

Academic program description



University name: University of Anbar

College: College of Science

Scientific Department: Department of Physics

Name of academic or professional program: Bachelor of Science in Physics

Final degree name: Bachelor of Physics

:Academic system

Description preparation date: 1-9-2024

Date of filling out the file 1-9-2024


التوقيع:

اسم المعاون العلمي: ا.د احمد سلمان
عبيد

التاريخ: ٤ / ٥ / ٢٠٢٥


التوقيع:

اسم رئيس القسم: ا.د جمال مال الله رزيق
التاريخ: ٤ / ٥ / ٢٠٢٥

د. إحمّد خليل إبراهيم
دقق الملف من منظور شعبة ضمان الجودة وتقوم الأداء
شعبة ضمان الجودة والاداء الجامعي

اسم مدير شعبة ضمان الجودة والاداء الجامعي:
م.د. احمد خليل ابراهيم

التاريخ: ٤ / ٥ / ٢٠٢٥


التوقيع:


مصادقة السيد العميد

أ.د. عصمت رمزي عبدالغفور
المعيدة



1. Program vision

Leadership in higher education, scientific research and academic program development to achieve sustainable community development.

2. Program message

Excellence in the quality of teaching, learning and scientific research by adopting ,analytical and critical thinking strategies to qualify human resources cognitively intellectually and skillfully in a competitive and creative environment.

3. Program objectives

.Raising the level of physics sciences in all fields
Transferring what is new about these sciences to serve the community
Raising the economic level of the country
Providing relevant institutions and departments with technical and scientific cadres .from recent graduates
Joint cooperation with state institutions and the private sector to conduct scientific .research to solve related problems

4. Program accreditation

?Is the program accredited? By which authority

5. Other external influences

?Is there a sponsor for the program

6. Program structure

The stage Third

Second semester				First semester					
Units	watches		Study materials	Subject categories	Units	watches		Study materials	Subject categories
	practical	theoretical				practical	theoretical		
2		2	Quantum Mechanics ³	requirements to divide	2		2	Quantum / Mechanics 1	requirements to divide
4.5	2	3	Optics 2		4.5	2	3	geometric optics	
3.5	2	2	Laser ²		3.5	2	2	The Laser 1	
2		2	Physics of		3		3	Mathematical Physics 1	

			Materials/2		2		2	molecular	
2		2	Statistical mechanics	requirements college	2		2	Physics of Materials/1	requirements college
2		2	Research methodology		3		2	Semiconductors 1	
2		2	Modeling and simulation	requirements university	3	2	2	numerical analysis	requirements university
18	4	15	Total hours and units		23	6	18	Total hours and units	

The stage Fourth

Second semester					First semester				
Units	watches		Study materials	Subject categories	Units	watches		Study materials	Subject categories
	practical	theoretical				practical	theoretical		

3	6		Practical Physics 2	requirements to divide	3	6		Practical Physics 1	requirements to divide
3		2	Solid State Physics 2		3		2	Solid State Physics 1	
2		2	Nuclear Physics 2		2		2	Nuclear Physics 1	
2		2	Electromagnetism 2		2		2	Electromagnetism 1	
2		2	Nanophysics 2		2		2	Nanophysics 1	
2		2	Graduation research		2		2	Graduation research	
2		2	Medical Physics	requirements college	2		2	solar cells	requirements college
2		2	elementary particles		2		2	Spectra	
					2		2	English 4	
18	6	14	Total hours and units		18	6	14	Total hours and units	

. Notes may include whether the course is core or optional *

7. Program description				
Credit hours		Course name	Course code	Year / Level
2	3	geometric optics		Third
2	2	Laser/1		Third
---	2	Quantum Mechanics/2		Third
---	2	Physics of Materials/1		Third
2	2	numerical analysis		Third
--	2	molecular		Third
--	2	Semiconductors/1		Third
2	2	Laser/2		Third
-	2	Quantum Mechanics/3		Third
-	2	Research methodology		Third
2	3	Optics/2		Third
-	2	Modeling and Simulation		Third
-	2	Physics of Materials/2		Third
-	2	Statistical mechanics		Third
3	3	Solid State Physics 1		Fourth
3	3	Nuclear Physics/1		Fourth
-	2	Electromagnetic Theory/1		Fourth
-	2	Nanophysics/1		Fourth
-	2	solar cells		Fourth
-	2	Spectra		Fourth
-	2	English language 4/		Fourth

