KINGDOOM OF SAUDI ARABIA
Ministry of Education
Al Imam Mohammad Ibn Saud Islamic University
College of Science
Department of Physics

المملكة العربية السعودية
وزارة التعـلـيـم
جامعة الإمام محمد بن سعود الإسلامية
كلية العلوم
قسم الفيزياء

SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Language
PHY	**255**	**Introduction to Modern Physics**	**2**	**2**	**0**	**0**	**4**	**PHY 101**	**5**	**English**

A. Course Description

Students will develop an understanding of some of the fundamental laws of nature. They will extend their understanding of macroscopic phenomena to include the geometric optic, physical optics and image formation. This will extend their understanding of ideas to laser and spectroscopy.

B. Course Outcomes

At the end of this course the student will be able to**:**

1. Describe the basic principles and applications of geometrical optics.
2. State the fundamental concepts of the wave nature of light.
3. Understand the fundamental of laser physics and provide an overview of the physics of modern optical technology.
4. Introduce the fundamental concepts of the atomic structure.
5. Understand some applications of lasers and the associated physics.
6. Give the basic principles of atomic spectroscopy.

C. References

Required Textbook
Hecht E., *Optics,* 4th edition, Addison-Wesley (2004).

Other references
Jenkins F.A., White H.E., *Fundamentals of Optics,* 4th edition, McGraw-Hill (2001).

Course Website: http://www.imamm.org/

D. Topics Outline

1. ***Laws of Geometrical Optics and Image Formation:*** *Reflection, Dispersion and prisms, Total Internal Reflection, Images formed by flat mirrors, Images formed by spherical mirrors, Images formed by refraction mirrors. Thin lenses* (Contact hours*: 8).*

2. ***Laser****: Introduction, Bohr's model of hydrogen atom, Bohr's model of hydrogen atom, Absorption, Emission, Spectra (series) Lyman, Balmer* (Contact hours*: 7).*

3. ***Properties of Laser:*** *Ordinary Vs. extraordinary light, Maxwell, Boltzmann distribution Beer's law, Non-inverting condition, Thermal equilibrium, Inversion, Einstein's coefficients (*Contact hours*: 7).*

4. ***Laser amplification and Oscillation:*** *Hypothetical laser amplifier, Population inversion technique (*Contact hours*: 4).*

5. ***Introduction to Spectroscopy:*** *Vibrational and rotational spectra, Atomic emission spectroscopy (*Contact hours*: 4).*

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E. Office Hours

Office hours give students the opportinuity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homeworks:** During the semester.
- **Final Exam:** 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 20 %	Midterm 2: 20 %	Final Exam: 40 %
Quizzes, Homework, Attendance & Participation: 20 %		

The grading distribution:

A+	A	B+	B	C+	C	D+	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)

G. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. ("Immediate family" is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

Executive Rules for Study Regulations and Exams
goo.gl/ykm7t3