiment	Bouncy	Experimental simulation	General questions +Exam
5	2 hours	Fourth experiment	Mass and sipring	Experimental simulation	General questions +Exam
6	2 hours	Fifth experiment	Vector edition	Experimental simulation	General questions +Exam
7	2 hours		Exam	Experimental simulation	Exam
8	2 hours	Sixth experiment	Energy skate park	Experimental simulation	General questions +Exam
9	2 hours	Seventh experiment	Black body spectrum	Experimental simulation	General questions +Exam
10	2 hours	Eighth experiment	Wave on string	Experimental simulation	General questions +Exam
11	2 hours	Ninth experiment	Molecule and light	Experimental simulation	General questions +Exam
12	2 hours		Review experiment		
13	2 hours		Month exam		
14	2 hours				
15	2 hours				
16	2 hours	Final	Exam	Final Exam	

#### 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 .... etc

12. Learning and Teaching Resources		
Required textbooks (curricular books, if any)	Lab. book	
Main references (sources)	Fundamental of physics,9 th editi 2011	
Recommended books and references (scientific journals, reports)	Any physics book and journal in library	
Electronic References, Websites	Wikipedia, PhET simulation	

1. Course Name:			
Virtual Lab.			
2. Course C	2. Course Code:		
	PPP 321		
3. Semeste	r / Year:		
	First semester / First Stage		
4. Descript	ion Preparation Date:		
5 Availabl	2024-4-2 e Attendance Forms:		
Weekly	e Attendance Forms.		
	of Credit Hours (Total) / Number of Units (Total)		
30 hours			
7. Course	administrator's name (mention all, if more than one name)		
Name D			
Email: sa	ad.mohmmed@sc.uobaghdad.edu.iq		
8. Course C	Dbjectives		
<b>Course Objectives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.			
9. Teaching	and Learning Strategies		
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive		

tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

### 10. Course Structure

10. 00					
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours		introduction	Experimental simulation	General questions +Exam
2	2 hours	First experiment	Determination of the Refractive Index of a medium by different Methods	Experimental simulation	General questions +Exam
3	2 hours	second experiment	Determination the Focal Length of Convex Lens	Experimental simulation	General questions +Exam
4	2 hours	Third experiment	Focal Length of The Concave Lens	Experimental simulation	General questions +Exam
5	2 hours	Fourth experiment	Aberration of Lenses	Experimental simulation	General questions +Exam
6	2 hours	Fifth experiment	The prism and estimation its dispersion and resolving powers	Experimental simulation	General questions +Exam
7	2 hours	Fifth experiment	Interference of light – Young's double – slit interference exp	Experimental simulation	Exam
8	2 hours	Sixth experiment	Estimation Light Wavelength Via Lloyd's Mirror / Fresnel's Prism Interference	Experimental simulation	General questions +Exam
9	2 hours	Seventh experiment	Michelson Interferometer	Experimental simulation	General questions +Exam
10	2 hours	Eighth experiment	Fabry – Perot Interferometer	Experimental simulation	General questions +Exam

11	2 hours	Ninth experiment	Determination the Diameter of a Fine Wire by Interference Phenomenon	Experimental simulation	General questions +Exam
12	2 hours		Review experiment		
13	2 hours		Monthly exam		
14	2 hours				
15	2 hours				
16	2 hours	Final	Exam	Final Exam	
Requir	ed textboo	ks (curricular books, if a	env) • 1-F. Se	ars, Addison-W	
			<ul> <li>publish</li> <li>2-F. Jer</li> <li>Fundar</li> </ul>	ning company, ( nkins& H. White mentals of Optic ok company, 4t	Dptics 1964 . e, cs by, McGraw
Main r	eferences	Υ.	<ul> <li>publish</li> <li>2-F. Jer</li> <li>Fundar</li> <li>Hallida</li> <li>Fundar</li> <li>2008.</li> <li>2-F. Se</li> <li>publish</li> <li>3-F. Jer</li> <li>Fundar</li> </ul>	ning company, ( nkins& H. White mentals of Optic ok company, 4th y, Resnick and mentals of Phys ars, Addison-W ning company, ( nkins& H. White mentals of Optic ok company, 4 <sup>th</sup>	Optics 1964 e, cs by, McGraw h edition, 1985 Walker; ics; 8th edition esley Optics 1964 cs by, McGraw
Recom	nmended	(sources)	<ul> <li>publish</li> <li>2-F. Jer</li> <li>Fundar</li> <li>Hallida</li> <li>Fundar</li> <li>2008.</li> <li>2-F. Se</li> <li>publish</li> <li>3-F. Jer</li> <li>Fundar</li> <li>Hill bo</li> <li>edition</li> </ul>	ning company, ( nkins& H. White mentals of Optic ok company, 4th y, Resnick and mentals of Phys ars, Addison-W ning company, ( nkins& H. White mentals of Optic ok company, 4 <sup>th</sup>	Optics 1964 e, cs by, McGraw h edition, 1985 Walker; ics; 8th edition esley Optics 1964 cs by, McGraw

1. Course Name:	Mathematical physics		
Mathematical physics			
2. Course Code:	DIN/ 2/22		
	PHY 3632		
3. Semester / Year:			
	Second semester / Third Stage		
4. Description Prepara	ation Date: 2024-4-2		
5. Available Attendance			
	Weekly		
6. Number of Credit Ho	ours (Total) / Number of Units (Total)		
	30 hours		
7. Course administrat	or's name (mention all, if more than one name)		
Name: Dr. Arkan Rifaah Ridha	a.		
Dr. Ahmed Qasim.			
Dr. Omar Abdulsada A	li		
Dr. Zainab Hadi			
Email: Arkan.Ridha@sc.uc	obaghdad.edu.iq		
ahmedqasim3@gm	nail.com		
omar.ab@sc.uobag	hdad.edu.iq		
Zainab.mahmood@	Dsc.uobagdad.edu.iq		
8. Course Objectives			
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.		

Strategy		g and Learning Stra			
Strategy		encourage students' partici expanding their critical thi	nain strategy that will be ad- pation in the exercises, wh nking skills. This will be a types of simple experiment idents	nile at the same chieved through	time refining and classes, interactive
10. Co	ourse St	ructure			
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter 1	Green's theorem in the plane	Theoretical	General questions +Exam
2	2 hours		Solved problems	Theoretical	General questions +Exam
3	2 hours		Divergence theorem	Theoretical	General questions +Exam
4	2 hours		Solved problems	Theoretical	General questions +Exam
5	2 hours		Stoke's theorem+ solved problems	Theoretical	General questions +Exam
6	2 hours	Chapter 2	Complex numbers + Solved problems	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours		Geometrical representation of imaginary numbers+ Argand diagram + Solved problems	Theoretical	General questions +Exam
9	2 hours		Absolute values of complex numbers+ Solved problems	Theoretical	General questions +Exam
10	2 hours		Euler's formula + Demoivre's theorem + Solved problems	Theoretical	General questions +Exam
11	2 hours	Chapter 3	Expressions for $\cos n\theta$ and $\sin n\theta$ in terms of $\cos^n \theta$ and $\sin^n \theta +$ Solved problems	Theoretical	General questions +Exam
12	2 hours		Expressions for $\cos^n \theta$ and $\sin^n \theta$ in terms of sines and cosines of	Theoretical	General questions +Exam

			multiple problem	es of $\theta$ + Solved		
13	2 hours		Roots o	f complex s+ Solved	Theoretical	General questions +Exam
14	2 hours		a comp	logarithm ( <i>ln</i> ) of lex number+ problems	Theoretical	General questions +Exam
15	2 hours			ns of complex es + Solved ns	Theoretical	General questions +Exam
11. (	Course I	Evaluation				
	-	score out of 100 ly oral, monthly,	-	-		lent such as daily
12. L	_earning	and Teaching	Resources			
				Media U (2004). • H. S. W Mathema edition, F • C. Ray Mathema Students	Pgrade, Pearson Veber and G. B Atics Methods Elsevier (2005). Wylie, "Ad- atics", 4th ed Edition), Mcgrav	v-Hill (1975).
Main references (sources)			of Phy Mcgrav • Murray an int	vsics and ,"I", v-Hill (1958).	'Vector analysis: o tensor analys	
Recommended books and references (scientific journals, reports) Wikipedia						
•		/				

1. Course Name	:				
Quantum Mechanics (2)					
2. Course Code:					
	PHY 3633				
3. Semester /	Year:				
	Second semester / Third Stage				
4. Description Pr	reparation Date:				
	2024-4-2				
5. Available Atten	idance Forms:				
	Weekly				
6. Number of Cre	dit Hours (Total) / Number of Units (Total)				
	30 hours				
7. Course admir	nistrator's name (mention all, if more than one name)				
Name: Dr. Ali Abdu	ılateef Kareem				
Dr. Ghaith N	. Flaiyh				
Email: Ali.k	areem@sc.uobaghdad.edu.iq				
	th.flaiyh@sc.uobaghdad.edu.iq				
8. Course Objecti	ves				
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.				
9. Teaching and I	_earning Strategies				

Strategy	Ty en the co	courage students' participati eir critical thinking skills. T	ain strategy that will be adoption in the exercises, while at this will be achieved through periments involving some san	he same time refi classes, interact	ning and expanding ive tutorials and by
		Structure			
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Raising and lowering operators	Theoretical	General questions +Exam
2	2 hours	Chapter2	Eigen value and Eigen function	Theoretical	General questions +Exam
3	2 hours	Chapter3	Action of the raising and lowering operators	Theoretical	General questions +Exam
4	2 hours	Chapter4	Wave functions in coordinate representation	Theoretical	General questions +Exam
5	2 hours	Chapter5	The raising and lowering operators in Cartesian and spherical coordinates	Theoretical	General questions +Exam
6	2 hours	Chapter6	Eigen values and Eigen functions of the angular momentum operator and matrices	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	The spin angular momentum	Theoretical	General questions +Exam
9	2 hours	Chapter8	Approximation method II: the variational method, variational principle and its applications	Theoretical	General questions +Exam
10	2 hours	Chapter9	Time independent perturbation theory	Theoretical	General questions +Exam
11	2 hours	Chapter10	Non-degenerate and degenerate systems.	Theoretical	General questions +Exam
12	2 hours	Chapter11	Stark effect and Zeeman effect	Theoretical	General questions +Exam

13	2	Chapter12		ependent	Theoretical	General questions	
	hours		perturba	ation theory		+Exam	
	nours						
14	2	Chapter1	Constar	ıt,	Theoretical	General questions +Exam	
	hours					+Exam	
15	2	Chapter13	sinusoid	lal perturbations	Theoretical	General questions	
15	2		and tran	sition probability		+Exam	
	hours						
16	2		Final	Exam	Theoretical		
	hours						
11. (	Course I	Evaluation					
Distrihi	iting the	score out of 100 accor	rding to	the tasks assig	ned to the stude	ent such as daily	
	0	ly oral, monthly, or wr		0		ine such as adiry	
		Feaching Resources	100011 011				
12. LCar							
Required	textbooks (	curricular books, if any)		Introduction to gu	antum machanica. F	D. J. Grifiths, 3 <sup>rd</sup> Ed.	
		- /		=			
Main refe	rences (sou	irces)		1. Modern phys Anderson.	acs and quantum	mechanics, E. E.	
				2. Introduction to quantum mechanics, Dick and Wittike.			
	3. Introduction to quantum mechanics, D. Park.						
Recomme	ended book	s and references (scientific j	ournals,				
reports)			none				
,	·	s. Websites		Wikiped	ia		
	Electronic References, Websites				iu		

1. Course Name:       Materials Physics (2)         2. Course Code:       PHY 3634         3. Semester / Year:       Second semester / Third Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uohaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country is need for development and progress and capable of meeting the needs of the joh market in state institutions and industry sectors. 3. Preparing a network of the obvious prevent and progress and capable of noneeting the needs of the joh market in state institutions and adaptation with the development of technologis, to keep up with the expension of human neck. 4. Effective contribution of development of technologis in this field to work as iteaching assistants in the development of the condering the academic teaching state of the industry constraining and development of technologis in the field of physics 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching state of the industry in the society through the field of physics 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching state of the paremarket in		Course Description Form		
2. Course Code:       PHY 3634         3. Semester / Year:       Second semester / Third Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq       8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the courty's need for development and progress and capable of meets of the job market in state institutions and industry sectors. 3 reacting absolute degree and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for decepaning and ducumenting the comest. 4. Effective contribution for decepaning and ducumenting the needs of the law service methods in thinking, analysis and adaptation with the development of technologies, to keep up with the implementation of advisory consulting, training and development of teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exereises, while at the same time refining and expanding t	1. Course Name:			
PHY 3634         3. Semester / Year:         Second semester / Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: Jarah.noori@sc.uobaghdad.cdu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts to as soon basis to brigmabut radical changes and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory connecting, training and development of teaching assistants in the department to be part of the academic teaching statif in the future.         9. Teaching and Learning Strategies         Strategies          Type something like: T		Materials Physics (2)		
3. Semester / Year:         Second semester / Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adaptor is at a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of traching and administrative staff. 5. The service of preparing graduates specialized in physics. The corrusping the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage	2. Course Code:			
Second semester / Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring abour radical changes and assign scientific knowledge and scientific methods in thinking, andysis and documenting the connection of the university with the society through the implementation of advisory counsching, training and development of tracking assistants in the development in the courty. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage student' participation in the exercises, while at the same time refining and expanding their critical thinking skills. Th		PHY 3634		
<ul> <li>4. Description Preparation Date: 2024-4-2</li> <li>5. Available Attendance Forms: Weekly</li> <li>6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours</li> <li>7. Course administrator's name (mention all, if more than one name)</li> <li>Name: Dr. Farah Tariq M.Noori</li> <li>Email: farah.noori@sc.uobaghdad.edu.iq</li> <li>8. Course Objectives</li> <li>Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the joh market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and asiss and adaptation of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing gaduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.</li> <li>9. Teaching and Learning Strategies</li> <li>Strategy</li> <li>Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exceptes, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students</li> </ul>	3. Semester / Ye	ear:		
2024-4-2 5. Available Attendance Forms:     Weekly 6. Number of Credit Hours (Total) / Number of Units (Total)     30 hours 7. Course administrator's name (mention all, if more than one name) Name: Dr. Farah Tariq M.Noori Email: farah.noori@sc.uobaghdad.edu.iq 8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with th expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseding, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. 9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		Second semester / Third Stage		
5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching assistants in the department to be part of the academic teaching specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies       Strategy         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exerci	4. Description P	reparation Date:		
Weekly           6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours           7. Course administrator's name (mention all, if more than one name)           Name: Dr. Farah Tariq M.Noori           Email: farah.noori@sc.uobaghdad.edu.iq           8. Course Objectives           Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.           9. Teaching and Learning Strategies           Strategy           Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This				
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adapts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tu	5. Available Atte			
30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students				
7. Course administrator's name (mention all, if more than one name)         Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive turbits and by considering types of simple experiments involving some sampling activities that are interesting to the students	6. Number of Cre			
Name: Dr. Farah Tariq M.Noori         Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		30 hours		
Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and asign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching staff in the future.         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same through the refining and expanding their critical thinking skills. This will be achieved through the acadiening and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	7. Course admir	nistrator's name (mention all, if more than one name)		
Email: farah.noori@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and asign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching staff in the future.         Strategy       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same through the refining and expanding their critical thinking skills. This will be achieved through the acadiening and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	Name: Dr. Farah Tariq	M.Noori		
8. Course Objectives         Course Objectives         The field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	-			
Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students		ng nau cou ng		
the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics. T. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. 9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	8. Course Object	ives		
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	Course Objectives	the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.		
Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	9. Teaching and Learning Strategies			
10. Course Structure	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple			
	10. Course Structure	9		