-	2	Graduation research		Fourth
2	3	Solid State Physics 2		Fourth
2	3	Nuclear Physics/2		Fourth
-	2	Electromagnetic Theory/2		Fourth
-	2	Nanophysics/2		Fourth
-	2	elementary particles		Fourth
-	2	Medical Physics		Fourth
-	2	Graduation research		Fourth

8. Expected learning outcomes of the program	
knowledge	
Learning Outcomes Statement 1	<p>Goals cognitive</p> <p>He seeks Department to -1 to choose better Roads Scientific Modern in receipt Information good to Students from during cadre distinct from Instructors</p> <p>Also Acquisition -2 Students Experiences Scientific and The process in Physics And all Its branches from during Training practical in</p>

	<p>Laboratories Department during year Academic</p> <p>In addition to stay -3 Training Summer For the stage Fourth For a period of month</p>
Skills	
Learning Outcomes Statement 2	<p>The department aims to graduate scientific cadres :capable of working in each of All state -1institutions such as hospitals , state factories and educational .institutions</p> <p>- 2 Building students' research and analytical capacity</p> <p>'Developing students -3 .deductive side</p> <p>Teaching students how to -4 .deal with scientific equipment</p>
Learning Outcomes Statement 3	.
values	
Learning Outcomes Statement 4	<p>Developing the student's ability - to understand the specialization .and deal with it flexibly</p> <p>Creating a sense of familiarity -2 with the vocabulary of the .specialty</p>

	Assume responsibility in -3 serving the community and the .country through this specialty
Learning Outcomes Statement 5	Learning Outcomes 5

9. Teaching and learning strategies

- Explanation and clarification through lectures.
- How to display scientific materials using projectors: data show , plasma screens.
- Self-learning through homework and mini-projects within lectures.
- Daily surprise tests(Quizzes) and ongoing weekly tests
- Guiding students to some resources to benefit from and expand their understanding of the scientific material
- Laboratories.
- Graduation projects.
- Scientific visits
- Seminars and symposia held in the department.
- Summer training.

10. Evaluation methods

- Exams Short
- Duties Home
- Exams Quarterly And the final For materials Theory The process

- Projects small within The lesson
- presentation Activities

11. Faculty					
Faculty members					
Faculty preparation		/ requirements skills (if any)	Specialization		Academic rank
lecturer	employee		private	general	
	employee		spectral nuclear composition	Physics	.Mr
	employee		Nanomaterials Physics	Physics	.Mr
	employee		Materials Technologies	Physics	.Mr
	employee		Nuclear and Environmental Physics	Physics	assistant professor
	employee		molecular physics	Physics	.Mr
	employee		Nanomaterials Physics (Nano) Technology	Physics	assistant professor

	employee		Solid State Physics (Nanostructures)	Physics	assistant professor
	employee		Nano Technology	Physics	assistant professor
	employee		Nanomaterials Physics	Physics	assistant professor
	employee		Nano Technology	Physics	assistant professor
	employee		Materials Physics	Physics	assistant professor
	employee		Nuclear and Environmental Physics	Physics	assistant professor
	employee		theoretical physics	Physics	teacher
	employee		Laser and Electrophysics optics	Physics	teacher
	employee		Laser Physics	Physics	teacher
	employee		Materials Physics	Physics	teacher
	employee		quantum physics	Physics	teacher
	employee		Nuclear and Environmental Physics	Physics	teacher

	employee		Laser Physics	Physics	teacher
	employee		High Energy Physics	Physics	teacher
	employee		Nano Technology	Physics	teacher
	employee		Medical Physics	Physics	teacher
	employee		Astrophysics	Physics	teacher
	employee		theoretical physics	Physics	teacher
	employee		Thin Film Physics	Physics	Assistant Professor
	employee		Thin Film Physics	Physics	Assistant Professor
	employee		nuclear physics	Physics	Assistant Professor
	employee		Laser Physics	Physics	Assistant Professor
	employee		Thin Film Physics	Physics	Assistant Professor
	employee		physics Materials	Physics	Assistant Professor

	employee		theoretical physics	Physics	Assistant Professor
	employee		physics Medical	Physics	Assistant Professor
	employee		nuclear physics	Physics	Assistant Professor

