

توصيف مقرر دراسي

١ - بيانات المقرر		الرمز الكودي:
المستوى:	أسم المقرر:	Physics
الثاني (بيولوجي)	Spectral analysis & Physical optics	
عدد الوحدات الدراسية: ٨ نظري: ٤ تمارين: ٠ عملي: 4		التخصص: علوم البيئة

٢ - هدف المقرر: For students undertaking this course, the aims are to: Introduce the student to the concept of the wave nature of light. - Acquaint the student with the fact that the superposition of light waves leads to a wide variety of effects called interference. - Study two beams and multiple beam interference and application. - Acquire the student's skills to derive mathematical formula of the Enable the students to use the diffraction grating diffraction of light. as a powerful device for dispersing light into its component wavelength. - Study the polarization is firm evidence of the transverse nature of light wave. - Introduce the students a comprehensive picture of the physical phenomena occurring in the atoms when being excited. - Study how spectrum is emitted or absorbed. - Introduce relation between atomic structure & atomic spectrum. - Study importance of spectroscopic analysis methods and their high sensitivity & accuracy. - Introduce the students to the basic fundamentals of "Spectroscopy" including its different types, regions, importance, etc... and emphasizing the concepts of energy levels, electronic transition, atomic excitation & ionization.	
٣ - المستهدف من التدريس المقرر:	
أ-المعلومات والمفاهيم: a- Knowledge and Understanding : On completing this course, students will be able to: - a1 - Define the wave theory of light. - a2 - Explain the principle of superposition of two or more light waves. - a3 - Explain the phase diagram to analyze single slit diffraction. - a 4 - Explain the Polarization of light. - a 5- Define physical terms such as; ionization, excitation, atomic spectra, line, band & continuous spectra, emission& absorption spectrum. - a 6- Explain the basics of the electromagnetic radiation and knowledge of its properties, regions and its interaction with matter. - a 7- Explain the different experimental techniques of spectroscopic analysis and its practical applications.	

b- Intellectual Skills: On completing this course, students will be able to: b1 - Analyze the single slit diffraction by using mathematical tools like phase or physical formulas.b2 - Sketch graphically how different optical instruments can work. b3 - Test how light waves can interfere constructively or destructively. b4- Distinguish between the Fresnel and Fraunhofer diffraction . b5 -Apply the mathematical formulas and explain how spectrum is emitted or absorbed and the related physical variables.	ب- المهارات الذهنية
c-Professional and Practical Skills: On completing this course, students will be able to: • c1 - Perform an experiment in the optical laboratory and draw relations. • c2- Compare between the intensity distribution pattern of two beam and multiple beam interference. • c3 - Design an experiment in the physics laboratory.	ج- المهارات المهنية الخاصة بالمقرر:
d-General and Transferable Skills: On completing this course, students will be able to: • d1 - Collect information's about subject. • d2 - Collect and analyze the database of information related to different subjects. • d3 - Solve community linked problems in ethical manner.	د- المهارات العامة :
Physical optics: wave motion: Path difference, energy of vibrating particle, superposition of two wave Interference of two beam of light: 1- division of wave front & 2-division of amplitude. Interference of multiple beam Diffraction of light Polarization of light Spectra analysis • General introduction about atomic & molecular spectroscopy. Characterization of the EMR and the E.M. Spectrum regions. Quantization of energy and energy levels. Definition of terms. Elements of atomic theory, Hydrogen atom, Bohr theory, Sommerfield's refinements, Lorentz formula. • Fine & hyperfine structure, line splitting, selection rules, electron spin, Pauli Excln. many elec. spc. Zeeman effect, Paschen-Back effect, periodic table, Hyperfine structure& Nuclear spin, Isotopic effect • Basics of practical spectroscopy, atomic emission methods, related spectral terms, instrumentation. Excitation sources; flame, d.c.arc, a.c.arc, a.c. spark; discharge tubes; hollow cathode, atomic beams & Lasers. • Monochromators; prisms and diffraction gratings. Detectors; photographic & photoelectric. • Qualitative & quantitative spectroscopic analysis.	٤- محتوى المقرر:

5-Teaching and Learning Methods			٥- أساليب التعليم والتعلم:
- Lectures using overhead projector and board. - Discussion sessions - Class activity. - Laboratory work			
The same as normal students, only skeletal disabilities are allowed in the Faculty of Science.			٦- أساليب التعليم والتعلم للطلاب ذوي القدرات المحدودة:
			٧- تقويم الطلاب :
Student Assessment Methods			أ- الأساليب المستخدمة :
Final exam	to assess	a1-a7, b1-b5, d3	
Oral exam	to assess	a1-a7, b1-b5,c2	
Practical exam	to assess	c1and c3	
report	to assess	d1,d2	
Assessment Schedule			ب- التوقيت :
Assessment 1	Week #	14	
Assessment 2	Week #	14	
Assessment 3	Week #	12	
Assessment 4	Week #	8	
Weighting of Assessments			ج- توزيع الدرجات :
Final-Term Examination		70%	
Oral Examination		10 %	
Practical Examination		20%	
Semester work		0%	
Other types of assessment		0%	
Total		100%	
٨- قائمة الكتب الدراسية والمراجع :			
Notes offered and authorized by the physics department			أ- مذكرات:
Physics for Scientists and Engineers Raymond A. Serway, John W. Jewett 6th Edition, 2004.			ب- كتب ملزمة
Physics, Hallidy, Resnick and Krane, Sixth edition, John Wiley & Sons, 2003.			ج- كتب مقترحة :
different web sites in physics			د- دوريات علمية أو نشرات..

مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسي

المحتويات للمقرر	عدد أسابيع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
Physical optics wave motion: Path difference, energy of vibrating particle, superposition of two wave	1-2	a1,a2	B3		
Interference of two beam of light: 1- division of wave front & 2-division of amplitude.	3-6	a2	b2,b3		D3
Interference of multiple beam	7-8			c2	d1
Diffraction of light	9-12	a3	b4		D3
Polarization of light	13,14	a4		C3	D3
•spectra analysis •General introduction about atomic & molecular spectroscopy. Characterization of the EMR and the E.M. Spectrum regions. Quantization of energy and energy levels. Definition of terms. Elements of atomic theory, Hydrogen atom, Bohr theory, Sommerfield's refinements, Lorentz formula.	1-2	a5	b5		
• Fine & hyperfine structure, line splitting, selection rules, electron spin, Pauli Excln. many elec. spc. Zeeman effect, Paschen-Back effect, periodic table, Hyperfine structure& Nuclear spin, Isotopic effect	3-6	a6			D3
•Basics of practical spectroscopy, atomic emission methods, related spectral terms, instrumentation. Excitation sources; flame, d.c.arc, a.c.arc, a.c. spark; discharge tubes; hollow cathode, atomic beams & Lasers.	7-9	a6		c3	
• Monochromators; prisms and diffraction gratings. Detectors; photographic & photoelectric.	10-12	a7	b5	c3	d3
• Qualitative & quantitative spectroscopic analysis.	13,14	a7	b5	c3	d3

Lecturer: Dr. Mohamed Mansour Head of Department: Prof. Dr. Mohamed Madkour