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Mechanical Properties and their Measurements, Strengthening Mechanism to Improve the Mechanical Properties, Fracture.	Theoretical	General questions +Exam
2	2 hours	Chapter2	Thermal properties: Heat Capacity, Thermal Expansion.	Theoretical	General questions +Exam
3	2 hours	Chapter3	Thermal Conductivity, Melting Point, Thermal Stress	Theoretical	General questions +Exam
4	2 hours	Chapter4	Classification of Optical Materials, Optical Properties of Materials, Excitons, Colour Centres	Theoretical	General questions +Exam
5	2 hours	Chapter5	Types of Dielectric Materials, Definitions, Claussius-Mosotti Equation, Experimental Determination of Dielectric Constant	Theoretical	General questions +Exam
6	2 hours	Chapter6	Composite Materials :Classification of the Composite Materials, Particle Reinforced Composites .	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	Fiber Reinforced Composites, Processing Techniques for Composite Materials, Applications.	Theoretical	General questions +Exam
9	2 hours	Chapter8	Advanced Ceramic: Classification of Ceramics, Structure of Ceramics, Ceramic Fabrication and properties	Theoretical	General questions +Exam
10	2 hours	Chapter9	Classification of Polymers , Structure of Polymer and properties	Theoretical	General questions +Exam
11	2 hours	Chapter10	Origin of Metallic Glasses, Classification of Nonlinear Materials.	Theoretical	General questions +Exam
12	2 hours	Chapter11	Biomechanism, Classification of Biomaterials, Synthesis of Nanostructured Materials	Theoretical	General questions +Exam

13	2 hours	Chapter12	material X-rays,	erization of : Diffraction of Bragg's Law and Structures	Theoretical	General questions +Exam
14	2 hours	Chapter1	Optical Microscope: Focusing of Electron Beams		Theoretical	General questions +Exam
15	2 hours	Chapter13	Classifications of Hardness Test: Microhardness (Nano- Hardness), Microhardness Test.		Theoretical	General questions +Exam
16	2 hours	Chapter14	Final E	xam	Theoretical	
11.	11. Course Evaluation					
	-	score out of 100 accor ly oral, monthly, or wr	-	-		ent such as daily
12.	Learning	and Teaching Res	ources			
Require	Required textbooks (curricular books, if any)				ian National Sc Tata McGraw-H 0 008.	ience Academy ill Publishing
Main references (sources)			S.L.Kakani, February 2004 Amit Kakani,		Kakani ,	
Recomr (scientif		books and refe s, reports…)	rences	none		
Electror	nic Refere	nces, Websites		Wikip	edia	

1.0				
1. Cours	se Name:			
	Scientific Research Methodology			
2. Cours				
	UOB 3635			
3. Seme	ester / Year:			
	Second semester / Third Stage			
4. Desci	ription Preparation Date:			
	2024-4-2			
5. Avail	able Attendance Forms:			
	Weekly			
6. Numb	ber of Credit Hours (Total) / Number of Units (Total)			
	30 hours			
7. Cour	se administrator's name (mention all, if more than one name)			
Name	e: Dr. Ali A. Alzubadi			
Emai	l: ali.kareem@sc.uobaghdad.edu.iq			
8. Cours	se Objectives			
Course Object	<b>tives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.			
9. Teach	9. Teaching and Learning Strategies			
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module encourage students' participation in the exercises, while at the same time refining and expan their critical thinking skills. This will be achieved through classes, interactive tutorials an considering types of simple experiments involving some sampling activities that are interes to the students				
10. Course	Structure			

Week	Hours	Required	Unit or subject name	Learning	Evaluation
		Learning		method	method
		Outcomes			
1	2 hours	Chapter1	1. <b>Research</b> <b>Methodology</b> : (a) A review of the Fundamentals (b) Definitions of Research Objectives of Research	Theoretical	General questions +Exam
2	2 hours	Chapter2	(a) Motivation in Research (b) General Characteristics of Research Types of Research	Theoretical	General questions +Exam
3	2 hours	Chapter3	2. The Research Problem (a) What is a Research Problem Selecting the Problem	Theoretical	General questions +Exam
4	2 hours	Chapter4	(a) Sources of the Problem (b) Statement of a Problem Evaluation of a Problem	Theoretical	General questions +Exam
5	2 hours	Chapter5	3. The Review of Literature (a) Meaning of Review of Literature Objectives of Review of Literature	Theoretical	General questions +Exam
6	2 hours	Chapter6	(a) Sources of Literature Reporting the Review of Literature	Theoretical	General questions +Exam
7	2 hours		exam	Theoretical	Exam
8	2 hours	Chapter7	4. The Research Approach (a) The Qualitative Approach The Quantitative Approach	Theoretical	General questions +Exam
9	2 hours	Chapter8	(a) The Mixed- Methods Approach	Theoretical	General questions +Exam

				or Selecting a		
10	2 hours	Chapter9	5. Da M	Research Approach 5. Data Collection Methods (a) Questionnaires		General questions +Exam
11	2 hours	Chapter10		) Focus Groups	Theoretical	General questions +Exam
12	2 hours	Chapter11		ampling and Definition of	Theoretical	General questions +Exam
13	2 hours	Chapter12	(a	) Functions of Population and Sampling of Sampling	Theoretical	General questions +Exam
14	2 hours	Chapter1	1. Preparation of the Research Characteristics of a Good Research Title		Theoretical	General questions +Exam
15	2 hours	Chapter13	(a) Structure of research paper: (1) Abstract (2) Introductions (3) Review of the literature (4) Methodology (5) Result & Discussions (6) Conclusions		Theoretical	General questions +Exam
16	2 hours		Final exa	m	Theoretical	
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 etc         12. Learning and Teaching Resources						
		ks (curricular books			ethodology by	Ashish Kumar
Main references (sources)       Scientific Research Methodology by Alejandro Drewes (2021)					ogy by Alejandro	
Recomn (scientifi		books and rest, reports)	eferences	none		
Electron	ic Refere	ences, Websites		Wikipedi	а	

1. Course Nam	ne:
	Laser physics (1)
2. Course Cod	e:
	PHY 3636
3. Semester /	Year:
	Second semester / Third Stage
4. Description	Preparation Date:
5 Available A	2024-4-2 ttendance Forms:
	ticildance Pormis.
Weekly	Credit Hours (Total) / Number of Units (Total)
30 hours	Credit Hours (Total) / Number of Offits (Total)
50 11001 5	
7. Course adr	ministrator's name (mention all, if more than one name)
Name: Dr. 1	Nathera Abass Ali
Dr.S	Sarmed Salih mehdi Khudhaier Al-Awadi
Dr. l	Eman.K.Hasan
Dr. I	Hadeel A.
Email:	
Natl	hera.Ali@sc.uobaghdad.edu.iq
sarr	ned.alawadi@sc.uobaghdad.edu.iq
ema	an.hasan@sc.uobaghdad.edu.iq
had	eel.o@sc.uobaghdad.edu.iq
8. Course Obje	ectives
Course Objectives	Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teaching an	nd Learning Strategies
-	

Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

#### 10. Course Structure

Week	Hours	<b>Required Learning</b>	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours		Introductory concepts; Electromagnetic Radiation; The development of the atomic model; Brief history of laser; Fundamental of Light-Matter Interaction; Absorption, spontaneous and Simulated Emission and its rate equations with examples	Theoretical	1
2	2 hours		The Laser Idea; Pumping Schemes; Three Level Laser; Four Level Laser; Advantages of four level lasers Compared to three level lasers with examples	Theoretical	2
3	2 hours		Properties of Laser Beam; Monochromaticity; Coherence; Directionality; Brightness; Optical Resonator; Definition; passive optical resonators ; Standing waves with examples	Theoretical	3
4	2 hours		Resonator Configurations (types); Plan- Parallel resonator( Fabry-	Theoretical	4

		Perot)advantage &		
		disadvantage;		
		Concentric		
		(Spherical) resonator		
		advantage &		
		disadvantage;		
		Confocal resonator		
		advantage &		
		disadvantage;		
		Resonators using a		
		combination of plane		
		& spherical mirrors;		
		Stable Resonator		
		with examples		
5	2	Unstable Resonator;	Theoretical	5
5		plane- parallel		
	hours	resonator; Modes and		
		Spot Size		
		Calculations; TEM00		
		Modes; TEM01		
		Modes; TEM11		
		Modes; Generalized		
		Spherical Resonator;		
		The stability		
		condition of the		
		resonator with		
		examples		
6	2	The stability	Theoretical	6
	<b>b</b>	condition of (1)		
	hours	Plane-Parallel		
		resonator (2)		
		Concentric Resonator		
		(3) Confocal		
		Resonator; schematic		
		diagram of stability		
		condition with		
		examples		
7	2	Exam	Theoretical	7
	hours			
		D :	The section 1	9
8	2	Pumping process;	Theoretical	8
	hours	Definition; Optical		
		pumping; Electrical		
		pumping; Chemical		
		pumping; Gas-		
		dynamic pumping;		
		Optical pumping;		
		pulsed laser;		
		continuous wave; the		
		type of lamps.;		

9	2	types of pumping	Theoretical	9
,		efficiency; Transfer		
	hours	efficiency; Lamp		
		radiative efficiency;		
		Pump quantum		
		efficiency; Pump		
		light distribution;		
		Pumping rate		
10	2	ELECTRICAL	Theoretical	10
10	2	PUMPING; Electron		
	hours	Impact Excitation;		
		Pump Rate and Pump		
		Efficiency;		
		Excitation by (Near)		
		resonant Energy		
		Transfer; Chemical		
		pumping		
11	2	Introduction; Types	Theoretical	11
11	2	of Laser according to	- neereneur	
	hours	active media & the		
		pumping methods;		
		solid state laser:-		
		Ruby laser; Nd-YAG		
		laser.	Theoretical	12
12	2	Gas laser : Atomic	Theoretical	12
	hours	laser, He-Ne laser;		
		Molecular laser, CO <sub>2</sub>		
		laser	Theoretical	13
13	2	Dye laser; photo	Theoretical	15
	hours	physical process		
14	2	Laser in medicine;	Theoretical	14
14	2	Introduction;		
	hours	Application in		
		Biology and		
		Medicine; Photo-		
		medicine and		
		Photobiology; Laser		
		Induced Biological		
		Damage; Laser		
		Induced Eyes		
		Damage; General		
		Structure of the Eye;		
		Light sensitive		
		tissues.		
15	2	Eye diseases; Myopia	Theoretical	
	hours	(short-sightedness);		
	hours	Treatment Myopia		
		with laser; Hyperopia		
		(long-sightedness);		
		Treatment Hyperopia		

		Bands Interac Biolog Interac mecha the las	aser; Spectral ; Tissue ctions and gical Effects; ction nisms between er radiation ological tissue		
Distributing the spreparation, dail	<ol> <li>Course Evaluation</li> <li>Distributing the score out of 100 according to the tasks assigned to the student such as da preparation, daily oral, monthly, or written exams, reports etc</li> <li>Learning and Teaching Resources</li> </ol>				nt such as daily
Required textbool	Required textbooks (curricular books, if any)			oles of Lase dition , Pler ork and Lond	um Press .
Main references (sources)			None		
Recommended books and references (scientific journals, reports)		None			
Electronic Referen	nces, Websites		Wikipe	edia	

		Outcomes	name	method	method	
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation	
10. Co	ourse S	structure				
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students						
		ng and Learning Strat	tegies			
Name Dr. Falah A-H. Mutlak Email: Falah.mutlak@sc.uobaghd.edu.iq8. Course ObjectivesCourse ObjectivesTeaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic						
I	Name I	Dr. Falah A-H. Mutlal	k			
7. (	Course	e administrator's na	me (mention all, i	f more than o	one name)	
	30 hou		,	()		
	Weekly Numbe	/ r of Credit Hours (To	tal) / Number of U	nits (Total)		
		ble Attendance Forms	:			
4. ]	Descrip	otion Preparation Da	ate:			
		Second	semester / Third S	Stage		
3. 9	Semest	er / Year:				
2. Course Code: PHY 3637-1						
			vable energy (elective	e)		
			/ I /·	<b>`</b>		

1	2	Introduction to Solar	Theoretical	General
1	2	Energy; Historical		questions
	hours	Perspective; Energy Use		+Exam
		in the Iraq; Solar Energy; Obstacles and		
		Outlook.		
2	2	Fundamentals of Solar	Theoretical	General
2		Radiation; The Nature		questions
	hours	of Solar Radiation; <b>Radiation on Earth's</b>		+Exam
		Surface;		
		Solar and Local		
		Standard Time		
3	2	Measurement of Insolation; Solar	Theoretical	General questions
	hours	geometry; Radiation on		+Exam
	liouis	Tilted Surfaces;		
		Absorption,		
		Transmission, Reflection		
4	2	Collectors of Solar	Theoretical	General
4	2	Radiation; Types of		questions
	hours	Solar Collectors; Flat		+Exam
		Plate Collectors Thermal Analysis of	Theoretical	General
5	2	Flat Plate Collectors -	Theoretical	questions
	hours	Absorber Plate		+Exam
(	-	Cover Plate - Enclosure	Theoretical	General
6	2	/ Insulation		questions
	hours			+Exam
7	2	Exam	Theoretical	Exam
,				
	hours			
8	2	Thermal Analysis of evacuated tube	Theoretical	General questions
	hours	Collectors - Absorber		+Exam
	liouis	Plate - Cover Plate -		
		Enclosure / Insulation		
9	2	<b>Concentrating</b> <b>Collectors;</b> Parabolic	Theoretical	General questions
	hours	Dish and Trough		+Exam
	liours	Concentrators; Central		
		Receiver Collector -		
		Power Tower. Review of Basic Heat	Theoretical	General
10	2	Transfer Principles;	Theoretical	questions
	hours	Conduction; Radiation;		+Exam
		Convection; Combined		
		Heat Transfer Mechanisms		
11	2	Transfer and Storage	Theoretical	General
11	2	of Heat; Types of	incorotiour	questions
	hours	Transfer Fluids; Water		+Exam
		and Water/Glycol		
		Mixtures; Hydrocarbon Oils; Silicone Liquids		
12	2	Types of Thermal	Theoretical	General
12	2	Energy Storage;		questions
	hours	Sensible Heat Storage;		+Exam
		Water Heat Storage;		

				l Storage,		
				eat Storage.	Theoretical	Cananal
13	2 hours		System; Storage N	f Storage Selection of Material; f Containment	Theoretical	General questions +Exam
			Sizing of System a Tempera	Storage nd		
			Stratifica	tion.		
14	2			solar energy	Theoretical	General
	hours			ators; Review		questions +Exam
	nours		Power CS			
			Concentr			
				taic (CPV) Fresnel lenses		
			and Frest	nel reflectors;		
				solar cells at dent energy for		
				n power output.		
15	2		Tracking	<u> </u>	Theoretical	General
			requiren			questions +Exam
	hours		examples +Exam			TEXam
16	2	Final Exam				
	hours				Fillal Exam	
11. (	Course E	Evaluation				
	-	score out of 100 accord n, daily oral, monthly, or	-		-	dent such as
	-	and Teaching Resou		<u>- ename, rep</u> e		
Require	d textbool	ks (curricular books, if an	ny) A	dvanced	Fechnologies	for Solar
		•	, P	hotovoltaics	Energy Syste	ms (Green
			E	nergy and Te	chnology) by Sa	aad Motahhir
			(	Editor), Ali M.	Eltamaly	
Main ref	erences (	sources)		none		
Recomm	Recommended books and references					
(scientific journals, reports)				none		
(scientifi	c journals	s, reports…)				

1. Course Name:					
Renewable energy (elective)					
2. Course Code:					
PHY 3637-1					
3. Semester / Year:					
Second semester / Third Stage					
4. Description Preparation Date:					
2024-4-2					
5. Available Attendance Forms: Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
30 hours					
7. Course administrator's name (mention all, if more than one name) Name Dr. Falah A-H. Mutlak					
Email: Falah.mutlak@sc.uobaghd.edu.iq					
8. Course Objectives					
<b>Course Objectives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.					
9. Teaching and Learning Strategies					
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students					
10. Course Structure					
Week         Hours         Required Learning         Unit or subject         Learning         Evaluation					
Outcomes name method method					
173					