Professional development

Orientation of new faculty members

Care Students Intellectually And educationally , including achieves an interest Homeland and .1 the nation in anchoring pillars the society Iraqi Democratic about building civilization Humanity .elegant Taking from style Scientific in thinking and practice tool To achieve that Objectives 2 Doing With the teachings Theory The process and applied And the field and training and laboratories and laboratories and the fields empiricism , And the governorate on Its assets And monitoring Hassan Use it And casting Lectures Theory The process , Solution Exercises And auditing Reports Students And the nobles on Research and messages . 3. Procedure Research Scientific in various Fields . 4. Stocks in Activities University

Professional development for faculty members

Doing With the teachings Theory The process and applied And the field and training and .1 laboratories and laboratories and the fields empiricism , And the governorate on Its assets And monitoring Hassan Use it And casting Lectures Theory The process , Solution Exercises And auditing Reports Students And the nobles on Research 2. Action and messages . Research Scientific in various Fields . 3 . Stocks in Activities University

12. Acceptance criteria

Establishing regulations related to joining the college or institute, whether central admission or)
(other mentioned

**He is acceptance The student a graduate Sixth Preparatory Department Biologist
or Applied At a rate of no It decreases on80% addition to possibility Acceptance
private**

13. The most important sources of information about the program

**from Most important sources Information For the program Academic Depending
on on what Common attic from Curricula and decisions Academic in Colleges and
sections Scientific in Universities English And American . Addition to
communication with Institutions and circles The state Which Own Cadres Physics
To put Programs Academic To be done Graduation Students Owns Experiences
For work in This is amazing circles and institutions same relationship , Please on
to support Programs Studies Supreme**

14. Program Development Plan

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Program Skills Map	
Required learning outcomes of the program	

General and) transferable skills other skills related to employability and personal development (Affective and value-based goals			Program skill objectives				Cognitive objectives				essential Or my choice	Course name	Year/Level	
D4	D3	D2	D1	A4	Pa rt 3	Pa rt 2	Pa rt 1	B4	B3	B2	B1	A4	A3	A2				A1
											√				√	essential	geometric optics	Third
		√	√				√			√	√			√	√	essential	Laser/1	Third
		√	√				√			√	√				√	essential	Quantum Mechanics/2	Third
		√	√				√			√	√				√	essential	Materials Physics	Third
											√				√	essential	numerical analysis	Third
											√				√	essential	molecular	Third

											√				√	essential	Semiconductors/1	Third
											√				√	essential	Laser/2	For the third
		√	√				√			√	√			√	√	essential	Quantum Mechanics/3	The third
		√	√				√			√	√				√	optional	Research methodology	Third
											√				√	essential	Optics/2	Third
		√	√				√			√	√				√	essential	Modeling and Simulation	Third
											√				√	essential	Physics of Materials 2	Third
											√				√	essential	Statistical mechanics	Third
											√				√	essential	Solid State Physics 1	Fourth

											√				√	essential	Nuclear Physics/1	Fourth
											√				√	essential	Electromagnetic Theory/1	Fourth
											√				√	essential	Nanophysics/1	Fourth
		√	√				√			√	√			√	√	optional	solar cells	Fourth
		√	√				√			√	√				√	optional	Spectra	Fourth
											√				√	optional	English language /4	Fourth
											√				√	essential	Graduation research	Fourth
											√				√	essential	Solid State Physics 2	Fourth
											√				√	essential	Nuclear Physics/2	Fourth
											√				√	essential	Electromagnetic Theory/2	Fourth

																essential	Nanophysics/2	Fourth
																optional	elementary particles	Fourth
										√				√	optional	Medical Physics	Fourth	
										√				√	essential	Graduation research	Fourth	

- .Please tick the boxes corresponding to the individual learning outcomes of the programme being assessed

Course Description Form

1. Course Name:	
Optic1	
2. Course Code:	
PHY-311	
3. Semester / Year:	
First / 2024-2025	
4. Description Preparation Date:	
1/9/2024	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3/3	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Khalil T Hassan Email: sc.khalil_alftyan@uoanbar.edu.iq	
8. Course Objectives	
Course Objecti	Knowledge of basic concepts of light. Basic knowledge of statistical and mathematical methods for the subject and the exte of students' understanding of them.

