Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	2023/10/15
	Deans Council Approval Decision Number	265/2024/24/3/2
	The Date of the Deans Council Approval Decision	2024/1/23
	Number of Pages	08

1.	Course Title	Optics-1
2.	Course Number	0302221
3.	Credit Hours (Theory, Practical)	(3, 0)
	Contact Hours (Theory, Practical)	(3, 0)
4.	Prerequisites/ Corequisites	Practical Physics-2 (0302112)
5.	Program Title	BSc. In Physics
6.	Program Code	
7.	School/ Center	School of Science
8.	Department	Physics
9.	Course Level	Bachelor
10.	Year of Study and Semester (s)	2024/2025, 2nd semester
11.	Program Degree	Bachelor
12.	Other Department(s) Involved in Teaching the Course	-
13.	Learning Language	English
14.	Learning Types	☒Face to face learning ☐Blended ☐Fully online
15.	Online Platforms(s)	☒Moodle ☐Microsoft Teams
16.	Issuing Date	20/02/2025
17.	Revision Date	17/06/2025

18. Course Coordinator:

Name: Prof. Dr. Hanan Sa'adeh

Contact hours: announced on the website: https://eacademic.ju.edu.jo/hanan.saadeh/Pages/OfficeHours.aspx

Office number: 220 Phone number: 22029

Email: Hanan.Saadeh@ju.edu.jo

19. Other Instructors:

None

20. Course Description:

As stated in the approved study plan. Introductory Course of Optics: Topics include: Nature of Light, Huygen's Principle, Fermat's Principle, Wave Equations, Superposition of Waves, Interference of Light, Optical Interferometry, Production of Polarized Light, Fraunhofer Diffraction, Diffraction Grating.

21. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

PILO's	***National Qualifications Framework Descriptors***		
	Competency (C)	**Skills (B)**	**Knowledge (A)**
1. Identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of Mathematics and Science and/or technical topics to areas relevant to the discipline.	☐	☐	☒
2. Formulate or design a system, process, procedure or program to meet desired needs.	☐	☒	☐
3. Develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.	☐	☐	☒
4. Communicate effectively with a range of audiences in oral or written forms and exhibit ethical and professional values.	☐	☒	☐
5. Reflect the impact of technical and/or scientific solutions in economic, environmental, and societal contexts.	☒	☐	☐
6. Function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.	☒	☐	☐

* Choose only one descriptor for each learning outcome of the program, whether knowledge, skill, or competency.

22. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Understand the fundamentals of geometrical and physical optics.

2. Describe and interpret most geometrical and physical phenomena in optics.

3. Understand basic optical systems.

4. Master general concepts of wave propagation that can be applied in a variety of different contexts, from acoustics to microwaves.

5. Set up equations for relevant optical phenomena and solve for relevant quantities of interest.

Course ILOs #	The learning levels to be achieved						Competencies
	Remember	Understand	Apply	Analyse	evaluate	Create	
1	√	√		√			
2		√	√		√		
3		√	√		√		
4	√	√	√				
5		√	√	√		√	

23. The matrix linking the intended learning outcomes of the course course -CLOs with the intended learning outcomes of the program -PILOs:

PILOs* / CILOs	1	2	3	4	5	6	Descriptors**		
							A	B	C
1	√						√		
2	√						√		
3		√						√	
4	√						√		
5		√					√	√	

***Linking each course learning outcome (CLO) to only one program outcome (PLO) as specified in the course matrix.**

****Descriptors are determined according to the program learning outcome (PLO) that was chosen and according to what was specified in the program learning outcomes matrix in clause (21).**

24. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1 1.2 1.3	**Nature of Light** A Brief History Particles and Photons The Electromagnetic Spectrum	1	Face to Face	Lecture room	Synchronous	HW &/Or Quiz	Ch.1 Sec 1-3
2 3 4	2.1 2.2 2.3 3.1 3.2 3.3 4.1 4.2 4.3	**Geometrical Optics** Huygens' Principle Fermat's Principle Principle of Reversibility Reflection in Plane Mirrors Refraction Through Plane Surfaces Imaging by an Optical System Reflection at a Spherical Surface Refraction at a Spherical Surface Thin Lenses Vergence and Refractive Power Newtonian Equation for the Thin Lens	1,2,3	Face to Face	Lecture room	Synchronous	Discussion	Ch. 2 Sec. 1-11
5 6	5.1 5.2 5.3 6.1 6.2 6.3	**Optical Instrumentation** Prisms **Wave Equations** One-Dimensional Wave Equation Harmonic Waves Complex Numbers (***Self-Reading***) Harmonic Waves as Complex Functions Plane Waves Spherical Waves Electromagnetic Waves Light Polarization	3 2,4	Face to Face	Lecture room	Synchronous	Discussion Exam	Ch.3 Sec. 3 Ch.5 Sec. 1-6, 8, 9
7 8	7.1 7.2 7.3 8.1 8.2	**Superposition of Waves** Superposition Principle Superposition of Waves of the Same Frequency Random and Coherent Sources Standing Waves	2,4,5	Face to Face	Lecture room	Synchronous	Discussion	Ch. 6 Sec. 1-6