	1			-
1	2 hours	Introduction to Solar Energy; Historical Perspective; Energy Use in the Iraq; Solar	Theoretical	General questions +Exam
2	2	Energy; Obstacles and Outlook. Fundamentals of Solar	Theoretical	General
-	hours	Radiation; The Nature of Solar Radiation;Radiation on Earth's Surface;Solar and Local Standard Time		questions +Exam
3	2 hours	Measurement of Insolation; Solar geometry; Radiation on Tilted Surfaces; Absorption, Transmission, Reflection	Theoretical	General questions +Exam
4	2 hours	Collectors of Solar Radiation; Types of Solar Collectors; Flat Plate Collectors	Theoretical	General questions +Exam
5	2 hours	Thermal Analysis ofFlat Plate Collectors -Absorber Plate	Theoretical	General questions +Exam
6	2 hours	Cover Plate - Enclosure / Insulation	Theoretical	General questions +Exam
7	2 hours	Midterm Exam	Theoretical	Exam
8	2 hours	<b>Thermal Analysis of</b> <b>evacuated tube</b> <b>Collectors -</b> Absorber Plate - Cover Plate - Enclosure / Insulation	Theoretical	General questions +Exam
9	2 hours	Concentrating Collectors; Parabolic Dish and Trough Concentrators; Central Receiver Collector - Power Tower.	Theoretical	General questions +Exam
10	2 hours	Review of Basic HeatTransfer Principles;Conduction; Radiation;Convection; CombinedHeat TransferMechanisms	Theoretical	General questions +Exam
11	2 hours	Transfer and Storageof Heat; Types ofTransfer Fluids; Waterand Water/GlycolMixtures; HydrocarbonOils; Silicone Liquids	Theoretical	General questions +Exam
12	2 hours	Types of ThermalEnergy Storage;Sensible Heat Storage;Water Heat Storage;	Theoretical	General questions +Exam

				Bed Storage,		
13	2 hours		Design System Storag	Heat Storage <b>n of Storage</b> <b>n;</b> Selection of the Material;	Theoretical	General questions +Exam
			Sizing Syster Tempe	n of Containment of Storage n and erature ication.		
14	2 hours		concer of con Power Concer Photo system and Fr operat high in	of solar energy ntrators; Review centrated Solar CSP) and ntrated voltaic (CPV) ns; Fresnel lenses resnel reflectors; ing solar cells at neident energy for num power output.	Theoretical	General questions +Exam
15	2 hours		Tracking requirements; examples		Theoretical	General questions +Exam
16	2 hours				Final Exam	
11. (	Course E	Evaluation				
	0	score out of 100 accord y oral, monthly, or writ	0	0		nt such as daily
12. L	_earning	and Teaching Resou	urces			
Required textbooks (curricular books, if any)			Photovoltaics <b>H</b>	y) by Saad Mo	for Solar (Green Energy otahhir (Editor),	
Main ref	erences (	(sources)		none		
Recomn	nended	books and refere	ences			
(scientifi	c journals	s, reports…)		none		
Electron	ic Refere	nces, Websites		Wikipedia		

1. Course Name:					
Optical fibers (elective)					
2. Course Code:					
PHY 3637-2					
3. Semester / Year:					
Second semester / Third Stage					
4. Description Preparation Date:					
5. Available Attendance Forms:					
Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
30 hours					
7. Course administrator's name (mention all, if more than one name	<del>?</del> )				
Name Dr. Soudad S.ahmed					
Email: Soudad.ahmed@sc.uobaghdad.edu.iq					
8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in the					
<b>Course Objectives</b> Iteaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing a educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. The service of preparing graduates specialized in physics who contribute the development in the country. 6. Meeting the needs of various sectors with high qualified personals in the field of physics. 7. Encouraging the distinguished in the field to work as teaching assistants in the department to be part of the academic					
9. Teaching and Learning Strategies					
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students					
10. Course Structure					
Week         Hours         Required Learning         Unit or subject         Learning         Evaluat	ion				
Outcomes name method method					
176					

	hours	fiber communications		questions +Exam
2	2 hours	Optical fibers, struct5ures, waveguiding, and fabrication.	Theoretical	General questions +Exam
3	2 hours	Signal degradation in optical fibers.	Theoretical	General questions +Exam
4	2 hours	Optical sources.	Theoretical	General questions +Exam
5	2 hours	Power launching and coupling.	Theoretical	General questions +Exam
6	2 hours	Photodetectors.	Theoretical	General questions +Exam
7	2 hours	Exam.	Theoretical	Exam
8	2 hours	Optical receiver operation.	Theoretical	General questions +Exam
9	2 hours	Digital transmission system	Theoretical	General questions +Exam
10	2 hours	Analog system	Theoretical	General questions +Exam
11	2 hours	WDM concepts and components.	Theoretical	General questions +Exam
12	2 hours	Optical amplifier, Optical networks	Theoretical	General questions +Exam
13	2 hours	FBG structure and components, manufacturing.	Theoretical	General questions +Exam
14	2 hours	Optical fiber system analysis,	Theoretical	General questions +Exam
15	2 hours	Overview of optical fiber communications	Theoretical	General questions +Exam
16	2 hours		Final Exam	

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

12. Learning and Teaching Resources				
Required textbooks (curricular books, if any)	Optical fiber communication essentials By			
	Gerd Keiser			
Main references (sources)	none			
Recommended books and references (scientific journals, reports)	none			
Electronic References, Websites	International university courses in the field			
	of optical communications			

	Opt :: /ear:		tage	
ster / Y iption ]	:: /ear: Second Preparation Da	PHY 3637-2 semester / Third S te:	tage	
ster / Y iption ]	Year: Second Preparation Da	semester / Third S te:	tage	
iption ]	Second Preparation Da	semester / Third S te:	tage	
iption ]	Second Preparation Da	te:	tage	
	Preparation Da	te:	tage	
	-		-	
able Att	endance Forms:			
		2024-4-2		
	endance Porms.	Weekly		
er of C	redit Hours (Tot	tal) / Number of Uni	ts (Total)	
		30 hours		
se adm	ninistrator's nar	me (mention all, if	more than o	ne name)
	udad S.ahmed			
		obaghdad.edu.iq		
e Objec		he basic principles of physic		
	educated generation radical changes and analysis and adapta expansion of human the connection of t advisory counseling 5. The service of development in the qualified personals	a market in state institutions a armed with science and add assign scientific knowledg ation with the development a needs. 4. Effective contribu- the university with the soc g, training and development preparing graduates specia e country. 6. Meeting the n in the field of physics. 7. E aching assistants in the dep e future.	opts it as a sound ba e and scientific me of technologies, to tion for deepening iety through the in of teaching and ad lized in physics we eeds of various se ncouraging the dis	asis to bring about thods in thinking, keep up with the and documenting mplementation of ministrative staff. who contribute to cors with highly stinguished in this
ing and	d Learning Strate			
encou expan tutoria	rage students' particip ding their critical thin	nain strategy that will be add pation in the exercises, wh thing skills. This will be add types of simple experiments dents	nile at the same the chieved through cl	ime refining and lasses, interactive
that ai				
	re			
Structu	uired Learning	Unit or subject	Learning	Evaluation
		· · · · · · · · · · · · · · · · · · ·	Structure	Structure

1	2 bours	Overview of optical fiber	Theoretical	General questions +Exam
	hours	communications		
2	2 hours	Optical fibers, struct5ures, waveguiding, and fabrication.	Theoretical	General questions +Exam
3	2 hours	Signal degradation in optical fibers.	Theoretical	General questions +Exam
4	2 hours	Optical sources.	Theoretical	General questions +Exam
5	2 hours	Power launching and coupling.	Theoretical	General questions +Exam
6	2 hours	Photodetectors.	Theoretical	General questions +Exam
7	2 hours	Exam.	Theoretical	Exam
8	2 hours	Optical receiver operation.	Theoretical	General questions +Exam
9	2 hours	Digital transmission system	Theoretical	General questions +Exam
10	2 hours	Analog system	Theoretical	General questions +Exam
11	2 hours	WDM concepts and components.	Theoretical	General questions +Exam
12	2 hours	Optical amplifier, Optical networks	Theoretical	General questions +Exam
13	2 hours	FBG structure and components, manufacturing.	Theoretical	General questions +Exam
14	2 hours	Optical fiber system analysis,	Theoretical	General questions +Exam
15	2 hours	Overview of optical fiber communications	Theoretical	General questions +Exam
16	2 hours		Final Exam	

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Optical fiber communication essentials By
	Gerd Keiser
Main references (sources)	none
Recommended books and references (scientific journals, reports)	none
Electronic References, Websites	International university courses in the field
	of optical communications

_					
1. Course Name:					
Radiation Physics (elective)					
2. Course Code:					
PHY 3637-3					
3. Semester / Year:					
Second semester / Third Stage					
4. Description Preparation Date:					
5. Available Attendance Forms:					
Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
30 hours					
7. Course administrator's name (mention all, if more than one name)					
Name Dr. Asia H. Al-Mashhadani					
Email: asia.hammad@sci.uobaghdad.edu.iq					
8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in the field					
needs of the job market in state institutions and industry sectors. 3. Preparing a educated generation armed with science and adopts it as a sound basis to bring abou radical changes and assign scientific knowledge and scientific methods in thinking analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documentin the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staf 5. The service of preparing graduates specialized in physics who contribute t development in the country. 6. Meeting the needs of various sectors with highl qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academi teaching staff in the future.					
9. Teaching and Learning Strategies					
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students					
10. Course Structure					
WeekHoursRequired LearningUnit or subjectLearningEvaluation					
Outcomes name method method					
182					

1	2	Introduction to	Theoretical	General
1	2 hours	Radiation Physics Historical overview of radiation physics		questions +Exam
2	2 hours	Types of radiation: ionizing and non- ionizing	Theoretical	General questions +Exam
3	2 hours	Fundamental properties of radiation	Theoretical	General questions +Exam
4	2 hours	Atomic and Nuclear Structure	Theoretical	General questions +Exam
5	2 hours	Atomic structure and energy levels Nuclear structure and stability	Theoretical	General questions +Exam
6	2 hours	Radioactive decay and decay modes Alpha decay	Theoretical	General questions +Exam
7	2 hours	Exam	Theoretical	Exam
8	2 hours	Beta and gamma decay	Theoretical	General questions +Exam
9	2 hours	Interaction of Radiation with Matter Charged particle interaction: (Maximum Energy Transfer in a Single Collision	Theoretical	General questions +Exam
10	2 hours	Interaction of Radiation with Matter beta	Theoretical	General questions +Exam
11	2 hours	Interaction of electrons with matter	Theoretical	General questions +Exam
12	2 hours	Interaction of neutrons with matter (Elastic scattering, Inelastic scattering)	Theoretical	General questions +Exam
13	2 hours	Interaction of gamma radiation with matter (Photoelectric effect, Compton scattering, pair production)	Theoretical	General questions +Exam
14	2 hours	Attenuation of gamma rays	Theoretical	General questions +Exam

15	2 hours			Radiation Units and Dosimetry	Theoretical	General questions +Exam	
16	2 hours				Final Exam		
11. 0	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 etc						nt such as daily	
12. L	earning	and Teaching	g Resou	rces			
Required textbooks (curricular books, if any) James Atoms Radiat					2		
Main ref	erences (	(sources)		Nuclear Physics (	Concepts, By Meyerl	nof.	
Recommended books and references none (scientific journals, reports)							
Electron	ic Refere	nces, Websites		Lecture Note	s of radiation ph	ysics	

		0	utcomes	name	method	method
Neek	Hou		equired Learning	Unit or subject	Learning	Evaluation
10. Co	ourse	Struc	ture			
Strategy		enco expa tutor	urage students' particip nding their critical thinl	ain strategy that will be ad ation in the exercises, wh king skills. This will be a types of simple experiment lents	nile at the same ti chieved through cla	me refining and asses, interactive
		ning a	nd Learning Strate	egies		
ľ I	Name Emai Cours	e Dr. E l: Ema se Obj	Eman M. Nasir an.nasir@sc.uoba ectives Teaching students the general physics and it the country's need for the job market in sta generation armed wit changes and assign ss and adaptation with th human needs. 4. Effect of the university with training and develop preparing graduates country. 6. Meeting th field of physics. 7. E		2. Preparing special ich bears the responses and capable of me ry sectors. 3. Preparation a sound basis to b ientific methods in gies, to keep up witt ning and document inplementation of ad ministrative staff. 3 to contribute to de with highly qualifie ned in this field to	alists in the field of sibility of studying beting the needs of aring an educated tring about radical thinking, analysis h the expansion of ing the connection visory counseling, 5. The service of evelopment in the ed personals in the work as teaching
7. (	Cour	se ad	ministrator's nar	me (mention all, if	more than o	ne name)
			X	30 hours		
6. I	Numł	ber of	Credit Hours (Tot	Weekly tal) / Number of Un	its (Total)	
5. 4	Avail	able A	Attendance Forms:			
4. I	Desci	ription	n Preparation Da	2024-4-2		
			Second	semester / Third S	Stage	
3. 5	Seme	ster /	Year:			
2. (	Lours	se Coo	ie:	PHY 3637-4		
2	2	0		ctors Physics (elective	;)	

1	2	General	Theoretical	General
		Introduction,		questions
	hours	Classification of		+Exam
		detectors,		
		semiconductor		
		detectors		
2	2	Photoconductive	Theoretical	General
2		detectors, types,		questions
	hours	Detectors		+Exam
		parameters, Figures		
		of merits		
3	2	Photovoltaic	Theoretical	General
5		detectors, types,		questions
	hours	Detectors		+Exam
		parameters, Figures		
		of merits		
4	2	Photodiode	Theoretical	General
-	2	detectors,		questions
	hours	Photodiode		+Exam
		characteristics,		
		Structure and		
		working circuits of		
		a photodiode		
		detectors, Figures of		
		merits		
5	2	Phototransistor	Theoretical	General
3	2	detectors,		questions
	hours	characteristic,		+Exam
		properties,		
		application		
6	2	Photoresistor	Theoretical	General
U	2	detectors,		questions
	hours	characteristic,		+Exam
		properties,		
		application		
7	2	Exam	Theoretical	Exam
	hours			
8	2	Solar cell	Theoretical	General
		efficiency,		questions +Exam
	hours	Difference between		+ExdIII
		detectors and solar		
		cell I-V		
		characteristics of		
		photoconductive		
		detector and		
		photovoltaic		
		detectors		
9	2	Thermal detectors,	Theoretical	General
9				
9	hours	classification and		questions +Exam

16	2 hours	Final 1	Exam
16	hours	materials, characteristics, parameters sensors, Properties of thermal detectors, Properties of gas sensors.	+Exam
14	2 hours 2	Detectors, Gamma ray detection (Scintillators, Solid State dets.) Neutron detection. Gas Sensors, types, Theoret	questions +Exam
13	2 hours 2	Bolometer detectorsTheoretCharged ParticleTheoretDetectors,ScintillatorsDetectors, GasDetectors, GasDetectors 1.IonizationChambers 2.ProportionalCounters 3.Avalanche detectors4. Geiger-Mullercounters 5. SparkdetectorsSolid State	questions +Exam
12	2 hours	Metalic and thermoistorTheoretBolometers detectors, semiconductor and micromachined bolometer detectors, SuperconductingTheoret	ical General questions +Exam
11	2 hours	Pyroelectric detectors,       Theoret:         Bolometers detectors,       characteristic,         properties, application       Formation	ical General questions +Exam
10	2 hours	ThermocouplesTheoretdetectors, characteristic, properties, application, Thermopiles detectors, characteristic, properties, applicationTheoret	ical General questions +Exam
		properties, Figures of merits	