	That the student understands the changes occurring in the scientific field he is studying (such as physical and optical).
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9. Teaching and Learning Strategies

Strategy	Conducting a mixed of three common learning strategies Learning Competitive Learning Individualistic –3 Cooperative learning
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Chapter One (Basic concepts of the electromagnetic nature of light)		
2	3		Faraday's law		
3	3		Amp's laws		
4	3		Maxwell's laws		
5	3		Application of Maxwell's law to light		
6	3		Chapter Two: Wave Motion The wave nature of light		

7	3		Plane waves		
8	3		Circular waves		
9	1		1st month exam		
10	3		Chapter Two (Propagation of Light)		
11	3		Smil's law		
12	3		Fresnel's law		
13	3		Laws of reflection and transmittance		
14	3		2nd month exam		
15	3		The preparatory week before the 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

Daily exams 5% Reports 10% Monthly exams 35% Final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	-Optics and photonics an introduction by F. Graham Smith, Terry A. King, Dan Wilkins (z-lib.org) -Optics-hecht-4th-ed-2003
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

13. Course Name:
Statistical mechanics / 3 rd stage
14. Course Code:
2
15. Semester / Year:
2024-2025
16. Description Preparation Date:
1/10/2024
17. Available Attendance Forms:

Presence	
18. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours	
19. Course administrator's name	
Name: Adil Nameh Ayyash	
Email: sc.adil_nameh78@uoanbar.edu.iq	
20. Course Objectives	
Course Objectives	
It is to achieve excellence in the field of statistical mechanics and continuous research and development to improve the principles.	
21. Teaching and Learning Strategies	
Strategy	<ul style="list-style-type: none"> 1- Using modern study methods. 2- Sudden daily and continuous weekly tests 3- exercises and activities. 4. It contains topics guide the student to some sources that contain topics and examples to benefit from in solving questions about these experiences.

22. Course Structure				
Week	Hours	Unit or subject name	Learning method	Evaluation method
1	2	1-Introduction	Presence	
2	2	2- Classification of statistics		
3	2	3- Descriptive statistics		
4	2	4- Inferential statistics		
5	2	5-Examples and Daily exam		
6	2	6- types of Measures of Dispersion		
7	2	7-Examples		
8	2	8- Data analysis		
9	2	9- Regression Analysis		
10	2	10- Pearson Linear Correlation Coefficient		
11	2	11- Experience of level disc		
12	2	12- Scientific activities		
13	2	13-A comprehensive review of all previous experiences		
14	2	14-Second month test		
15	2	15-The final test		

23. Course Evaluation				
50 % include 30 exam , 10 daily test, 10 homework and 50 final exam				
24. Learning and Teaching Resources				
Required textbooks (curricular books, if any)		Statistical mechanics -1 عبدالهادي محمد حمدان البرغوثي		
Main references (sources)		Statistical mechanics -1 عبدالهادي محمد حمدان البرغوثي		
Recommended books and references (scientific journals, reports...)				
Electronic References, Websites				

Course Description Form

25. Course Name:
Molecular physics/ 3 rd stage
26. Course Code:
1
27. Semester / Year:
2024-2025
28. Description Preparation Date:
1/10/2024

29. Available Attendance Forms:

Presence

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

2 hours

31. Course administrator's name

Name: Adil Nameh Ayyash

Email: sc.adil_nameh78@uoanbar.edu.iq

32. Course Objectives

Course Objectives

It is to achieve excellence in the field of molecular physics and continuous research and development to improve the principles.

33. Teaching and Learning Strategies

Strategy

- 1- Using modern study methods.
- 2- Sudden daily and continuous weekly tests
- 3- exercises and activities.
4. It contains topics guide the student to some sources that contain topics and examples to benefit from in solving questions about these experiences.

34. Course Structure				
Week	Hours	Unit or subject name	Learning method	Evaluation method
1	2	1-principles in molecular spectroscopy	Presence	Daily test
2	2	2- molecules and bonds		
3	2	3- molecular orbitals		
4	2	4- spectrum region		
5	2	5-Examples and Daily exam		
6	2	6- types of molecules		
7	2	7-1 st exam		
8	2	8- Morse potential		
9	2	9- dissociation energy		
10	2	10- the vibrations		
11	2	11- rotation energy		
12	2	12- transition energy		
13	2	13-rigid and non rigid rotor		
14	2	14-diatomic and poly atomic molecules		
15	2	15-2 nd exam test		
35. Course Evaluation				
50 % include 30 exam , 10 daily test, 10 homework and 50 final exam				

36. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	<p>2- Spectrum Dr. Layla M. Najeeb</p> <p>3- Modern physics Baiser</p>
Main references (sources)	<p>1- Spectrum Dr. Layla M. Najeeb</p> <p>2- Modern physics Baiser</p>
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Optic2
2. Course Code:
PHY-311
3. Semester / Year:
First / 2024-2025
4. Description Preparation Date:

