The Hashemite University
Faculty of Science
Course Syllabus

Department of Physics

Course Title: Laser Physics | **Course Number: 110102464**
Pre-requisite: 110102364 | **Credit Hours**: 3
Designation: Elective | **Instructor**: Dr. Saleh Omari
Instructor's E-mail: salomar@hu.edu.jo

Course Description (Catalog): This course introduce students to the introductory concepts of light, Interaction of radiation with matter, Pumping processes, Passive optical resonators, Continuous wave and transient laser behavior, Types of lasers, Applications of lasers.

Text Book: Principles of Lasers by Orazio Svelto, Springer , 4th edition, 1998.
References: **Laser theory**: Haken, Hermann. Springer-Verlag, Berlin: 1984.

Major Topics Covered:

Topics	No. of Weeks	Contact Hours*
Introductory concepts	2	6
Interaction of radiation with matter	2	6
Pumping processes	3	9
Passive optical resonators	3	9
Continuous wave and transient laser behavior	2	6
Types of lasers	2	6
Applications of lasers	1	3
Total	**16**	**45**

*Contact Hours include lectures, quizzes and exams.

- **Specific Outcomes of Instruction (Course Learning Outcomes):**

After completing this course units, the students will be able to:

	Course Learning Outcomes (CLO)	(SO*)
CLO1.	Perform calculations on the main concepts of ground and excited states population.	(a), (k)
CLO2.	Knowledge of some theories concerning the interaction of electromagnetic radiation with matter.	(a), (k)
CLO3.	Demonstrate the different methods of pumping processes like optical, chemical, and electromagnetic ones.	(a), (e) (k)

	Course Learning Outcomes (CLO)	(SO*)
CLO4.	Perform calculations on the geometry the passive optical resonators	(a), (k)
CLO5.	Dealing with the calculations of the continuous wave and transient laser behavior.	(a), (k)
CLO6.	Knowledge of the types of lasers and its applications	(a), (k)

*(SO) = Student Outcomes Addressed by the Course.

- **Student Outcomes (SO) Addressed by the Course:**

#	Outcomes Description Applied and Natural Sciences Student Outcomes	Contribution
(a)	an ability to apply knowledge of mathematics, science, and applied sciences	H
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to formulate or design a system, process or program to meet desired needs	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify and solve applied sciences problems	L
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of solutions in a global and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.	M

H = High, **M** = Medium, **L** = Low

Grading Plan:

First Exam:	25 points	5/11/2025
Second Exam:	25 points	15/12/2025
Home works, quizzes	10 points	
Final Exam:	40 points	To be announced later

General Notes: (Attendance Policy) students are expected to attend every class and arrive on time in compliance with HU regulations. In case you find yourself in a situation that prevents you from attending class or exam, you have to inform your instructor. If you miss more than 6 classes for the (Sunday, Tuesday, and Thursday model) or 4 classes for the (Monday and Wednesday Model), you cannot pass the course. Makeup excuses will be accepted only for very limited justified cases, such as illness and emergencies. Changing your section without informing your instructors is not accepted at all.