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Measurement and detection of radiation,4 <sup>th</sup> edition, Nicholas Tsoulfanidis,2015
Main references (sources)	Compound semiconductor radiation detector, Alan owens,2016
Recommended books and references (scientific journals, reports)	none
Electronic References, Websites	https://www.semiconductor.org/ semiconductor-sensors

of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.9. Teaching and Learning StrategiesStrategyType something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interac tutorials and by considering types of simple experiments involving some sampling activi that are interesting to the students10. Course StructureWeekHoursRequired LearningUnit or subjectLearningEvaluati			-		
2. Course Code:       PHY 3637-5         3. Semester / Year:       Second semester / Third Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the 1 of general physics and its practical applications, which bears the responsibility studying the country's need for development of technologies, to keep up with expansion of human needs. 4. Effective contribution for depending and daptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for depending and daptation with the society through the implementation advisory counseling, training and development of technologies, to keep up with expansion of human needs. 4. Effective contribution for depending and daministrative staf The service of preparing graduates specialized in physics who contribute development to the cance teaching astift in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module i neitorial and by considering types of simple experiments involving some sampling activit that are interesting to the students         10. Course Structure       Unit or subject       Learning       Evaluati	1. Course	e Name:			
PHY 3637-5         3. Semester / Year:         Second semester / Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Course Objectives         Course of the physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing excitation are with science and adopts it as a sound basis to bring a radical changes and assign scientific knowledge and aconthes in think analysis and dataptation with the development of technolize, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the development of technolizes. The sace tracking astift in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module in encourge students' participation in the exercises, while at the same time		Bic	omaterials (elective)		
3. Semester / Year:         Second semester / Third Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of teaching and documen the connection of the university with the society through the implementation advisory conseling, training and development of teaching and administrative staf The service of preparing graduates specialized in physics who contribute development in the contrologies, to keep up with explosion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory conseling, training and development of teaching and dorisor scores with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching	2. Course	e Code:			
Second semester / Third Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq       8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and caapble of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assigns cientific knowledge and scientific nethods in think analysis and adaptation with the development of teaching and documen the connection of the university with the society through the implementatior advisory counseling, training and development of teaching and adorumen the connection of the university with the society through the implementation advisory counseling. Training and development of teaching and adorumen the connection of the university with the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interae tutorials and			PHY 3637-5		
4. Description Preparation Date:       2024-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the for general physics and its practical applications, which bears the responsible of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at adical changes and asign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementator advices cop preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interacturbrias and by considering types of simple experiments involving	3. Semes	ster / Year:			
20244-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of teaching and administrative staf The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hij qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interac tutorials and by considering types of simple experiments involving some sampling activi that are interesting to the students         10. Course Structure		Second	semester / Third S	tage	
5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the for general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf. The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encorarging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through clases, interac tutorials and by considering t	4. Descri	ption Preparation Dat			
Weekly           6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours           7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq           8. Course Objectives           Course Objectives           Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.           9. Teaching and Learning Strategies           Strategy           Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through clases, interac tutorials and by	5 Availa	ble Attendance Forms			
6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific modeds in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with huj qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         10. Course Structure         Week       Hours       Required Learning       Unit or subject       Learning       Evaluati	J. Hvullu				
7. Course administrator's name (mention all, if more than one name Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf. The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         10. Course Structure         10. Course Structure         Week       Hours       Required Learning       Unit or subject       Learning       Evaluati <td>6. Numbe</td> <td>er of Credit Hours (Tot</td> <th></th> <td>its (Total)</td> <td></td>	6. Numbe	er of Credit Hours (Tot		its (Total)	
Name Dr. Seenaa Ibraheim Hussein Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing needs of the job market in state institutions and industry sectors. 3. Preparing needs of the job market in state institutions of neeting and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of teaching and administrative staf radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of teaching and administrative staf radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of teaching and administrative staf radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of teaching and administrative staf The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         Strategy         Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This wi			30 hours		
Email: seenaa.hussein@sc.uobaghdad.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the f         of general physics and its practical applications, which bears the responsibility         studying the country's need for development and progress and capable of meeting         needs of the job market in state institutions and industry sectors. 3. Preparing         educated generation armed with science and adopts it as a sound basis to bring at         radical changes and assign scientific Mowledge and scientific methods in think         analysis and adaptation with the development of technologies, to keep up with         expansion of human needs. 4. Effective contribution for deepening and documen         the connection of the university with the society through the implementation         advisory counseling, training and development of teaching and administrative staff         The service of preparing graduates specialized in physics who contribute         development in the country. 6. Meeting the needs of various sectors with hig         qualified personals in the field of physics. 7. Encouraging the distinguished in         field to work as teaching assistants in the department to be part of the acade         teaching staff in the future.         Strategy         Type something like: The main strategy that will be adopted in delivering this module i         encourage students' participation in the exercises, while at the same time refining         expanding their critical thinking skills. This will be achieved through classes, interac         thorals and by considering types of simple experiments involving some sampling activit         that are interesting to the students         10. Course Structure       Week       Hours	7. Cours	e administrator's nan	ne (mention all, if	more than c	one name)
8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy       Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interact thorals and by considering types of simple experiments involving some sampling activitiat are interesting to the students         10. Course Structure       Required Learning       Unit or subject       Learning       Evaluati					
Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the f of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring at radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf. The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         10. Course Structure         Week       Hours       Required Learning       Unit or subject       Learning       Evaluati			iobaghdad.edu.iq		
of general physics and its practical applications, which bears the responsibility studying the country's need for development and progress and capable of meeting needs of the job market in state institutions and industry sectors. 3. Preparing educated generation armed with science and adopts it as a sound basis to bring al radical changes and assign scientific knowledge and scientific methods in think analysis and adaptation with the development of technologies, to keep up with expansion of human needs. 4. Effective contribution for deepening and documen the connection of the university with the society through the implementation advisory counseling, training and development of teaching and administrative staf. The service of preparing graduates specialized in physics who contribute development in the country. 6. Meeting the needs of various sectors with hig qualified personals in the field of physics. 7. Encouraging the distinguished in field to work as teaching assistants in the department to be part of the acade teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interact tutorials and by considering types of simple experiments involving some sampling activit that are interesting to the students         10. Course Structure         Week       Hours       Required Learning       Unit or subject       Learning       Evaluati	8. Course	-			
9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interact tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students         10. Course Structure         Week       Hours       Required Learning       Unit or subject       Learning       Evaluation		educated generation a radical changes and a analysis and adaptatio expansion of human m the connection of the advisory counseling, t The service of prep development in the c qualified personals in field to work as teac	rmed with science and adop assign scientific knowledge on with the development of needs. 4. Effective contribu- e university with the soci- raining and development of paring graduates specializ country. 6. Meeting the ne- the field of physics. 7. En- thing assistants in the depart	pts it as a sound be and scientific me f technologies, to tion for deepening ety through the i teaching and adm ed in physics we reds of various se noouraging the dis	asis to bring about ethods in thinking, b keep up with the g and documenting implementation of hinistrative staff. 5. who contribute to ectors with highly stinguished in this
Type something like: The main strategy that will be adopted in delivering this module i encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, interact tutorials and by considering types of simple experiments involving some sampling activit that are interesting to the students10. Course StructureWeekHoursRequired LearningUnit or subjectLearningEvaluati	9. Teachi				
Week         Hours         Required Learning         Unit or subject         Learning         Evaluation	trategy	encourage students' particip expanding their critical thin tutorials and by considering	pation in the exercises, which will be a types of simple experiment	nile at the same chieved through c	time refining and classes, interactive
			1		
	Veek Hours		Unit or subject		Evaluation
Outcomes name method method		Outcomes	name	method	method

1	2	Fundamentals of	Theoretical	General
1	2	biomaterials science.		questions
	hours	Concept of		+Exam
		biocompatibility.		
		Classes of biomaterials		
		used in medicine, basic		
		properties, medical		
		requirements and		
		clinical significance.		
		Desinfection and		
		sterilization of		
		biomaterials.		
2	2	Physico-chemical	Theoretical	General
2		properties of		questions
	hours	biomaterials:		+Exam
		mechanical (elasticity,		
		yield stress, ductility,		
		toughness, strength,		
		fatigue, hardness, wear		
		resistance), tribological		
		(friction, wear,		
		lubricity), morphology		
		and texture, physical		
		(electrical, optical,		
		magnetic, thermal).		
3	2	Chemical and biological	Theoretical	General
3	2	properties: solubility		questions
	hours	and erosion, ,		+Exam
		corrosion, Biological		
		properties and		
		Biological soft tissue		
		materials		
4	2	Elements in contact	Theoretical	General
4		with the surface of a		questions
	hours	biomaterial: blood		+Exam
		composition, plasma		
		proteins, cells, tissues.		
5	2	Phenomena at the	Theoretical	General
3	2	biointerfaces. Molecular		questions
	hours	and cellular processes		+Exam
		with living		
		environment, blood-		
		materials interaction,		
		short and long term		
		reactions to the body		
6	2	Testing of biomaterials:	Theoretical	General
0	2	in vitro, in vivo		questions
	hours	preclinical and <i>in vivo</i>		+Exam
		clinical tests.		
		clinical tests.		
_		Exam	Theoretical	Exam
7	2	Exam	Theoretical	Exalli
	houre			
	hours			
8	2	Technologies of	Theoretical	General
0		biomaterials processing,		questions
	hours	as implants and medical		+Exam
		devices; improvement		
		of materials		

		biocompatibility by		
0		plasma processing. Metal -Based	Theoretical	General
9	2		Theoretical	questions
	hours	biomaterials,		+Exam
		Polymer -based		
		biomaterials ,		
		Ceramic -based		
		biomaterials		
10	2	Applications of	Theoretical	General
	hours	biomaterials , Applications in		questions +Exam
	liours	dentistry, Applications		LXam
		in oral and maxillofacial		
		surgery, Applications		
		in tissue engineering		
11	2	Composites biomaterials .	Theoretical	General questions
	hours	Reinforced of matrix ,		+Exam
		Based on the type of		
		matrix material, Types		
		of fibers, Fabrication		
		Processes of Fibrous bioComposites, Factors		
		influencing the		
		performance of bio		
		composites		
12	2	Synthetic biomaterials,	Theoretical	General
	haura	Addition , Condensation ,		questions +Exam
	hours	Polymerization		+Exam
13	2	Characteristics of	Theoretical	General
15		biomaterials,		questions
	hours	toxicology,		+Exam
		biocompatible, biodegradation,		
		Classification and		
		medical application of		
		biomaterials		
14	2	Biomaterials and Sol–	Theoretical	General
	hours	Gel Process: A Methodology for the		questions +Exam
		Preparation of		Laun
		Functional Materials		
15	2	Antibacterial	Theoretical	General
		Performance of Graded Nano–Composite		questions +Exam
	hours	Biomaterials		+Exaili
16	2	Distance and		
10			Final Exam	
	hours			
	Course Evaluation			
	_	100 according to the tasks assign		nt such as dail
prepar	ation, daily oral, mont	hly, or written exams, reports	etc	
		ning Resources		

Required textbooks (curricular books, if any)	• H.Boenig, Fundamentals of Plasma Chemistry and Tehnology, Technomic Publishing Co.Inc. Lancaster Basel, 1990.		
Main references (sources)	<ul> <li>Practical Surface Analysis, 2- edition, Edited by D.Briggs, M.P.Seah, J.Wiley &amp; Sons Ltd, 1990.</li> <li>Biomaterials Science, An Intoduction to Materials in medicine, Eds. B. D. Ratner and A. S. Hoffman, Academic Press, New York, 1996.</li> <li>Plasma-surface modification of biomaterials, P.K.Chua, J.Y.Chena, L.P.Wanga, N.Huang, Elsevier Science B.V, 2002.</li> <li>XXX – Articles about Biomaterials and Biocompatibility</li> </ul>		
Recommended books and references (scientific journals, reports)	none		
Electronic References, Websites	Wikipedia		

1. Course Name:
Electrical Discharges Physics (elective)
2. Course Code:
PHY 3637-6
3. Semester / Year:
Second semester / Third Stage
4. Description Preparation Date:
5. Available Attendance Forms:
Weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours
7. Course administrator's name (mention all, if more than one name)
Name Dr. Thamir H. Khalaf
Email: Thamir.Khalaf@sc.uobaghdad.edu.iq
8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in the field
needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teaching and Learning Strategies
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students
10. Course Structure
Week         Hours         Required Learning         Unit or subject         Learning         Evaluation
Outcomes name method method
193

12 hoursIntroduction: Definition and Content of Gas Discharge, History of Fleetrical Discharge Applications of the Discharge, Applications of the Discharge, Particles in the Process- of Gas Discharge, Photons, Electrona, Grand Discharge, Photons, Electrona, Grand Particles in the Process- of Gas Discharge, Photons, Electrona, Grand Grand Nodecules), Positive and Negative HoursTheoretical General questions +Exam32 hoursMovement of Charged Particles in the Process- of Gas Discharge, Photons, Electrona, Ground State Atoms (or Molecules), Positive and Negative Ions.Theoretical general questions +Exam42 hoursMovement of Charged Particles. Diffusion Motion of Charged Particles. Diffusion Motion of Charged Particles. Diffusion Motion of Charged Particles.Theoretical general general general the particles.52 hoursCollision Interactions of Collision Granderfisitic Collision Between Particles. Collision Excitation and Collision of Charged Particles.Theoretical general general general collision, Between Particles. Collision Excitation and Excitation and Excitation and Excitation and Excitation and Excitation and Discharge, Chiefford, Gas Discharge, Orther, Gas Discharge, Orther, Gas Discharge, Chiefford, Gas Discharge, Chiefford, Gas Discharge, Fire Characteristic, From Non-ScI-Stastining Discharge, The Condition of Self- Sustained Discharge, Fire Characteristic, From Non-ScI-Stastining Discharge, The Condition of Self- Sustained Discharge, Fire Characteristic, From Non-ScI-Stastining Discharge, The Condition of Self- Sustained Di					
2       2       Discharge: Charged Particles in the Process of Gas Discharge; Photons, Electrons, Ground State Atoms (or Molecules) and Excited Atoms (or Molecules), Positive and Negative Ions.       Theoretical       General questions         3       2       Movement of Charged Particles: Thermal Motion of Charged Particles, Diffusion Motion of Charged Particles: Collision Interactions of Collision Interactions of Collision Energy Transfer, Collision Characteristic Parameters, Elastic Collisions of Electrons, Ions and Atoms, Excitation and Ionization of Gas Atoms, Gas Particles, Collision of Sate Pormation and Development of Electronic Avalanche, Formation of Electronic Avalanche, a Process, γ Process.       Theoretical       General questions +Exam         6       2 hours       Self-Sustaining Discharge Volt-Mapper Process.       Theoretical       General questions +Exam	1		and Content of Gas Discharge, History of Electrical Discharge Research, Classification of the Discharge, Applications of the Discharge.		questions +Exam
3       2       Particles: Thermal Motion of Charged Particles, Drift Motion of Charged Particles.       questions +Exam         4       2       Collision Interactions of Charged Particles: hours       Theoretical       General questions         4       2       Collision Interactions of Classification of Collision Between Particles, Collision Energy Transfer, Collisions of Electrons, Ions and Atoms, Excitation and Ionization of Gas Atoms, Gas Particle Excitation ransferring, Disappearance of Charged Particles; Pormation and Development of Electronic Avalanche, Formation of Electronic Avalanche, a Process, γ Process.       Theoretical       General questions +Exam         6       2       Self-Sustaining Discharge Criterion, Gas Discharge Criterion, Gas Discharge Criterion, Gas Discharge Criterion, Gas       Theoretical       General questions +Exam	2		Discharge: Charged Particles in the Process of Gas Discharge, Photons, Electrons, Ground State Atoms (or Molecules) and Excited Atoms (or Molecules), Positive and Negative	Theoretical	questions
42Charged Particles: Classification of Collision Between Particles, Collision Energy Transfer, Collision Characteristic Parameters, Elastic Collision of Gas Atoms, Gas Particle Excitation and Ionization of Gas Atoms, Gas Particle Excitation and Ionization of Gasquestions +Exam52Fundamental Theory of Charged Particles.Theoretical questionsGeneral questions52Fundamental Theory of Townsend Discharge: Formation and Development of Electronic Avalanche, Formation of Electronic Avalanche, a Process, γTheoretical General questions62 hoursSelf-Sustaining Discharge Volt-Ampere Characteristics, From Non-Self-Sustaining Discharge, The Condition of Self-Theoretical	3		Particles: Thermal Motion of Charged Particles, Diffusion Motion of Charged Particles, Drift Motion	Theoretical	questions
52 hoursFundamental Theory of Townsend Discharge: Formation and Development of Electronic Avalanche, Formation of Electronic Avalanche, α Process, γ Process.Theoretical questions +Exam62 hoursSelf-Sustaining Discharge Volt-Ampere Characteristics, From Non-Self-Sustaining Discharge, The Condition of Self-Theoretical questions +Exam	4		Charged Particles: Classification of Collision Between Particles, Collision Energy Transfer, Collision Characteristic Parameters, Elastic Collisions of Electrons, Ions and Atoms, Excitation and Ionization of Gas Atoms, Gas Particle Excitation Transferring, Disappearance of	Theoretical	questions
bours       Discharge Criterion, Gas       questions         hours       Discharge Volt-Ampere       +Exam         Non-Self-Sustaining       to Self-Sustaining       +Exam         Discharge, The       Condition of Self-       +	5		Fundamental Theory of Townsend Discharge: Formation and Development of Electronic Avalanche, Formation of Electronic Avalanche, α Process, γ	Theoretical	questions
	6		Discharge Criterion, Gas Discharge Volt-Ampere Characteristics, From Non-Self-Sustaining to Self-Sustaining Discharge, The Condition of Self-		questions
7     2     Exam.     Theoretical     Exam       hours     hours     bours     bours     bours     bours	7		Exam.	Theoretical	Exam

