



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Geometrical Optics		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UoB12345		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	Lasers and Optoelectronics	College	Engineering
Module Leader	Dr. Sarmed .K	e-mail	Nawal.Naji@alayen.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Assistant Lecture
Module Tutor		e-mail	Nawal.Naji@alayen.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	



Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	To introduce an obvious idea about different optical laws and properties as well as most of elements and devices that concern lasers as one of the optics science branches in order to insure how to apply these instruments for laser systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental principles of optics, including geometrical optics, wave 2. optics, and quantum optics. 3. 2. Apply basic concepts of optics to real-world situations, including the analysis of 4. optical systems and devices. 5. 3. Learn about the properties of optical materials, including their refractive index and 6. optical absorption. 7. 4. Understand the principles of light propagation and polarization. 8. 5. Analyze the behavior of light in various optical systems, including lenses, mirrors, and 9. prisms. 10. 6. Learn about the principles of interference and diffraction and their applications in 11. optics.
Indicative Contents المحتويات الإرشادية	The Propagation of Light: Introduction, Rayleigh Scattering, Reflection, Refraction, Fermat's Principle, Total Internal Reflection, Optical Properties of Metals Familiar Aspect s of the Interaction of Light with Matter, Photons, Waves and Probability (4hrs) Geometrical Optics: Lenses, Stops, Mirrors, Prisms, Fiber optics Optical systems, Wave front Shaping, Gravitational Lenses, Thick, lenses and Lens system, Analytical Ray Tracing, Aberrations, GRIN system (8hrs). Polarization: The Nature of Polarized Light, Polarizers, Dichroism Birefringent , Scattering and Polarization, Polarization by Reflection, Retarders, Circular Polarizer, Polarization of polychromatic light, Liquid Crystals, A mathematical Description of Polarization (6hrs) Interference: General Considerations, Conditions of Interference Wavefront-Splitting Interferometers, Amplitude-Splitting, Interferometers, Types and Localization of Interference Fringes, Multiple-Beam Interference, Applications of Interferometry (4hrs) Diffraction: Fraunhofer Diffraction, Fresnel Diffraction, Kirchhoff's Scalar Diffraction Theory, Boundary Diffraction Waves Rectangular Aperture, Circular Aperture, Resolving Power, Telescope, Dispersion

	(4hrs)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	16% (10)	Continuous	All
	Assignments	4	16% (10)	Continuous	All
	Seminars	1	4% (10)	Continuous	All
	Report	1	4% (10)	Continuous	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Nature and Propagation of Light
Week 2	Mirrors, type of mirrors , mirror formula
Week 3	The Lenses , type of Lenses ,This LENSES eqations
Week 4	Polarization of light
Week 5	Interference of light
Week 6	Diffraction of light
Week 7	Exam 1
Week 8	Introduction to Telescopes and Microscopes
Week 9	crystal optics
Week 10	Refraction of light
Week 11	Description of ray paths
Week 12	Wave description and calculation of phase and amplitude of the wave field
Week 13	Interactions of light with matter
Week 14	Diffraction of light
Week 15	Applications of Fresnel equations
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Optics, 4th ed., Eugene Hecht 2002 2- Introduction to Modern Optics, 2nd ed., Grant Fowles	

	3- Fundamentals of Optics, 4th ed., Francis A. Jenkins	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				