

مختصر توصيف المقرر

(Course Information)

معلومات المقرر \*

	فيزياء الليزر	اسم المقرر:
	فيز 3552	رقم المقرر:
	فيز 2512	اسم ورقم المتطلب السابق:
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	الخامس	مستوى المقرر:
	(0+0+3) 3	الساعات المعتمدة:
<b>Module Title:</b>	Laser Physics	
<b>Module ID:</b>	PHYS 3552	
<b>Prerequisite (Co-requisite):</b>	PHYS 2512	
<b>Co-requisite:</b>	--	
<b>Course Level:</b>	Fifth	
<b>Credit Hours:</b>	3 (3+0+0)	



Module Description

وصف المقرر :

Absorption and Emission of light, Einstein Relations, Population inversion, Gain coefficient, Optical resonator, Laser Modes, solid state lasers, semiconductor lasers, Gas lasers, Dye lasers, Free electron laser and some new lasers. Laser beam properties, Line width, Divergence, coherence, Brightness, focusing properties of laser, Q-switching, Frequency doubling, Phase conjugation. Applications: medical, industrial, Military, Scientific, Holography and compuncions

Module Aims

أهداف المقرر :

<p>Aim of this module is to give fundamental understanding of Laser Physics by covering the following details</p> <ul style="list-style-type: none"> <li>• Absorption and Emission of light, Einstein Relations, Population inversion, Gain coefficient,</li> <li>• Optical resonator, Laser Modes,</li> <li>• Solid state lasers, semiconductor lasers, Gas lasers, Dye lasers, Free electron laser and some new lasers.</li> <li>• Laser beam properties, Line width, Divergence, coherence, Brightness, Focusing properties of laser,</li> <li>• Q- switching, Frequency doubling, Phase conjugation.</li> <li>• Applications: medical, industrial, Military, Scientific, Holography and compuncions</li> </ul>	
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Learning Outcomes:

مخرجات التعليم:

<p>After successful completion of this module student will be able to understand theoretical and some experimental aspects of Laser Physics covered in the following contents.</p> <ul style="list-style-type: none"> <li>• Absorption and Emission of light, Einstein Relations, Population inversion, Gain coefficient,</li> </ul>	
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<ul style="list-style-type: none"> <li>• Optical resonator, Laser Modes,</li> <li>• Solid state lasers, semiconductor lasers, Gas lasers, Dye lasers, Free electron laser and some new lasers.</li> <li>• Laser beam properties, Line width, Divergence, coherence, Brightness, Focusing properties of laser,</li> <li>• <math>Q</math>- switching, Frequency doubling, Phase conjugation.</li> <li>• Applications: medical, industrial, Military, Scientific, Holography and compunctions</li> </ul>
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**Course Contents:**

محتوى المقرر:

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)
3	1	Absorption and Emission of light, Einstein Relations,
3	1	Population inversion, Gain coefficient,
6	2	Optical resonator, Laser Modes,
9	3	Solid state lasers, semiconductor lasers, Gas lasers, Dye lasers, Free electron laser and some new lasers.
9	3	Laser beam properties, Line width, Divergence, coherence, Brightness, Focusing properties of laser,
2	2	$Q$ - switching, Frequency doubling, Phase conjugation.
2	2	Applications: medical, industrial, Military, Scientific, Holography and compunctions

**Textbook and References:**

المقرر والمراجع المساندة:

سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم الكتاب المقرر Textbook title
(2010) ISBN-10: 0198506929	Oxford	Simon Hooker and Colin Webb	Laser Physics
سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم المرجع Reference
(1987) ISBN: 013523705X	Prentice Hall	J. Willson and J. F. B. Hawkes	Lasers: principles and applications
(1989) ISBN: 0486659577	Dover Publications	Grant R. Fowles	Introduction to modern physics
(2009) ISBN: 0470177985	Wiley	Elijah Kannatey-Asibu Jr.	Principles of Laser Materials Processing