8	2	Paschen's Law:	Theoretical	General
U	2	Paschen's curve, The		questions
	hours	Impact of Impurity		+Exam
		Gases, on the		
		Breakdown Potential,		
		The Impact of		
		Electrodes on		
		Breakdown Voltage,		
		The Impact of Electric		
		Field Distribution on		
		Breakdown Voltage,		
		The Impact of External		
		Ionization Source on		
		Breakdown Potential.		
9	2	Townsend Discharge	Theoretical	General
-	2	Experiments: The		questions
	hours	Steady-State Townsend		+Exam
		Experiment (SST),		
		Pulse Townsend		
		Method (PT).		
10	2	Fundamental Theory of	Theoretical	General
10		Streamer and Leader		questions
	hours	Discharge: Streamer		+Exam
		Discharge Mechanism,		
		Basic Properties of		
		Spark Discharge,		
		Streamer Discharge.		
11	2	Long Gap and Leader	Theoretical	General
11	2	Discharge,		questions
	hours	Experimental Study on		+Exam
		the Long Gap Discharge		
		in Air, Discharge		
		Process in Non-uniform		
		Electric Field		
12	2	Theoretic Analysis	Theoretical	General
14	2	Methods for Modeling		questions
	hours	Gas Discharge: Monte		+Exam
		Carlo Simulation,		
		Introduction of General		
		Monte Carlo		
		Simulation, Monte		
		Carlo Simulation of		
		Electron Avalanche		
		Development, Electron		
		Swarm Parameters from		
		Monte Carlo		
		Simulation.		
13	2	Breakdown Voltage	Theoretical	General
15	2	Characteristics in		questions
	hours	Uniform and Quasi-		+Exam
		Uniform Electric Fields,		
		Breakdown		
		Characteristics		
		Under Continuous		
		Voltages, Breakdown		
		Characteristics Under		
		Lightning Impulse		
		Voltages, Breakdown		
		Characteristics, Under		
		Operating Impulse		
		Voltage.		
		VUILAZE.		

		D	reakdown	Theoretical	General
14	2		haracteristics in	Theoretical	questions
	hours		xtremely: Non-		+Exam
	nours		niform Electric Fields,		
			reakdown		
		C	haracteristics Under		
			ontinuous Voltage,		
			reakdown		
			haracteristics, Under ightning Impulse		
			oltage, Breakdown		
			oltage Under		
			perating Impulse		
			oltage		
15	2		lethods to Improve	Theoretical	General
	hours		isulation Strength in		questions +Exam
	hours		ir: Improve the Shape f Electrodes, Use of		+EXalli
			lectric Field Distortion		
		b	y Space Charges, Use		
			f Barrier in Extremely		
			on-uniform Electric		
1.6		F	ields.		
16	2			Final Exam	
	hours				
11.	Course E	Evaluation			
Distrib	uting the	score out of 100 according	to the tasks assign	ed to the stude	nt such as daily
	0	y oral, monthly, or writte			int such as daily
nrenar			n avame ranorte		
<u>^</u>				ell	
12.	Learning	and Teaching Resource	ces		
12.	Learning		ces	ao "Gas Dischar	ge and Gas
12.	Learning	and Teaching Resource	<b>•</b> 1- D. Xia		ge and Gas
12. Require	Learning ed textbool	and Teaching Resources (curricular books, if any)	• 1- D. Xia Insulation,	ao "Gas Dischar Springer, 2016.	
12. Require	Learning	and Teaching Resources (curricular books, if any)	• 1- D. Xia Insulation,	ao "Gas Dischar Springer, 2016. "Gas discharge pl	
12. Require	Learning ed textbool	and Teaching Resources (curricular books, if any)	<ul> <li>• 1- D. Xia Insulation,</li> <li>• Raizer YP, Berlin, 199</li> </ul>	ao "Gas Dischar Springer, 2016. "Gas discharge ph 1.	nysics", Springer,
12. Require	Learning ed textbool	and Teaching Resources (curricular books, if any)	<ul> <li>• 1- D. Xia Insulation,</li> <li>• Raizer YP, Berlin, 199</li> <li>• Zhancheng</li> </ul>	ao "Gas Dischar Springer, 2016. "Gas discharge pl	nysics", Springer, , Youzhi Hu Gas
12. Require	Learning ed textbool	and Teaching Resources (curricular books, if any)	<ul> <li>• 1- D. Xia Insulation,</li> <li>• Raizer YP, Berlin, 199</li> <li>• Zhancheng</li> </ul>	ao "Gas Dischar Springer, 2016. "Gas discharge pl 1. Wu, Xijun Zhang National Defence	nysics", Springer, , Youzhi Hu Gas
12. Require Main re	Learning ed textbool	and Teaching Resources (curricular books, if any)	<ul> <li>• 1- D. Xia Insulation,</li> <li>• Raizer YP, Berlin, 199</li> <li>• Zhancheng discharge. Beijing, 20</li> </ul>	ao "Gas Dischar Springer, 2016. "Gas discharge pl 1. Wu, Xijun Zhang National Defence	nysics", Springer, , Youzhi Hu Gas
12. Require Main re	Learning ed textbook eferences ( mended	and Teaching Resources	<ul> <li>Provide the second state of the s</li></ul>	ao "Gas Dischar Springer, 2016. "Gas discharge pl 1. Wu, Xijun Zhang National Defence	nysics", Springer, , Youzhi Hu Gas
12. Require Main re Recom	Learning ed textbool eferences ( mended fic journals	and Teaching Resources	<ul> <li>• 1- D. Xia Insulation,</li> <li>• Raizer YP, Berlin, 199</li> <li>• Zhancheng discharge. Beijing, 20</li> </ul>	ao "Gas Dischar Springer, 2016. "Gas discharge pl 1. Wu, Xijun Zhang National Defence	nysics", Springer, , Youzhi Hu Gas

1. Course	
	Virtual Lab.
2. Course	Code:
	PPP 321
3. Semest	ter / Year:
	Second semester / Third Stage
4. Descrip	otion Preparation Date:
<b>5</b> A	2024-4-2
5. Availat	ble Attendance Forms:
	Weekly
6. Number	r of Credit Hours (Total) / Number of Units (Total)
	30 hours
7. Course	e administrator's name (mention all, if more than one name)
Name	Dr.Manal M. Adulla
	Dr. Inaam M. abdulmajeed
	Dr saad hammed
	Dr.Qusai adnan
	Dr. falah abdul hassn
<b>F</b>	
	inaam.mohammed@ sc.uobaghdad.edu.iq
	manal.m@sc.uobaghdad.edu.iq
	saad.mohmmed@sc.uobaghdad.edu.iq
8. Course	Objectives
Course Objectiv	<b>es</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
9. Teachir	ng and Learning Strategies
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive

tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

#### 10. Course Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours		introduction	Experimental simulation	General questions +Exam
2	2 hours	First experiment	Gases law	Experimental simulation	General questions +Exam
3	2 hours	second experiment	Momentum and collision	Experimental simulation	General questions +Exam
4	2 hours	Third experiment	Project motion	Experimental simulation	General questions +Exam
5	2 hours	Fourth experiment	Capacitor lab.	Experimental simulation	General questions +Exam
6	2 hours	Fifth experiment	Geometric optics 1	Experimental simulation	General questions +Exam
7	2 hours		Exam	Experimental simulation	Exam
8	2 hours	Sixth experiment	Geometric optics 2	Experimental simulation	General questions +Exam
9	2 hours	Seventh experiment	Wave interference	Experimental simulation	General questions +Exam
10	2 hours	Eighth experiment	Wave on string	Experimental simulation	General questions +Exam
11	2 hours	Ninth experiment	Rutherford	Experimental simulation	General questions +Exam
12	2 hours		Review experiment		
13	2 hours		Month exam		
14	2 hours				

15	2 hours					
16	2	Fir	nal Exam		Final Exam	
	hours					
11. (	11. Course Evaluation					
	0	score out of 100 acc y oral, monthly, or	0	Ũ		nt such as daily
12. L	earning	and Teaching Re	esources			
Require	d textbool	ks (curricular books,	if any)	Lab. bo	ok	
Main ref	erences	(sources)		Funda: editior	mental of pl 1 2011	nysics,9 th
	Recommended books and references (scientific journals, reports) Any physics book and journal in library					
Electron	ic Refere	nces, Websites		Wikipedia,	PhET simula	tion

I
1. Course Name:
Nuclear Physics 1
2. Course Code:
PHYS 4738
3. Semester / Year:
First semester / Fourth stage
4. Description Preparation Date:
2024-4-2
5. Available Attendance Forms:
Weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Asia H. Al-Mashhadani
Email: asia.hammad@sci.uobaghdad.edu.iq
8. Course Objectives

#### Teaching students the basic principles of physics. 2. Preparing **Course Objectives** specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.

#### 9. Teaching and Learning Strategies

Strategy

Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

#### 10. Course Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter 1 Historical review (Development of atom)	Dalton's atom, Electron, Thomson's atom, Proton, Neutron, Penetration of alpha particle through thin gold foil	Theoretical	General questions +Exam
2	2 hours	=	Rutherford's atom, Failure of Thomson's atom, Failure of Rutherford's atom, Bohr's atom, Photon energy, What is Bohr's idea account for?	Theoretical	General questions +Exam
3	2 hours	Chapter 2 Properties of nuclei (Basic nuclear concepts)	Nuclear radii, Nuclear density, Nuclear size,	Theoretical	General questions +Exam
4	2 hours		Nomenclature (Nuclide, Isotopes, Isobars, Isomer, Nucleon, Mesons), Mass defect, Binding energy,	Theoretical	General questions +Exam
5	2 hours		Nuclear forces, Properties of nuclear forces, Nuclear separation energy, Chart of Nuclides and nuclear stability, Nuclear abundance	Theoretical	General questions +Exam
6	2 hours	Chapter3	Nuclear angular momentum, Nuclear Parity, Magnetic dipole moments,	Theoretical	General questions +Exam
7	2 hours		Electric quadrupole moments, Wave mechanical properties, Types of statistics: (Bose- Einstein statistics and Fermi – Dirac statistics)	Theoretical	Exam
8	2 hours		Monthly Exam in Chapters 1, 2 and 3	Theoretical	General questions +Exam
9	2 hours	Chapter 4 Quantum mechanical description of Nuclei	Schrodinger wave equation, Bound states in one dimensional systems, Particle in square well	Theoretical	General questions +Exam
10	2 hours		Bound states in three dimensions, Neutron-Proton	Theoretical	General questions +Exam

			o section	stem: Bound state of the deuteron, verview of cross calculation.		
11	2 hours	Chapter 5 Interaction of Radiation with Matter	Charged particle interaction: (Maximum Energy Transfer in a Single Collision, Stopping Power, Range of a particle)		Theoretical	General questions +Exam
12	2 hours		with mat of neutro (Elastic	on of electrons tter, Interaction ons with matter scattering, e scattering)	Theoretical	General questions +Exam
13	2 hours		Interaction of gamma radiation with matter (Photoelectric effect, Compton scattering, pair production)		Theoretical	General questions +Exam
14	2 hours		Attenuation of gamma rays Applications and solved problems		Theoretical	General questions +Exam
15	2 hours	Monthly Exam	Monthly chapters	v Exam in 4 and 5	Theoretical	General questions +Exam
Distrib prepar	uting the ation, dail	Evaluation score out of 100 accor ly oral, monthly, or wr and Teaching Reso	itten ex	0		lent such as daily
		ks (curricular books, if a		References: 1. Nuclear Physics 2. Introductory: N 3. Lecture Note Technology.	uclear Physics, B	y Krane.
Main re	ferences	(sources)				
	mended fic journals	books and refe s, reports…)	rences			
Electro	nic Refere	nces, Websites				

13. Course Name:						
1.4	Solid State physics (1)					
14.	Course Code: PHY4739					
15						
15.	Semester / Year:					
	First semester / Fourth stage					
16.	Description Preparation Date:					
	2024-4-2					
17.Avail	able Attendance Forms:					
Weel						
	per of Credit Hours (Total) / Number of Units (Total)					
30 ho	ours					
19.	Course administrator's name (mention all, if more than one					
name	e)					
Name: Dr. F	arah Tariq M. Noori					
Emai	l:					
20.	Course Objectives					
Course Object	<b>tives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.					
21.	Teaching and Learning Strategies					
Strategy	<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students					
22. Course	Structure					

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	1-Crystal structure: Basis, Lattice crystal translation vector and lattice- symmetry operations- two dimensional lattice type- three dimensional lattice type- Miller indices, the indices of a direction.	Theoretical	General questions +Exam
2	2 hours	Chapter2 Position in the cell - simple crystal structure		Theoretical	General questions +Exam
3	2 hours	Chapter3	2- Crystal diffraction and the reciprocal lattice: Bragg law- Experimental diffraction methods- Laue method- rotating crystal method	Theoretical	General questions +Exam
4	2 hours	Chapter4	powder method- reciprocal lattice- Brilloun zones- structure factor of the basis.	Theoretical	General questions +Exam
5	2 hours	Chapter5	3-Crystal Binding: crystal of Inert gases- Vander Waals- London interaction-equilibrium lattice constants- Cohesive energy- Repulsive interaction	Theoretical	General questions +Exam
6	2 hours	Chapter6	Compressibility and Bulk modulus- Ionic crystal- Madelung energy - Covalent crystal- Metal crystal- Hydrogen- bonded crystal- Atomic radii.	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	4- Phonons and Lattice vibrations: phonon Momentum- Inelastic scattering of photons by long wavelength phonons- Inelastic scattering of neutrons by phonons-Vibration of monoatomic lattices	Theoretical	General questions +Exam
9	2 hours	Chapter8	- group velocity- phase velocity- Vibrational modes of Lattice with two atoms per primitive	Theoretical	General questions +Exam