	8.3	The Beat Phenomenon Phase and Group Velocities						
9	9.1	**Interference of Light** Two-Beam Interference Young's Double-Slit Experiment Double-Slit Interference with Virtual Sources Interference in Dielectric Films Fringes of Equal Thickness Newton's Rings Film-Thickness Measurement by Interference Stokes Relations **Optical Interferometry** The Michelson Interferometer Applications of the Michelson Interferometer Variations of the Michelson Interferometer (Self-Reading) The Fabry-Perot Interferometer (Self-Reading)	1-5	Face to Face	Lecture room	Synchronous	Discussion Exam	Ch.7 Sec. 1-8 Ch.8 Sec. 1-4
	9.2							
	9.3							
10	10.1							
	10.2							
	10.3							
11	11.1							
	11.2							
	11.3							
12	12.1							
	12.2							
	12.3							
13	13.1	**Fraunhofer Diffraction** Diffraction from a Single Slit Beam Spreading Rectangular and Circular Apertures Resolution Double-Slit Diffraction Diffraction from Many Slits (***Self-Reading***) **The Diffraction Grating** The Grating Equation Free Spectral Range of a Grating Dispersion of a Grating Resolution of a Grating	1-5	Face to Face	Lecture room	Synchronous	Discussion Project Exam	Ch. 11 Sec. 1-6 Ch. 12 Sec. 1-4
	13.2							
	13.3							
14	14.1							
	14.2							
	14.3							
15	15.1							
	15.2							
	15.3							

25. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	*Mark wt.	CILOs					
		1	**2**	**3**	**4**	**5**	**6**
Quiz	5	√	√				
Midterm Exam	30	√	√	√	√	√	√
Second Exam							
Group Project	15	√	√	√	√	√	√
Final Exam	50	√	√	√	√	√	√
**Class work							
Total 100%	100						

*** According to the instructions for granting a Bachelor's degree.**

****According to the principles of organizing semester work, tests, examinations, and grades for the bachelor's degree.**

Mid-term exam specifications table*

No. of questions/ cognitive level						No. of questions per CLO	Total exam mark	Total no. of questions	CILO/ Weight	CILO no.
Create **%10**	Evaluate **%10**	Analyse **%10**	Apply %20	Understand **%20**	Remember %30					
	1	1	5	2	2	5	30	8	63%	1
	1	1	5	2	2	5			63%	2
	1	1				1			13%	3
		1		1	1	1			13%	4
1	2	2	5	2	2	6			75%	5

Final exam specifications table

No. of questions/ cognitive level						No. of questions per CLO	Total exam mark	Total no. of questions	CILO Weight	CILO no.
Create **%10**	Evaluate **%10**	Analyse **%10**	Apply %20	Understand **%20**	Remember %30					
1	1		1	3	2	4	50	10	40%	1
1	1	1	1	1	1	2			20%	2
			3	3	3	5			50%	3
1	1	2	2	3	4	4			40%	4
1	1	1	5	3	4	6			60%	5

26. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform…etc.):

Textbook, Lecture Notes, Scientific Calculator, Internet Connection.

27. Course Policies:

A- Attendance policies:

Class attendance is expected. Past experience has shown that students who do not attend the lectures invariably receive poor grades. A student whose absence exceeds 15% of lectures will be dismissed.

B- Absences from exams and submitting assignments on time:

Absence from exams without an acceptable excuse means ZERO. No late submission of homework assignments is allowed.

C- Health and safety procedures:

No special precautions.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

All these issues will be considered according to the regulations and laws adopted at the University of Jordan.

E- Grading policy:

Quiz: 5%

Midterm Exam: 30%

Group Project: 15% Final Exam: 50% F- Available university services that support achievement in the course: Class Room, Ibn Al-Haytham Laboratory, Library, Students Computer Lab, E-Learning Platform

28. References:

A- Required book(s), assigned reading and audio-visuals: Introduction to Optics, 3rd Edition (2014), by F. L. Pedrotti, L. M. Pedrotti, and L. S. Pedrotti. B- Recommended books, materials, and media: 1- 1- Optics, 5th Edition (2017), by E. Hecht. 2- Schaum's outlines - Optics, by E. Hecht (McGraw-Hill). 3- Ibn Sahl Corner for Optics at PhysLAB: https://physlab.org/optics-lab/

29. Additional information:

-

Name of the Instructor or the Course Coordinator: …… **Prof. Dr. Hanan Sa'adeh** ……	Signature: ……..……	Date: 18/06/2025
Name of the Head of Quality Assurance Committee/ Department …….	Signature: ……..……	Date: ……..……
Name of the Head of Department …….	Signature: ……..……	Date: ……..……
Name of the Head of Quality Assurance Committee/ School or Center …….	Signature: ……..……	Date: ……..……
Name of the Dean or the Director …….	Signature: ……..……	Date: ……..……