1/2/2025

5. Available Attendance Forms:

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

3/3

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

Name: Dr. Khalil T Hassan

Email: sc.khalil_alftyan@uoanbar.edu.iq

8. Course Objectives

Course Objectives	Through this study, we expect that the student will be able to learn about the basics of optics and its applications, and simulate different optical properties through different computer programs in order to get a feel for the topics presented theoretically, through: <ul style="list-style-type: none">• Recognize visual terms• Learn about applications of optics.• Learn how to disassemble telescopes and microscopes
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9. Teaching and Learning Strategies

Strategy	Conducting a mixed of three common learning strategies Learning Competitive Learning Individualistic –3 Cooperative learning
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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1	3		The first chapter (basic concepts in geometric optics)		
2	3		Chapter Two (Lenses)		
3	3		Thin lenses		
4	3		Lens rules.		
5	3		Chapter Three (Zoom in and Zoom out).		
6	3		The real image and the imaginary image.		
7	3		How to plan to draw a picture		
8	1		1 month exam		
9	3		Chapter Four (thick lenses).		

10	3		Optical fiber		
11			Mirrors.		
12	3		Chapter Five (Diffraction and its applications).		
13	3		Chapter Six (Interference).		
14	3		Chapter Seven (Scattering)		
15	3		2 month exam		
	3		The preparatory week before the 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

Daily exams 5% Reports 10% Monthly exams 35% Final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	-Optics and photonics an introduction by F. Graham Smith, Terry A. King, Dan Wilkins (z-lib.org) -Optics-hecht-4th-ed-2003

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

Course Description Form

37. Course Name:	
Semiconductors-1	
38. Course Code:	
39. Semester / Year:	
Frist Semester 2024-2025	
40. Description Preparation Date:	
17-9-2024	
41. Available Attendance Forms:	
Official working hours / attendance	
42. Number of Credit Hours (Total) / Number of Units (Total)	
12 working hours per week	
43. Course administrator's name (mention all, if more than one name)	
Name: Dr. Moaaed -M- Motlak	
Email: moaaed.motlak@uoanbar.edu.iq	

44. Course Objectives

Course Objectives	<ol style="list-style-type: none"> 1. Define what a semiconductor is and distinguish it from conductors and insulators. 2. Understand the electronic band structure and charge transport in semiconductors. 3. Explain the concept of doping and its effect on electrical properties of semiconductors. 4. Identify the types of semiconductor junctions and their electrical behavior.
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45. Teaching and Learning Strategies

Strategy	<p>Theoretical lectures with practical examples.</p> <p>Interactive classroom discussions and problem-solving sessions.</p> <p>Weekly homework assignments and quizzes.</p> <p>Active participation in class discussions.</p> <p>Submission of weekly assignments.</p> <p>Midterm and final written exams.</p>
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46. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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1		Understand the concept of semiconductors	Theoretical	
2		Differentiate between intrinsic and extrinsic semiconductors	Theoretical	Questions, discussion, assignments and other activities
3		Understand energy band theory	Theoretical	
4		n-type and p-type semiconductors	Theoretical	
5		Understand conduction mechanisms	Theoretical	
6		Analyze density of states (DOS)	Theoretical	
7		Exam 1		
8		Understand junction formation	Theoretical	
9		Analyze junction behavior under biasing	Theoretical	
10		Interpret energy diagrams of p-n junction	Theoretical	
11		Study electro-optical behavior	Theoretical	

12			Evaluate electrical performance of junctions	Theoretical	
13			Exam 2		
14			Interpret energy diagrams of p-n junctions	Theoretical	
15			Concluding Lecture	Theoretical	

47. Course Evaluation

1. Follow-up daily attendance 2. Quizzes daily tests 3. Monthly Tests 4. Final exam

48. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Solid State Physics by Charles Kittel Physics of Semiconductor Devices by S.M. Sze
Recommended books and references (scientific journals, reports...)	