			11 7			
			cell- Lo modes.	ocal phonon		
10	2 hours	Chapter9	5-Thermal properties of solids:Lattice heat capacity- Classical model for specific heat- Einstein model- Density of modes in one dimension- Density of modes in three dimensions		Theoretical	General questions +Exam
11	2 hours	Chapter10	Debye model of the lattice heat capacity, An harmonic crystal interactions- thermal expansion- thermal conductivity- Lattice thermal resistivity- Normal and Umklapp processes.		Theoretical	General questions +Exam
12	2 hours	Chapter11	6- Free electron model : classical free electron theory- Drude model- Lorentz model Thermal conductivity for free electron gas.		Theoretical	General questions +Exam
13	2 hours	Chapter12	7-Quantum free electron model: energy levels and density of state in one dimension		Theoretical	General questions +Exam
14	2 hours	Chapter1	dimensi state for	ctron gas in three ions- density of r free electron gas dimensions	Theoretical	General questions +Exam
15	2 hours	Chapter13	metallic	rfeld's model for c conduction- al conductivity.	Theoretical	General questions +Exam
16	2 hours	Chapter14	Final	Exam	Theoretical	
02						
prepar	outing the ration, dai	Evaluation score out of 100 accor ly oral, monthly, or wr Teaching Resources	0	0		nt such as daily
	-	(curricular books, if any)		2007 WileyWeste	oduction to SolidSta ern Limited, New Yo Elementary SolidSta	ork.
Main ref	ferences (sou	urces)		None		
Recomm	nended book	s and references (scientific j	ournals,	none		
reports.	)			none		
Electron	ic Reference	s. Websites		none		

1. Course Name: Electromagnetic Theory (1) 2. Course Code: PHY 4739 3. Semester / Year: First semester / Fourth stage 4. Description Preparation Date: 2024-4-2 5. Available Attendance Forms: Weekly 6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours Course administrator's name (mention all, if more than one name) Name: Dr. Thamir H. Khalaf Email: Thamir.Khalaf@sc.uobaghdad.edu.iq 8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in **Course Objectives** the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. 9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

10. Course Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	hours Ra hours Chapter R G D C C C C C C C C C C C C C		Relevant Mathematics:		
2	2 hours	Chapter2	Static Electric and Magnetic Fields in Vacuum: Static Charges, The electrostatic Force, The Electric Field, Gauss' Law, and The Electric Potential.	Theoretical	General questions +Exam
3	2 hours	Chapter3	Moving Charges, The Continuity Equation, Magnetic Forces, The Law of Biot and Savart, Ampere's Law, The Magnetic Vector Potential, and The Magnetic Scalar Potential.	Theoretical	General questions +Exam
4	2 hours	Chapter4	Charge and Current Distributions: Multipole Moments, The Cartesian Multipole Expansion, The Spherical Polar Multipole expansion, Interactions with the Field, Electric Dipoles, Magnetic Dipoles, and Potential Energy.	Theoretical	General questions +Exam
5	2 hours	Chapter5	Slowly Varying Fields in Vacuum: Magnetic Induction, Electromotive Force, Magnetically Induced Motional EMF, Time-Dependent Magnetic Fields, and Faraday's Law.	Theoretical	General questions +Exam
6	2 hours	Chapter6	Displacement Current, Maxwell's Equations, The Potentials, The Lorentz Force and Canonical Momentum, Wave Equation in Vacuum, and Plane Waves.	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam

8	2 hours	Chapter7	Energy and Momentum: Energy of a Charge Distribution, Stationary Charges, Coefficients of Potential, Forces on Charge Distributions, and Potential Energy of Currents.		Theoretical	General questions +Exam
9	2 hours	Chapter8	Poynting's theorem, Magnetic Monopoles, and Duality Transformations.		Theoretical	General questions +Exam
10	2 hours	Chapter9	Static Potentials in Vacuum – Laplace's Equation: Laplace's equation, Uniqueness Theorem, and Laplace's equation in one		Theoretical	General questions +Exam
11	2 hours	Chapter10	Dimension.Laplace's equation in twoDimensions: CartesianCoordinates in TwoDimensions, Plane PolarCoordinates, andSpherical PolarCoordinates with AxialSymmetry.		Theoretical	General questions +Exam
12	2 hours	Chapter11	Laplace's equation in three dimensions: Cylindrical Polar Coordinates, and Spherical Polar Coordinates.		Theoretical	General questions +Exam
13	2 hours	Chapter12	Static Po Sources Equation	otentials with – Poisson's n, Image charges: nite conducting	Theoretical	General questions +Exam
14	2 hours	Chapter1	conduct conduct	harges: The ing sphere, The ing cylinder and ne charges.	Theoretical	General questions +Exam
15	2 hours	Chapter13	Green's Green's Poisson	Functions: Theorem, 's Equation and Theorem.	Theoretical	General questions +Exam
16	2 hours	Chapter14	Final E	kam	Theoretical	
Distrib prepara	Course uting the ation, dai	Evaluation score out of 100 accor ly oral, monthly, or wr 1 and Teaching Reso	itten ex	0		ent such as daily
		ks (curricular books, if a			ctromagnetic T 2005 Springer	Theory, by Jack Science.
Main re	ferences	(sources)		none		

Recommended books and references (scientific journals, reports)	none
Electronic References, Websites	none

1. Course Name: Solar Energy and Solar Cells 2. Course Code: **PES 411** 3. Semester / Year: First semester / Fourth stage 4. Description Preparation Date: 2024-4-2 5. Available Attendance Forms: Weekly 6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours 7. Course administrator's name (mention all, if more than one name) Name: Maysoon Ahmed Email: m a y s o o n . a h m e d @ s c . u o b a g h d a d . e d u . i q 8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in the **Course Objectives** field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. 9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students 10. Course Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	- <u>Introduction</u> - <u>Sun and earth</u>	Theoretical	General questions +Exam
2	2 hours	Chapter2	- <u>Effects of the</u> <u>atmosphere</u> <u>Solar Radiation (direct</u> <u>radiation, diffuse</u> <u>radiation, reflect</u> <u>radiation, global</u> radiation)	Theoretical	General questions +Exam
3	2 Chapter3 hours		- Blackbody radiation and solar spectrum - Solar energy	Theoretical	General questions +Exam
4	2 hours	Chapter4	- Temperature - Energy resources and forms - The greenhouse effect	Theoretical	General questions +Exam
5	2 hours	Chapter5	<ul> <li>Air mass and azimuth angle</li> <li>Properties of light</li> <li>Energy of photon, photon flux, spectral irradiance, radiant energy</li> </ul>	Theoretical	General questions +Exam
6	2 hours	Chapter6	1 <sup>st</sup> Examination	Theoretical	General questions +Exam
7	2 hours		Semiconductors for PV (materials, bonds, effective mass and structure)	Theoretical	Exam
8	2 hours	Chapter7	Types of Semiconductors (intrinsic and extrinsic)	Theoretical	General questions +Exam
9	2 hours	Chapter8	Optical properties of semiconductors	Theoretical	General questions +Exam
10	2 hours	Chapter9	Electrical properties of semiconductors	Theoretical	General questions +Exam
11	2 hours	Chapter10	Photoelectric and photovoltaic effect	Theoretical	General questions +Exam
12	2 hours	Chapter11	p-n Junction	Theoretical	General questions +Exam
13	2 hours	Chapter12	- Solar cell (materials, types and applications)	Theoretical	General questions +Exam

			Charac cell	terization of solar		
14	2 hours	Chapter1	Figure of cells	of merit of solar	Theoretical	General questions +Exam
15	2 hours	Chapter13	2 <sup>nd</sup> Exa	mination	Theoretical	General questions +Exam
16	2 hours	Chapter14	radiatio radiatio	Effects of the atmosphere adiation (direct n, diffuse n, reflect n, global n)	Theoretical	
11. (	Course I	Evaluation				
prepara	tion, dai	score out of 100 acco y oral, monthly, or v	written ex	0		lent such as daily
		and Teaching Re				
Require	d textboo	ks (curricular books,	if any)			
Main ref	ferences	(sources)		none		
Recomr (scientif		books and re s, reports…)	ferences	none		

none

Electronic References, Websites

	The second secon		
1. Cours	se Name:		
	Nano Technology		
2. Cours			
	PES 411		
3. Seme	ester / Year:		
	First semester / Fourth stage		
4. Desci	ription Preparation Date:		
	2024-4-2		
	able Attendance Forms:		
Week	kly ber of Credit Hours (Total) / Number of Units (Total)		
<u> </u>			
50 110			
7. Cour	se administrator's name (mention all, if more than one name)		
Name: Dr. V	Vasan Saleh		
Emai	l: wasan.saleh@sc.uobaghdad.edu.iq		
	se Objectives		
Course Object	<b>tives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.		
9. Teach	hing and Learning Strategies		
<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is encourage students' participation in the exercises, while at the same time refining an expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students			
10. Course	Structure		

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Introduction: Philosophy, What is Nanotechnology? History, Definitions	Theoretical	General questions +Exam
2	2 hours	Chapter2	The Scale of Things, Future Applications, Why nanoscale has become so important?	Theoretical	General questions +Exam
3	2     Chapter3     M       hours     Qi       Set		Moor's Law, Structure of Nanomaterials Quantum Confinement in Semiconductors, Types of Electron Confinements	Theoretical	General questions +Exam
4	2 hours	Chapter4	Differences between top- down and bottom-up approaches, Advantages and Disadvantages of top- down and bottom-up approaches	Theoretical	General questions +Exam
5	2 hours	Chapter5	Fabrication conditions of nanomaterials, Parameters of Nanostructures 1. Fermi wavelength 2. Exciton Bohr radius	Theoretical	General questions +Exam
6	2 hours	Chapter6	Nano-Scale Effects on Properties, Size- Dependent Properties, Reasons for Size- Dependent Properties	Theoretical	General questions +Exam
7	2 hours			Theoretical	Exam
8	2 hours	Chapter7	Reason for change in optical properties in nanoscale, Examples of properties change	Theoretical	General questions +Exam
9	2 hours	Chapter8	Different Size-Dependent Properties (Part 1)	Theoretical	General questions +Exam
10	2 hours	Chapter9	Different Size-Dependent Properties (Part 2)	Theoretical	General questions +Exam
11	2 hours	Chapter10	Manufacturing Methods of Nanomaterials: Top- down Methods	Theoretical	General questions +Exam
12	2 hours	Chapter11	Manufacturing Methods of Nanomaterials Bottom-up Methods:	Theoretical	General questions +Exam

13	2 hours	Chapter12	Exampl Nanoma nanotub	aterials, Carbon	Theoretical	General questions +Exam
14	2 hours		Review		Theoretical	General questions +Exam
15	2 hours		Final E	xam	Theoretical	General questions +Exam
11. (	Course I	Evaluation				
	-	score out of 100 ly oral, monthly,	-	-		lent such as daily
12. 1	_earning	and Teaching	Resources			
Require	d textboo	ks (curricular boo	ks, if any)			
Main ref	ferences	(sources)		none		
Recommended books and references (scientific journals, reports)			none			
	Electronic References, Websites					

1. Course Name	2:					
		uclear Physics Lab.				
2. Course Code	:					
		PPP 421				
3. Semester / Y	ear:					
	First sem	ester / Fourth stage				
4. Description l	Preparation Da	2024-4-2				
5. Available Att	endance Forms					
Weekly						
6. Number of C	redit Hours (To	tal) / Number of Uni	ts (Total)			
30 hours						
	inistrator's nai	me (mention all, if r	nore than on	e name)		
Name: Email:						
8. Course Object	tives					
-		••••••				
Course Objectives	students will learn	ides an introduction to esse	ntial computer skill	ls. In this module,		
	<ul> <li>compute</li> </ul>	er literacy, including hardv	vare and software	fundamentals in		
		is well as practical.				
		office applications (Micros				
		students will use these s resume, and slide presen	••	ions to create a		
		omputer knowledge an		to obtain an		
		anding of computer hard	•			
	search.					
9. Teaching and	8	•				
Strategy By the end		ents should be able to: puter hardware, softwar	e components a	nd peripheral		
1.		them to use computers co		inu periprierai		
2.		anize files and folders on a		ively, including		
	-	ng, moving, and deleting fi				
3. 4.		y Microsoft Office to execu ernet and communicate				
4.	internet safety.	ernet and communicate	via erriali, WHIIE	understanding		
Upon	finishing the course,	students will be aware of the ters, promoting safe and res				
when using computers, promoting safe and responsible digital behavior.         10. Course Structure						
Week Hours Req	uired Learning	Unit or subject	Learning	Evaluation		
Outo	comes	name	method	method		

1	2 hours		Introduction: Detailed explanation about the nuclear laboratory	Theoretical	1
2	2 hours		Radiation risks and prevention: How to prevent radiation	Theoretical	2
3	2 hours		electronic devices: Pulse to Noise Ratio	Theoretical	3
4	2 hours		Experiment No. (1): G.M. Plateau	Theoretical	4
5	2 hours		Experiment No. (2): The relative stability region of scintillation detector	Theoretical	5
6	2 hours		Experiment No. (3): Study the differential spectrum of gamma ray and the effect of the window aperture of single channel analyzer on it	Theoretical	6
7	2 hours		Exam	Theoretical	7
8	2 hours	Chapter7	Experiment No. (4): The differential spectrum of gamma ray	Theoretical	8
9	2 hours	Chapter8	Experiment No. (5): Effect the high voltage for scintillation detector in gamma-ray spectrum	Theoretical	9
10	2 hours	Chapter9	Experiment No. (6): Effect the gain of the amplifier in gamma-ray spectrum	Theoretical	10
11	2 hours	Chapter10	Experiment No. (7): Statistical fluctuation in random processes	Theoretical	11
12	2 hours	Chapter11	Experiment No. (8): Least Square Linear Fitting	Theoretical	12
13	2 hours	Chapter12	Experiment No. (9): Deflection of beta radiation in a magnetic field	Theoretical	13
14	2 hours		Experiment No. (10): The integral spectrum of gamma ray	Theoretical	14
15	2 hours		Experiments review	Theoretical	

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	No
Main references (sources)	No
Recommended books and references (scientific journals, reports)	No
Electronic References, Websites	No

		Οι	itcomes	name	method	method
Neek	Hours		equired Learning	Unit or subject	Learning	Evaluation
10. Co	urse	Struct	ture			
Strategy         Type something like: The main strategy that will be adopted in delivering this module is the encourage students' participation in the exercises, while at the same time refining an expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students						time refining and classes, interactive
9. T	each	ing ar	nd Learning Strate	egies		
8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in to of general physics and its practical applications, which bears the responsil studying the country's need for development and progress and capable of meen needs of the job market in state institutions and industry sectors. 3. Prepareducated generation armed with science and adopts it as a sound basis to brin radical changes and assign scientific knowledge and scientific methods in the analysis and adaptation with the development of technologies, to keep up to expansion of human needs. 4. Effective contribution for deepening and document the connection of the university with the society through the implementary advisory counseling, training and development of teaching and administratives The service of preparing graduates specialized in physics who contring development in the country. 6. Meeting the needs of various sectors with qualified personals in the field of physics. 7. Encouraging the distinguished field to work as teaching assistants in the department to be part of the advisory counseling assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the department to be part of the advisory field to work as teaching assistants in the						the responsibility of able of meeting the rs. 3. Preparing an pasis to bring about bethods in thinking, to keep up with the g and documenting implementation of ministrative staff. 5. who contribute to sectors with highly istinguished in this
8. C	Course	e Obj				
	lame Email:					
			ministrator's nan	ne (mention all, if	more than o	one name)
3	0 hoi	urs				
			Credit Hours (Tot	al) / Number of Un	its (Total)	
	Vaila Veekl		ttendance Forms:			
				2024-4-2		
ΛΓ	Joseri	intior	Preparation Dat	,	age	
3. 5	emes	ster /	Year: First se	emester / Fourth si		
2 0				PPP 421		
2. 0	Cours	e Cod	le:			
				Solid State Lab.		

