

مختصر توصيف المقرر

(Course Information)

معلومات المقرر \*

	الفيزياء الحيوية	اسم المقرر:
	فيز 2622	رقم المقرر:
	فيز 2032	اسم ورقم المتطلب السابق:
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	الرابع	مستوى المقرر:
	(0+0+3)3	الساعات المعتمدة:
<b>Module Title:</b>	Biophysics	
<b>Module ID:</b>	PHYS 2622	
<b>Prerequisite (Co-requisite):</b>	PHYS 2032	
<b>Co-requisite:</b>	--	
<b>Course Level:</b>	Fourth	
<b>Credit Hours:</b>	3 (3+0+0)	



Module Description

وصف المقرر :

Biomechanics Forces affects on our bodies. Vector analysis. Levers and equilibrium of rigid bodies. Stress-strain curve. Young's and Shear modulus for materials and biological tissues. Stress-Strain Curve - Young's and Shear Modulus for materials and applications. Properties of Fluid. Viscosity and Surface tension. Bernoulli's Equation and its applications. Effect of gravity and acceleration on blood pressure. Nature of sound and sound intensity level. Ultra-sound, production and its applications in diagnostic and treatment. Nervous system. And electricity within the body. Equilibrium potential and Nernst equation. Factors affecting the propagation of action potential. Action potential measurements of some organs; EGG, EEG and ERG. Nonionizing Radiation, Physical and biological effects.

Module Aims

أهداف المقرر :

1	To provide a broad overview of biophysics, an explanation of how forces effects on our bodies, a description of current methods of analysis of the properties of Living tissue	
2	To provide a broad overview of nerve biophysics, an explanation of how nerve cells process information, a description of current methods of analysis of the properties of nerve cells and examples of how physical techniques and methods of analysis can be applied in unfamiliar areas.	
3	Introduce the mathematical tools used in their analysis	

Learning Outcomes:

مخرجات التعليم:

1	<ul style="list-style-type: none"> <li>Understand the concepts of Biomechanics Forces affects on our bodies and vector analysis.</li> </ul>	
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	<ul style="list-style-type: none"> <li>• Be able to analyse Levers and equilibrium of rigid</li> </ul>	
2	<ul style="list-style-type: none"> <li>• Understand Stress-strain curve. Young's and Shear modulus for materials and biological tissues. Stress-Strain Curve - Young's and Shear Modulus for materials</li> <li>• Know the properties of Fluid. Bernoulli's Equation and its applications. Effect of gravity and acceleration on blood pressure</li> <li>• Understand Viscosity and Surface tension.</li> </ul>	
3	<ul style="list-style-type: none"> <li>• Have a general understanding of the overall anatomy of the brain</li> <li>• Understand the different types of membrane potential and have an understanding of the basic structure of nerve membranes</li> <li>• Understand the basic thermodynamics of ionic diffusion across nerve membrane and know the difference between passive and active transport</li> <li>• Have an appreciation of the different techniques used to measure neural activity and understand the meaning of the membrane time constant</li> <li>• Understand the derivation of the Nernst equation</li> <li>• Understand the derivation of the constant-field equation</li> <li>• Understand the origin of the resting membrane potential</li> </ul>	
4	<ul style="list-style-type: none"> <li>• Understand how nerve impulses are generated and sustained</li> <li>• Understand how synapses function and understand how ligand-gated ion channels lead to changes in membrane potential and excitability</li> <li>• Understand the interactions between synaptic and intrinsic conductance</li> </ul>	
5	<ul style="list-style-type: none"> <li>• Have a broad understanding of synaptic plasticity and have a broad understanding of the mechanisms of general anaesthesia and natural sleep</li> <li>• Understanding non-ionizing Radiation, Physical and biological effects.</li> </ul>	

**Course Contents:**

**محتوى المقرر:**

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)
9	3-1	CHAPTER 1: Biomechanics Forces affects on our bodies. Vector analysis. Levers and equilibrium of rigid bodies.
12	4-7	CHAPTER 2: Stress-strain curve. Young's and Shear modulus for materials and biological tissues. Stress-Strain Curve - Young's and Shear Modulus for materials and applications.
9	10-8	CHAPTER 3: Properties of Fluid. Viscosity and Surface tension. Bernoulli's Equation and its applications. Effect of gravity and acceleration on blood pressure.
12	14-11	CHAPTER 4: Nature of sound and sound intensity level. Ultra-sound, production and its applications in diagnostic and treatment.
12	17-15	CHAPTER 5: Nervous system. And electricity within the body. Equilibrium potential and Nernst equation. Factors affecting the propagation of action potential. Action potential measurements of some organs; EGG, EEG and ERG. Nonionizing Radiation, Physical and biological effects.

**Textbook and References:****المقرر والمراجع المساندة:**

سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم الكتاب المقرر Textbook title
(2002) ASIN: B000VHVMDG	Wiley	Rodney Cotterill	Biophysics: An Introduction
سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم المرجع Reference
(1999) ISBN: 094483891X	Medical Physics Pub. Corp.	John R. Cameron, James G. Skofronick and Roderick M. Grant	Physics of the Body (Medical Physics Series)
(2008) ASIN: B001UX79LO	McGraw-Hill Medical	Thomas E. Johnson and Herman Cember	Introduction to Health Physics
(2002) ISBN: 1402002181, 9781402002182	Springer	V. Pattabhi, N. Gautham	Biophysics