Electronic References, Websites	
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Course Description Form

1. Course Name:
Laser 1
2. Course Code:
PHY-
3. Semester / Year:
First / 2024-2025
4. Description Preparation Date:
26/9/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30/30
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Maher Khaleel Ibrahim Email: mkibrahim@uoanbar.edu.iq
8. Course Objectives

Course Objecti	<p>Knowledge of basic laser concepts.</p> <p>Basic knowledge of the ways radiation interacts with matter and the extent to which students understand it. That the student understands the changes occurring in the scientific field he is studying (such as physical, optical, etc.) The first chapter (basic concepts in lasers, the interaction of radiation with matter, the laser spectrum, and wavelengths), spontaneous and stimulated emission processes, and the absorption process. The second chapter, inverse qualification, the black body and its advantage the mathematical relationships related to it, the resonator, and learning about its type</p>
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9. Teaching and Learning Strategies

Strategy	<p>Conducting a mixed of three common learning stratiges Learning Competitive Learning Individualistic –3 Cooperative learning</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Introduction of Laser		
2	2		Interaction of radiation with matter		
3	2		Black Body Radiation		

4	2		Boltzmann distribution function		
5	2		Spontaneous emission		
6	2		Allowed and prohibited transfers		
7	2		Spectral line exposure mechanics		
8	2		First month test		
9	2		Masers and lasers		
10	2		Basics of laser work		
11	2		Pumping plans		
12					

13	2		Pumping methods		
14	2		Optical resonator		
15	2		Second month exam		
	2		Full review		

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

Daily exams 5% Attendance 5% Monthly exams 40% Final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	-Optics and photonics an introduction by F. Graham Smith, Terry A. King, Dan Wilkins (z-lib.org) -Optics-hecht-4th-ed-2003 Dr.. Siham Afif Qandala, laser physics and some practical applications
Recommended books and references (scientific journals, reports...)	Dr. Saud bin Humaid Al-Lahyani, Laser and applications, Umm Al-Qura University
Electronic References, Websites	

Course Description Form

1. Course Name:	
Laser 2	
2. Course Code:	
PHY-	
3. Semester / Year:	
Second / 2024-2025	
4. Description Preparation Date:	
2/2/2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30/30	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Maher Khaleel Ibrahim Email: mkibrahim@uoanbar.edu.iq	
8. Course Objectives	
Course Objecti	Identifying the types of lasers and the development of their uses, as well as studying the components of the laser, including the active medium, the excited source, and the resonator, and studying the conditions for the occurrence of lasers in detail.

	Learn about the types of lasers, their applications, and methods of protection from laser radiation
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9. Teaching and Learning Strategies

Strategy	Conducting a mixed of three common learning strategies Learning Competitive Learning Individualistic –3 Cooperative learning
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Basic concepts)		
2	2		Oscillation formulas for the resonator		
3	2		Types of lasers		
4	2		Inverse distribution		
5	2		Laser level systems.		
6	2		First month test		
7	2				

8	2		Emission line width		
9	2		Laser properties		
10	2		Solid state lasers		
11	2		Electrical characteristics of a flashlight		
12	2		Liquid state lasers		
13	2		Gas state lasers		
14	2		Semiconductor laser		
15	1		Laser applications		
			Second month test		

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

Daily exams 5% Attendance 5% Monthly exams 40% Final exam 50%	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	-Optics and photonics an introduction by F. Graham Smith, Terry A. King, Dan Wilkins (z-lib.org) -Optics-hecht-4th-ed-2003 Dr.. Siham Afif Qandala, laser physics and some practical applications
Recommended books and references (scientific journals, reports...)	Dr. Saud bin Humaid Al-Lahyani, Laser and applications, Umm Al-Qura University
Electronic References, Websites	

Course Description Form

1. Course Name:
Laser 2
2. Course Code:
PHY-
3. Semester / Year:

Second / 2024–2025

4. Description Preparation Date:

2/2/2025

5. Available Attendance Forms:

Attendance

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

30/30

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

Name: Dr. Maher Khaleel Ibrahim

Email: mkibrahim@uoanbar.edu.iq

8. Course Objectives

Course Objecti	Identifying the types of lasers and the development of their uses, as well as studying the components of the laser, including the active medium, the excited source, and the resonator, and studying the conditions for the occurrence of lasers in detail. Learn about the types of lasers, their applications, and methods of protection from laser radiation
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9. Teaching and Learning Strategies

Strategy	Conducting a mixed of three common learning strategies Learning Competitive Learning Individualistic -3 Cooperative learning
-----------------	--

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Basic concepts)		
2	2		Oscillation formulas for the resonator		
3	2		Types of lasers		
4	2		Inverse distribution		
5	2		Laser level systems.		
6	2		First month test		
7	2		Emission line width		
8	2		Laser properties		
9	2		Solid state lasers		
10					