1	2	Crystalline systems	Theoretical	General questions
	hours	(Part A)		+Exam
2	2 hours	Crystalline systems (Part B)	Theoretical	General questions +Exam
3	2 hours	x-ray diffraction (Part A)	Theoretical	General questions +Exam
4	2 hours	x-ray diffraction (Part B)	Theoretical	General questions +Exam
5	2 hours	Electron diffraction	Theoretical	General questions +Exam
6	2 hours	Zeeman effect	Theoretical	General questions +Exam
7	2 hours	Exam	Theoretical	Exam
8	2 hours	Compensation and Revision	Theoretical	General questions +Exam
9	2 hours	Susceptibility of diamagnetic properties	Theoretical	General questions +Exam
10	2 hours	Some electrical properties for Ferroelectric TGA crystal	Theoretical	General questions +Exam
11	2 hours	Nuclear magnetic resonance NMR	Theoretical	General questions +Exam
12	2 hours	Piezo-electric of quartz crystal	Theoretical	General questions +Exam
13	2 hours	Electrical resonance (part A)	Theoretical	General questions +Exam
14	2 hours	Electrical resonance (part B)	Theoretical	General questions +Exam
15	2 hours	Compensation and Revision	Theoretical	General questions +Exam
16	2 hours		Final Exam	

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

12.	Learning and	Teaching	Resources
-----	--------------	----------	-----------

120 (C)	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references	nona
(scientific journals, reports)	none
Electronic References, Websites	none

			utcomes	name	method	method
Week	Hou		equired Learning	Unit or subject	Learning	Evaluation
10. Co	ourse	Struc	ture			
Strategy         Type something like: The main strategy that will be adopted in delivering this mode to encourage students' participation in the exercises, while at the same time refining expanding their critical thinking skills. This will be achieved through classes, intera tutorials and by considering types of simple experiments involving some samp activities that are interesting to the students						ne time refining and classes, interactive
	1	ning a	nd Learning Strate	egies		
]	Email Cours	l: se Obj	of general physics a studying the country needs of the job ma educated generation radical changes and analysis and adaptat expansion of human the connection of t advisory counseling, The service of pro- development in the qualified personals i	be basic principles of physi and its practical application 's need for development and arket in state institutions a armed with science and act assign scientific knowledge ion with the development needs. 4. Effective contribute he university with the so training and development eparing graduates special country. 6. Meeting the in the field of physics. 7. acching assistants in the defuture.	ns, which bears the d progress and cap and industry sector opts it as a sound lage and scientific model of technologies, the oution for deepenin ciety through the of teaching and admized in physics needs of various science Encouraging the d	he responsibility of able of meeting the rs. 3. Preparing an basis to bring about bethods in thinking, to keep up with the g and documenting implementation of ministrative staff. 5. who contribute to sectors with highly istinguished in this
	Vour: Name		ministrator's nar	me (mention all, if	more than c	one name)
	30 ho				man the second	
6. I	Numb	per of	Credit Hours (Tot	al) / Number of Un	its (Total)	
	Avail Week		Attendance Forms:			
			n Preparation Da	2024-4-2		
			First s	emester / Fourth s	age	
3. 9	Seme	ster /	Year:			
2. (	Cours	se Coo	le:	PPP 421		
			_	Virtual Lab.		
1. (	Cours	se Nai	me:			

1	2 hours		Introduction	Theoretical	General questions +Exam
2	2 hours		Density	Theoretical	General questions +Exam
3	2 hours		Alpa decay	Theoretical	General questions +Exam
4	2 hours		Beta decay	Theoretical	General questions +Exam
5	2 hours		Lambert Law	Theoretical	General questions +Exam
6	2 hours		Experiments review	Theoretical	General questions +Exam
7	2 hours		exam	Theoretical	Exam
8	2 hours		Capacitors (Series)	Theoretical	General questions +Exam
9	2 hours		Capacitors (Parallel)	Theoretical	General questions +Exam
10	2 hours		Bohr model	Theoretical	General questions +Exam
11	2 hours		Radioactive dating	Theoretical	General questions +Exam
12	2 hours		Experiments review	Theoretical	General questions +Exam
13	2 hours		Second exam	Theoretical	General questions +Exam
14	2 hours		Exam (Theoretical)	Theoretical	General questions +Exam
15	2 hours			Final Exam	
11.	Course I	Evaluation			
		score out of 100 accord y oral, monthly, or writ			nt such as daily
12.	Learning	and Teaching Reso	urces		
Require	d textbool	ks (curricular books, if a	ny)		

Main references (sources)	
Recommended books and references (scientific journals, reports)	none
Electronic References, Websites	none

1. Course Name: Nuclear Physics 2 2. Course Code: **PHYS 4844** 3. Semester / Year: Second semester / fourth Stage 4. Description Preparation Date: 2024-4-2 5. Available Attendance Forms: Weekly 6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours Course administrator's name (mention all, if more than one name) Name: Prof. Dr. Asia H. Al-Mashhadani Email: asia.hammad@sci.uobaghdad.edu.iq 8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists **Course Objectives** in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. 9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter 1	1- Nuclear Models Liquid – Drop Model	Theoretical	General questions +Exam
2	2 hours		1-2 The Semi – Empirical Mass Formula	Theoretical	General questions +Exam
3	2 hours		1-3 Fermi – Gas Model	Theoretical	General questions +Exam
4	2 hours		1-4 Simple Shell Model	Theoretical	General questions +Exam
5	2 hours		1-5 Spin – Orbit Potential	Theoretical	General questions +Exam
6	2 hours	Chapter 2	2- Decay processes 2-1 Natural Radioactivity,	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours		2-2 α – Decay	Theoretical	General questions +Exam
9	2 hours		2-3 β – Decay	Theoretical	General questions +Exam
10	2 hours		2-4 γ – Decay	Theoretical	General questions +Exam
11	2 hours	Chapter 3	3- Nuclear Reactions	Theoretical	General questions +Exam
12	2 hours		3-1 Introduction to Nuclear Reactions	Theoretical	General questions +Exam
13	2 hours		3-2 Compound Nucleus	Theoretical	General questions +Exam
14	2 hours		<ul><li>3-3 Pre – Equilibrium</li><li>Reactions</li><li>3-4 Direct Reactions (</li><li>Optical Model)</li></ul>	Theoretical	General questions +Exam
15	2 hours		3-5 Fission Reaction 3-6Fusion Reaction	Theoretical	General questions +Exam

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

12. Learning and Teaching Resource
------------------------------------

Required textbooks (curricular books, if any)	References: 1. Nuclear Physics Concept, By Walter E. Meyerhof. 2. Introductory: Nuclear Physics, By Krane. 3. Lecture Notes of Massachusetts Institute of Technology.						
Main references (sources)							
Recommended books and references							
(scientific journals, reports)							
Electronic References, Websites							

13.	13. Course Name:				
	Solid State physics (2)				
14.	Course Code:				
	PHY 4845				
15.	Semester / Year:				
	Second semester / fourth Stage				
16.	Description Preparation Date:				
	2024-4-2				
17.Avail	able Attendance Forms:				
Weel					
	ber of Credit Hours (Total) / Number of Units (Total)				
30 ho	ours				
19. name	Course administrator's name (mention all, if more than one				
Name: Dr. F	Parah Tariq M. Noori				
Emai	l:				
20.	Course Objectives				
Course Object	<b>tives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.				
21.	Teaching and Learning Strategies				
Strategy	<b>Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students				
22. Course	Structure				

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	8- Band theory: Energy levels and energy bands, Nearly free electron model	Theoretical	General questions +Exam
2	2 hours	Chapter2	Bragg reflection and energy gap, Bloch function, Kronig-Penney model, Brillouin zones	Theoretical	General questions +Exam
3	2 hours	Chapter3	Fermi surfaces, effective mass, Hall effect.	Theoretical	General questions +Exam
4	2 hours	Chapter4	9-Semiconductor crystals: Intrinsic semiconductor, Direct and indirect absorption, Intrinsic carrier concentration, Extrinsic semiconductor,	Theoretical	General questions +Exam
5	2 hours	Chapter5	N-type semiconductor, p- type semiconductor, Concentration of electrons and holes in doped semiconductor	Theoretical	General questions +Exam
6	2 hours	Chapter6	mobility, electrical conductivity, Photoconductivity, Exciton.	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	apter7 10-Crystal Defect: Point defect in a lattice, Diffusion, Dislocation (line imperfection, Edge dislocation, Screw dislocation, Burger's vector, dislocation movement, Surface defects (Planar defects), Stacking faults, Grain Boundaries, Volume defects (Bulk defects).		General questions +Exam
9	2 hours	Chapter8	11-Superconductivity: Applications of Superconductivity, Superconducting Properties: Critical Temperature, Critical Magnetic field, Critical current density	Theoretical	General questions +Exam
10	2 hours	Chapter9	Meissner Effect, Penetration depth, BCS Theory of Superconductivity,	Theoretical	General questions +Exam
11	2 hours	Chapter10	Coherence length, Types of Superconductors, Perovskite, Superconductivity in high	Theoretical	General questions +Exam

			tempera			
		Charter 11	1	nductor gnetic Properties	Theoretical	General
12	2	Chapter11		ls: Diamagnetic	Theoretical	questions
	hours			ls, Paramagnetic		+Exam
				l, Curie's law		
13	2	Chapter12	Ferrom Bloch v	agnetic materials,	Theoretical	General questions
	hours			romagnetism,		+Exam
	nours			ignetism		
14	2	Chapter1		ic Resonance ESR	Theoretical	General
			(electro	n spin resonance)		questions
	hours					+Exam
15	2	Chapter13		nuclear magnetic	Theoretical	General
	hours		resonan	ice).		questions +Exam
	nours					+LXaIII
16	2	Chapter14	Final	Exam	Theoretical	
	hours					
23. (	Course I	Evaluation			L	
Distribi	iting the	score out of 100 accor	ding to	the tasks assign	ed to the stude	nt such as daily
		ly oral, monthly, or wr				ne buon ab aany
		Teaching Resources		,		
Required	textbooks (	curricular books, if any)				ate Physics" 8 <sup>th</sup> ed.,
	(	,		2007 WileyWestern Limited, New York .		
			2- Omar, MA., " E	Elementary SolidSta	ate Physics"	
Main refe	rences (sou	irces)		None		
Recomme	ended book	s and references (scientific j	ournals,			
reports	)	,		none		
Electronic	Reference	s, Websites		none		

1. Course Name: Electromagnetic Theory (2) 2. Course Code: **PHY 4846** 3. Semester / Year: Second semester / fourth Stage 4. Description Preparation Date: 2024-4-2 5. Available Attendance Forms: Weekly 6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours Course administrator's name (mention all, if more than one name) Name: Dr. Thamir H. Khalaf Email: Thamir.Khalaf@sc.uobaghdad.edu.iq 8. Course Objectives Teaching students the basic principles of physics. 2. Preparing specialists in **Course Objectives** the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. 9. Teaching and Learning Strategies Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students 10. Course Structure

Week	Hours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1	2 hours	Chapter1	Static Electromagnetic Fields in Matter: The Electric Field Due to a Polarized Dielectric, Description of dielectrics, The electric displacement field.	Theoretical	General questions +Exam
2	2 hours	Chapter2	Magnetic Induction Field Due to a Magnetized Material, Magnetic field intensity, The Hysteresis Curve of a Ferromagnetic.	Theoretical	General questions +Exam
3	2 hours	Chapter3	Time-Dependent Electric Fields in Matter: Maxwell's Equations, Energy of electric and magnetic field.	Theoretical	General questions +Exam
4	2 hours	Chapter4	The electromagnetic potentials. Plane waves in material media. Plane waves in tenuous plasma.	Theoretical	General questions +Exam
5	2 hours	Chapter5	Waveguide Propagation: Bounded waves, TM modes in a rectangular waveguide.	Theoretical	General questions +Exam
6	2 hours	Chapter6	Cylindrical Waveguides, Circular Cylindrical Waveguides, Resonant Cavities.	Theoretical	General questions +Exam
7	2 hours		Exam	Theoretical	Exam
8	2 hours	Chapter7	Dissipation by Eddy Currents, Dielectric Waveguides (Optical Fibers), HE Modes.	Theoretical	General questions +Exam
9	2 hours	Chapter8	Electromagnetic Radiation, The Inhomogeneous Wave Equation, Solution by Fourier Analysis, Green's Function for the Inhomogeneous Wave Equation.	Theoretical	General questions +Exam
10	2 hours	Chapter9	Radiation from a Localized Oscillating Source, Electric Dipole Radiation, Magnetic Dipole and Electric Quadrupole Radiation.	Theoretical	General questions +Exam
11	2 hours	Chapter10	Radiation by Higher Order Moments, Energy and Angular Momentum of the Multipole Fields, Radiation from Extended Sources	Theoretical	General questions +Exam

12	2 hours	Chapter11	Li´enard-Wiechert Potentials, The Li´enard- Wiechert Potentials Using Green's Functions The Fields Of a Moving Charge, Radiation from Slowly Moving Charges.	,	General questions +Exam
13	2 hours	Chapter12	Thompson Scattering, Radiation by Relativistic Charges, Synchrotron Radiation, Bremstrahlung and Cherenkov radiation	5	General questions +Exam
14	2 hours	Chapter1	Radiation Reaction – Electrodynamics, Electromagnetic Inertia, The Reaction Force Needed to Conserve energy, Direct Calculation of Radiation Reaction – The Abraham Lorentz Model.	Theoretical	General questions +Exam
15	2 hours	Chapter13	The Equation of Motion, The Covariant equation of Motion, Alternative Formulations.	Theoretical	General questions +Exam
16	2 hours	Chapter14	Final Exam	Theoretical	
Distrib prepar	uting the ation, dai		rding to the tasks assigning to the tasks assigning to the tasks assigning the tasks assignments as a sources as a sources as a source so	-	lent such as daily
Required textbooks (curricular books, if any)				Vanderlinde,	netic Theory, by 2005 Springer
Main re	Main references (sources)				
	mended fic journal	books and refe s, reports…)	erences none	2	
Electro	nic Roforo	nces, Websites	none		

1. Course Name:       Plasma Physics         2. Course Code:       PHY 4847         3. Semester / Year:       Second semester / fourth Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       2024-4-2         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name: Dr. Qusay Adman Abbas Email: gusay.a@sc.uobaghdat.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and is practical applications, which bears the responsibility of studying the courty's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3 Preparing an educated generation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for decpening and documenting the councetion of the university with the society through the implementation of advisory counseling. training and development of technologies, to keep up with the examination of advisory counseling. training and development of technologies, to keep up with the same time refining at advisory counseling. Training and development of the industing matching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching assistants in the department to be part of the academic teaching stand in physics. 7. Encouraging the distinguiskills. This will be a	1.0				
2. Course Code:       PHY 4847         3. Semester / Year:       Second semester / fourth Stage         4. Description Preparation Date:       2024-4-2         5. Available Attendance Forms:       2024-4-2         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name: Dr. Qusay Adnan Abbas Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing and councet and adoptis it as a sound basis to bring about radical changes and assign scientific haveledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for development of teaching and administrative staff. 5. The service of preparing and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies       Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourge students' participation in the exercises, while at the same timerefining and existing this the salive through classes, interactive tutorials and by considering	1. Course Name				
PHY 4847         3. Semester / Year:       Second semester / fourth Stage         4. Description Preparation Date:       2024-42         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name: Dr. Qusay Adnan Abbas Email: gusay a@sc.uobaghdad.edu.iq         8. Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adquation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the country's need for document of the addition and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development of teaching and administrative staff. 5. The service of preparing the disting and addited physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching statats in the department to be part of the academic teaching statats in the departement to be part of the academic teaching		Plasma Physics			
3. Semester / Year:         Second semester / fourth Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and daptation with the development of technologies, to keep up with the scapansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting and administrative staff. 5. The service of preparing the adshift on work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies	2. Course Code:	DHV 4847			
Second semester / fourth Stage         4. Description Preparation Date:         2024-4-2         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation arms with becance and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adpatation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribute to development of teaching and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type some	2 Compostor / Vo				
4. Description Preparation Date:       2024-2         5. Available Attendance Forms:       Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)       30 hours         7. Course administrator's name (mention all, if more than one name)       Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq       8. Course Objectives         Courese objectives <t< td=""><td>3. Semester / Ye</td><td></td></t<>	3. Semester / Ye				
2024-42         5. Available Attendance Forms:         Weekly         6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaphdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and asign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative set. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching aasistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies       Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at		Second semester / fourth Stage			
<ul> <li>5. Available Attendance Forms: Weekly</li> <li>6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours</li> <li>7. Course administrator's name (mention all, if more than one name) Name: Dr. Qusay Adnan Abbas Email: gusay.a@sc.uobaghdad.edu.iq</li> <li>8. Course Objectives</li> <li>Course Objectives</li> <li>Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job markt in state institutions and industry sectors. 3. Preparing an educated generation armsonion fhuman the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to mork as teaching assistants in the department to be part of the academic teaching staff in the future.</li> <li>9. Teaching and Learning Strategies</li> <li>Strategy</li> <li>Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students</li> </ul>	4. Description P				
Weekly         6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours         7. Course administrator's name (mention all, if more than one name) Name: Dr. Qusay Adnan Abbas Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring abour radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development in the cloud physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	<b>5</b> A 11.1.1. A.().				
6. Number of Credit Hours (Total) / Number of Units (Total)         30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinki		ndance Forms:			
30 hours         7. Course administrator's name (mention all, if more than one name)         Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorals and by		dit Hours (Total) / Number of Units (Total)			
7. Course administrator's name (mention all, if more than one name)         Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to what scaeching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the experiments involving some sampling activities that are interesting to the students					
Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achived through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	50 11001 5				
Name: Dr. Qusay Adnan Abbas         Email: gusay.a@sc.uobaghdad.edu.iq         8. Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	7. Course admi	nistrator's name (mention all, if more than one name)			
8. Course Objectives         Course Objectives         Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and asign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students					
Course Objectives       Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.         9. Teaching and Learning Strategies         Strategy         Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	Email: <u>qusay.a</u>	@sc.uobaghdad.edu.iq			
<b>below of supervisor</b> the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future. <b>9. Teaching and Learning Strategies Strategy</b> Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	8. Course Object	ives			
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	<b>Course Objectives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7.				
Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students	9. Teaching and Learning Strategies				
10. Course Structure	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling				
	10. Course Structure	9			

Week Ho	ours	Required Learning	Unit or subject	Learning	Evaluation
		Outcomes	name	method	method
1 2 hc	ours	Chapter1	Introduction: Occurrence of Plasmas in Nature, Definition of Plasma, Concept of Temperature, Debye Shielding, The Plasma Parameter, Criteria for Plasmas.	Theoretical	General questions +Exam
2 2 hc	ours	Chapter2	Applications of Plasma Physics: Gas Discharges (Gaseous Electronics), Controlled Thermonuclear Fusion, Space Physics, Modern Astrophysics, MHD Energy Conversion and Ion Propulsion, Solid State Plasmas, Gas, Particle Accelerators, Industrial Plasmas, Atmospheric Plasmas.	Theoretical	General questions +Exam
3 2 hc	ours	Chapter3	Single-Particle Motions: Introduction, Uniform E and B Fields, $E = 0$ , Finite E, Gravitational Field, Non-uniform B Field, $\nabla B \perp B$ : Grad-B Drift, Curved B: Curvature Drift, $\nabla B \parallel B$ : Magnetic Mirrors.	Theoretical	General questions +Exam
4 2 hc	ours	Chapter4	Non-uniform E Field, Time-Varying E Field, Time-Varying B Field, Summary of Guiding Center Drifts, Adiabatic Invariants.	Theoretical	General questions +Exam
5 2 hc	ours	Chapter5	Plasmas as Fluids: Introduction, Relation of Plasma Physics to Ordinary Electromagnetics, Maxwell's Equations, Classical Treatment of Magnetic Materials, Classical Treatment of Dielectrics.	Theoretical	General questions +Exam
6 2 hc	ours	Chapter6	The Dielectric Constant of a Plasma, The Fluid Equation of Motion, The Convective Derivative, The Stress Tensor, Collisions. Comparison with Ordinary Hydrodynamics.	Theoretical	General questions +Exam
7 2			Exam	Theoretical	Exam

8	2	Chapter7	Equation of Continuity,	Theoretical	General
0	2	1	Equation of State, The		questions
	hours		Complete Set of Fluid		+Exam
			Equations, Fluid Drifts		
			Perpendicular to B, Fluid		
			Drifts Parallel to B, The		
			Plasma Approximation.		
9	2	Chapter8	Waves in Plasmas:	Theoretical	General
			Representation of Waves,		questions
	hours		Group Velocity, Plasma		+Exam
			Oscillations, Electron		
			Plasma Waves, Sound Waves, Ion Waves,		
			Validity of the Plasma		
			Approximation.		
	-	Chantar	Comparison of Ion and	Theoretical	General
10	2	Chapter9	Electron Waves,	Theoretical	questions
	hours		Electrostatic Electron		+Exam
	nours		Oscillations		
			Perpendicular to B,		
			Electrostatic Ion Waves		
			Perpendicular to B, The		
			Lower Hybrid Frequency,		
			Electromagnetic Waves		
			with $B_0=0$ , Experimental		
			Applications,		
			Electromagnetic Waves		
			Perpendicular to B0.		
11	2	Chapter10	Cutoffs and Resonances,	Theoretical	General
			Electromagnetic Waves		questions
	hours		Parallel to B0,		+Exam
			Experimental		
			Consequences, The		
			Whistler Mode, Faraday Rotation.		
1.		Chapter 11	Hydromagnetic Waves:	Theoretical	General
12	2	Chapter11	Magnetosonic Waves,	Theoretical	questions
	hours		Summary of Elementary		+Exam
	nours		Plasma Waves, CMA		
			Diagram.		
13	2	Chapter12	Diffusion and Mobility in	Theoretical	General
15	2		Weakly Ionized Gases,		questions
	hours		Decay of a Plasma by		+Exam
			Diffusion, Steady State		
			Solutions, and		
			Recombination.		
14	2	Chapter1	Diffusion Across a	Theoretical	General
			Magnetic Field:		questions
	hours		Ambipolar Diffusion		+Exam
			Across B, Experimental		
			Checks, Collisions in		
			Fully Ionized Plasmas:		
			Plasma Resistivity,		
			Mechanics of Coulomb		
		<u>(1)</u> (1)	Collisions.	Theoretical	Conoral
15	2	Chapter13	The Single-Fluid MHD	Theoretical	General
	heure		Equations: Diffusion of		questions +Exam
	hours		Fully Ionized Plasmas, Solutions of the Diffusion		+Exaifi
	nours		Solutions of the Diffusion Equation, Bohm		

16	2 hours			on and ssical Diffusion. <b>exam</b>	Theoretical	
11. (	Course I	Evaluation				
	Distributing the score out of 100 according to the tasks assigned to the student such as dail preparation, daily oral, monthly, or written exams, reports etc					nt such as daily
12. l	earning	and Teaching	Resources			
Require	Required textbooks (curricular books, if any)				luction to Pla led Fusion, Thi 016	•
Main ref	Main references (sources)					
	Recommended books and references (scientific journals, reports)					
Electron	ic Refere	nces, Websites		none		

1. Course Name:					
Nuclear Physics Lab.					
2. Course Code: PPP 421					
3. Semester / Year:					
Second semester / fourth Stage					
4. Description Preparation Date: 2024-4-2					
5. Available Attendance Forms:					
Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
30 hours					
7. Course administrator's name (mention all, if more than one name)					
Name:					
Email:					
8. Course Objectives					
<ul> <li>Course Objectives</li> <li>This module provides an introduction to essential computer skills. In this module, students will learn, <ul> <li>computer literacy, including hardware and software fundamentals in theory as well as practical.</li> <li>various office applications (Microsoft Word, Excel, and PowerPoint), where students will use these software applications to create a current resume, and slide presentation.</li> <li>basic computer knowledge and skills required to obtain an understanding of computer hardware, software, Internet, and web search.</li> </ul> </li> </ul>					
9. Teaching and Learning Strategies					
Strategy       By the end of this module, students should be able to:         1.       Understand computer hardware, software components, and peripheral devices, enabling them to use computers confidently.         2.       Manage and organize files and folders on a computer effectively, including creating, renaming, moving, and deleting files and folders.         3.       Efficiently employ Microsoft Office to execute fundamental tasks with ease.         4.       Navigate the internet and communicate via email, while understanding internet safety.         Upon finishing the course, students will be aware of the ethical and security considerations when using computers, promoting safe and responsible digital behavior.					
safety. Upon finishing the course, students will be aware of the ethical and security considerations when using computers, promoting safe and responsible digital behavior.					
safety. Upon finishing the course, students will be aware of the ethical and security considerations when using computers, promoting safe and responsible digital behavior. <b>10. Course Structure</b>					
safety. Upon finishing the course, students will be aware of the ethical and security considerations when using computers, promoting safe and responsible digital behavior.					
safety. Upon finishing the course, students will be aware of the ethical and security considerations when using computers, promoting safe and responsible digital behavior. <b>10. Course Structure</b>					

1	2	Introduction: A detailed	Theoretical	1
	hours	explanation of the experiments of the second semester		
2	2 hours	Radiation risks: How to prevent radiation and use measuring devices	Theoretical	2
3	2 hours	Radiation interaction: Radiation interaction with matter	Theoretical	3
4	2 hours	Experiment No. (1): Attenuation Coefficient.	Theoretical	4
5	2 hours	Experiment No. (2): Radioactivity	Theoretical	5
6	2 hours	Experiment No. (3): Study efficiency and the effective factors on it for scintillation detector.	Theoretical	6
7	2 hours	Exam	Theoretical	7
8	2 hours	Experiment No. (4): Determination the efficiency in the absolute	Theoretical	8
9	2 hours	and intrinsic method. Experiment No. (5): Calculate Exposure to radiation	Theoretical	9
10	2 hours	Experiment No. (6): Bremsstrahlung ray.	Theoretical	10
11	2 hours	Experiment No. (7): Gamma-ray Spectrum Analysis using a Scintillation Detector	Theoretical	11
12	2 hours	Experiment No. (8): Buildup Factor	Theoretical	12
13	2 hours	Experiment No. (9): Compton Scattering.	Theoretical	13
14	2 hours	Experiment No. (10): The differential cross section; the scattering probability as a function of angle.	Theoretical	14
15	2 hours	Experiments review	Theoretical	

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	No
Main references (sources)	No
Recommended books and references (scientific journals, reports)	Wikipedia
Electronic References, Websites	Wikipedia

		Out	tcomes	name	method	method
Neek	Hour		quired Learning	Unit or subject	Learning	Evaluation
10. Co	ourse	Structu	ıre			
Strategy		encou expan tutori	urage students' partici nding their critical thi	main strategy that will be a ipation in the exercises, inking skills. This will be g types of simple experime udents	while at the same achieved through	time refining and classes, interactive
		ing an	d Learning Strat	tegies		
		e Obje	Teaching students the of general physics studying the country needs of the job meducated generation radical changes and analysis and adapta expansion of humar the connection of the advisory counseling The service of pro- development in the qualified personals	he basic principles of physic and its practical application y's need for development and harket in state institutions in armed with science and act assign scientific knowled attion with the development in needs. 4. Effective contril the university with the sci g, training and development reparing graduates specia e country. 6. Meeting the in the field of physics. 7. eaching assistants in the de- future.	ons, which bears the ad progress and cap and industry sector dopts it as a sound lige and scientific me of technologies, the bution for deepenin ociety through the of teaching and addi- lized in physics needs of various sector Encouraging the d	he responsibility of bable of meeting the ors. 3. Preparing an basis to bring about nethods in thinking, to keep up with the ag and documenting implementation of ministrative staff. 5. who contribute to sectors with highly listinguished in this
Ν	Name					
			ninistrator's na	me (mention all, if	more than c	one name)
	Numb 30 ho		Credit Hours (To	tal) / Number of Un	nits (Total)	
				Weekly		
			tendance Forms	2024-4-2		
4. T	Descr	intion	Preparation Da	,		
3. 8	semes	ster / `		semester / fourth	Stage	
0.0		. ()		PPP 421		
2. (	Cours	e Code	2:	Solid State Lab.		

1	2	V	Theoretical	General
1	hours	X-ray absorption (part A)		questions +Exam
2	2 hours	X-ray absorption (part B)	Theoretical	General questions +Exam
3	2 hours	Hall effect (part A)	Theoretical	General questions +Exam
4	2 hours	Hall effect (part B)	Theoretical	General questions +Exam
5	2 hours	Forbidden energy gap	Theoretical	General questions +Exam
6	2 hours	Seebeck effect	Theoretical	General questions +Exam
7	2 hours	Exam	Theoretical	Exam
8	2 hours	Compensation and Revision	Theoretical	General questions +Exam
9	2 hours	Solar cell (part A)	Theoretical	General questions +Exam
10	2 hours	Solar cell (part B)	Theoretical	General questions +Exam
11	2 hours	Some properties of Ferroelectric materials TGA crystal	Theoretical	General questions +Exam
12	2 hours	Electron spin resonance	Theoretical	General questions +Exam
13	2 hours	Measuring the difference of ordinary and extraordinary refractive index for quartz crystal using dark rings (part A)	Theoretical	General questions +Exam
14	2 hours	Electron spin resonance Measuring the difference of ordinary and extraordinary refractive index for quartz crystal using dark bands (part A)		General questions +Exam
15	2 hours	Compensation and Revision	Theoretical	General questions +Exam

16	2 hours				Final Exam	
11. (	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 etc					
12. Learning and Teaching Resources						
Require	d textbool	ks (curricular boo	oks, if any)			
Main references (sources)						
Recommended books and references (scientific journals, reports)						
Electron	ic Refere	nces, Websites		none		

1. (	1. Course Name:						
	Virtual Lab.						
2. (	2. Course Code:						
	PPP 421						
3. 9	Semeste	er / Year:					
		Second	semester / fourth S	tage			
4. 1	Descript	tion Preparation Dat	2024-4-2				
5. 4	Availabl	e Attendance Forms:	2027-7-2				
	Weekly						
		of Credit Hours (Tota	al) / Number of Uni	ts (Total)			
	30 hours						
7. (	Course	administrator's nam	ne (mention all, if r	more than on	e name)		
I	Name						
]	Email:						
8. Course Objectives							
Course	<b>Course Objectives</b> Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.						
9. Teaching and Learning Strategies							
Strategy Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students							
10. Course Structure							
Week	Hours	Required Learning	Unit or subject	Learning	Evaluation		
		Outcomes	name	method	method		

1 2 hours 2 2 hours	Introduction		questions
			+Exam
	Bending light (I)	Theoretical	General questions +Exam
3 2 hours	Bending light (II)	Theoretical	General questions +Exam
4 2 hours	Curve fitting (I)	Theoretical	General questions +Exam
5 2 hours	Curve fitting (II)	Theoretical	General questions +Exam
6 2 hours	Experiments review	Theoretical	General questions +Exam
7 2 hours	First exam	Theoretical	Exam
8 2 hours	Schrodinger model of hydrogen atom	Theoretical	General questions +Exam
9 2 hours	Stern-Gerlach experiment	Theoretical	General questions +Exam
10 2 hours	Square well potential	Theoretical	General questions +Exam
11 2 hours	Harmonic Oscillator potential	Theoretical	General questions +Exam
12 2 hours	Experiments review	Theoretical	General questions +Exam
13 2 hours	Second exam	Theoretical	General questions +Exam
14 2 hours	Exam (Theoretical)	Theoretical	General questions +Exam
15 2 hours		Final Exam	
11. Course Evaluation			
Distributing the score out of 100 accord preparation, daily oral, monthly, or wri			nt such as daily
12. Learning and Teaching Reso			
Required textbooks (curricular books, if a			

Main references (sources)	
Recommended books and references	none
(scientific journals, reports)	none
Electronic References, Websites	none