11	2				
12	2		Electrical characteristics of a flashlight		
13	2		Liquid state lasers		
14	2		Gas state lasers		
15	2		Semiconductor laser		
	1		Laser applications		
			Second month test		

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

Daily exams 5% Attendance 5% Monthly exams 40% Final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Main references (sources)

-Optics and photonics an introduction by F. Graham Smith, Terry A. King, Dan Wilkins (z-lib.org)

-Optics-hecht-4th-ed-2003

	Dr.. Siham Afif Qandala, laser physics and some practical applications
Recommended books and references (scientific journals, reports...)	Dr. Saud bin Humaid Al-Lahyani, Laser and applications, Umm Al-Qura University
Electronic References, Websites	

Course Description Form

1. Course Name:
Electromagnetic theory 1
2. Course Code:
3. Semester / Year:
First Semester 2024-2025
4. Description Preparation Date:
20-9-2024
5. Available Attendance Forms:
Official working hours / attendance
6. Number of Credit Hours (Total) / Number of Units (Total)

12 working hours per week

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

Name: Alaa ahmed

8. Course Objectives

Course Objectives

Study of electromagnetic theory
Teaching the basic concepts of electromagnetism
Knowledge of the concepts of electrostatics and magnetism and their applications
Learn how to mathematically deal with the concepts of electromagnetism

9. Teaching and Learning Strategies

Strategy

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 expanding their critical thinking skills.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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1			vectors	Theoretical	
2			Differential Calculus	Theoretical	
3			Second Derivative	Theoretical	
4			Integral calculus	Theoretical	Questions, discussion, assignments and daily activities
5			Exam 1	Theoretical	
6			Curvilinear Coordinates	Theoretical	
7			The Dirac Delta Function	Theoretical	
8			The Electric Field	Theoretical	
9			The Electric Potential	Theoretical	
10			Exam2	Theoretical	
11			Work and Energy	Theoretical	
12			Conductors	Theoretical	
13			Laplace Equation	Theoretical	
14			Exam3	Theoretical	
15			Review	Theoretical	

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11. Course Evaluation

1. Follow-up daily attendance 2. Quizzes daily tests 3. Monthly Tests 4. Final exam

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Main references (sources)

Introduction to Electrodynamics by David Griffiths 3rd edition

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

Course Description Form

1. Course Name:

Electromagnetic theory 1

2. Course Code:

3. Semester / Year:

Second Semester 2024-2025

4. Description Preparation Date:

20-2-2025

5. Available Attendance Forms:

Official working hours / attendance

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

12 working hours per week

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

Name: Alaa Ahmed

8. Course Objectives

Course Objectives

Study of electromagnetic theory

Teaching the basic concepts of electromagnetism

Knowledge of the concepts of electrostatics and magnetism and their applications

Learn how to mathematically deal with the concepts of electromagnetism

9. Teaching and Learning Strategies

Strategy

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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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1			Electric field in Matter	Theoretical	
2			Polarization	Theoretical	
3			The electric displacement	Theoretical	
4			Linear Dielectric	Theoretical	Questions, discussion, assignments and daily activities
5			Magnetostatic	Theoretical	
6			The Lorentz Force Law	Theoretical	
7			Exam1	Theoretical	
8			-----		
9			The Biot Savart Law	Theoretical	
10			Ampere Law	Theoretical	
11			-----		
12			Magnetic field in Matter	Theoretical	
13			Magnetization	Theoretical	
14			The Auxiliary field H	Theoretical	
15			Exam2	Theoretical	

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11. Course Evaluation

1. Follow-up daily attendance 2. Quizzes daily tests 3. Monthly Tests 4. Final exam

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Main references (sources)

Introduction to Electrodynamics by David Griffiths 3rd edition

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

Course Description Form

13. Course Name:

Nuclear physics Lab

14. Course Code:

PHYS112

15. Semester / Year:

1, 2 course 2024-202 5

16. Description Preparation Date:

2024/10/15

17. Available Attendance Forms:

Official working hours / attendance

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

2 hours a week

2*15 weeks = 30 hours in the course

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

Name: Dr.Israa.K.Ahmed

Email:esraa-nuc_med@uoanabr,edu.iq

20. Course Objectives

Course Objectives

Getting to know the principles and basics of nuclear physics, radiation detection devices and methods of operation, identifying radioactive sources, and learning about the types of radiation and methods of prevention and safe from them.

21. Teaching and Learning Strategies

Strategy	
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Getting to know the principles and basics of nuclear physics, radiation detection devices and methods of operation, identifying radioactive sources, and learning about the types of radiation and methods of prevention and safety from them.

22. Course Structure

Week	Hours	Required Learning Outcome	Unit or subject name	Learning method	Evaluation method
1	2		1. Characteristics of the Gigier-Miller meter and setting its operating voltage 2. Study of radiation background 3. Calculating the radiation dose 4. Determine the idle time the Kaeker-Miller counter 5. Fulfilling the inverse square law for gamma rays		
2	2				
3	2				
4	2				
4	2				
5	2				
6	2				
7	2				
8	2				
9	2				

10	2		6. Efficiency of the Gigier counter for beta rays		
11	2		7. Efficiency of the Gigier counter for gamma rays		
12	2		8. Radiation count statistics		
13	2		9. Finding the endpoint energy of beta particles and calculating the range in aluminum sheets		
14	2		10. Determine the linear mass absorption coefficient for gamma rays		
15	2		11. Directional emission of a radioactive source		
			12. Determine the half-life of a radioactive source		
			13. Analysis of the gamma ray spectrum of some standard radioactive sources		

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)	Nucleus and Nuclear Energy Dr. M.N.AVADHANULU S.R CHOUBEY
Main references (sources)	The basic sheet for experiments in the laboratory
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Spectra /4 th stage
2. Course Code:
1
3. Semester / Year:
2024-2025
4. Description Preparation Date:

1/10/2024

5. Available Attendance Forms:

Presence

6. Number of Credit Hours (Total) / Number of Units (Total) 2 hours

7. Course administrator's name

Name: Adil Nameh Ayyash

Email: sc.adil_nameh78@uoanbar.edu.iq

8. Course Objectives

Course Objectives

It is to achieve excellence in the field of spectroscopy and continuous research and development to improve the principles.

9. Teaching and Learning Strategies

Strategy	
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- 1- Using modern study methods.
- 2- Sudden daily and continuous weekly tests
- 3- exercises and activities.
4. It contains topics guide the student to some sources that contain topics and examples to benefit from in solving questions about these experiences.

10. Course Structure

Week	Hours	Unit or subject name	Learning method	Evaluation method
1	2	Concepts in spectroscopy		
2	2	Atomic spectra		
3	2	Types of atomic spectra		
4	2	Experiments and laws		
5	2	Molecular spectra		
6	2	Diatomic and polyatomic molecules		
7	2	Rotational spectra	Presence	Daily test
8	2			

9	2	Vibrational spectra		
10	2	Electronic spectra		
11	2	Exam 1		
12	2	Nuclear spectra		
13	2	NMR		
14	2	Spectra from nuclear reactions		
15	2	Comparison between spectra Exam2		

11. Course Evaluation

50 % include 30 exam , 10 daily test, 10 homework and 50 final exam

12. Learning and Teaching Resources

Required textbooks (curricular books any)	كتاب الطيف د. ليلى محمد نجيب
Main references (sources)	كتاب الطيف د. ليلى محمد نجيب
Recommended books and reference (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:

particlees

2. Course Code:

PHY-414

3. Semester / Year:

First / 2024-2025

4. Description Preparation Date:

1/9/2024

5. Available Attendance Forms:

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

2

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

Name: Dr. Afraa Ammash Kanaan

Email: sc.af.ak33@uoanbar.edu.iq

8. Course Objectives

Course Objectives

1. To develop problem solving skills and understanding of particle physics.
2. To understand the matter.
3. This course deals with the basic concept of particles physics.
4. To understand the components of matter .

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 Outcomes	Unit or subject name	Learning method	Evaluation method
1	2				

			Introduction to elementary particle		
2	2		Classification of particles		
3	2		Bosons particles		
4	2		Fermions particles		
5	2		Hadrons particle		
	2		Mesons particles and Lepton particles		
6	2		Mid-term Exam		
			Fundamental forces		
7	2		Particles decay and reactions		
8	2		Conservations laws		
9	2		Isospin		
10	2		Color charge		
11	2		Feynman diagram		
12	2		K.G. equation		
13	2		Dirac equation		
14	2		Preparatory week before		
15			The final Exam		

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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

Daily exams 5% Reports 10% Monthly exams 35% Final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, any)	
Main references (sources)	<p>-- Paolo Franzini – elementary particle physics</p> <p>- B.R.Martin - Nuclear and Particle physics.</p>
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

