

International School of Medicine / Medicine (English)

2023 - 2024 Academic Year

BIOPHYSICS

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
BIOPHYSICS	ISM2012711	Yearly	24+0	0	2
Prerequisites Courses					
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Committee Course				
Course Coordinator					
Name of Lecturer(s)					
Assistant(s)					
Aim	The main objective of this course is to provide the student with a clear and logical presentation of the concepts and methods of muscular-skeletal biophysics and biophysics of nervous system.				
Course Content	This course contains; The overall structure of the nerve cells of the nerve cell membrane structure ,Action potentials in neurons, signal transduction, neurotransmitter agents and their direct-indirect effects on neurons,Muscle biophysics and its dynamics,Skeletal Muscle, smooth muscle, hearth muscle differences,EMG,Nervous system general organization,Action Potential, Nerst Equation, Goldman Equation,Biophysics of Visual System,Biophysics of Auditory System,Radiation biophysics: Light bilateral (both particle and wave) nature,Electromagnetic Spectrum: cosmic rays, gamma rays, X-rays, ultraviolet, visible rays, infrared, microwaves and radio waves,CT, X-Ray,MR, fMRI, PET,EEG, Event Related Potentials,EEG, Event Related Oscillations.				
Course Learning Outcomes		Teaching Methods	Assessment Methods		
The students will learn the Biophysics of Vision		10, 14, 16, 19, 9	A		
The students will learn the Biophysics of Auditory System		10, 14, 16, 19, 9	A		
5.Will understand Structural and Functional Neuroimaging techniques,MRI, X-Ray,fMRI, PET, MEG and EEG		10, 14, 16, 19, 9	A		
1. In this course, students:1. Will be able to learn the overall structure of the nerve cell, nerve cell membrane structure and properties, ion channels and their types in neurons, formation of action potentials that occur through these ion channels and the EEG recording method.		10, 14, 16, 19, 9	A		
2. Will be able to understand muscle Biophysics and dynamics, skeletal muscle cells structure, molecules that play a role in the sliding filament theory, skeletal muscle cells action potential, communication between muscle cells and neurons, EMG recording method.		10, 14, 16, 19, 9	A		
6. will be able to learn about definition of radiation and its the types, electromagnetic spectrum, the radiation dose units, its the advantages and disadvantages and its use medicine.		10, 14, 16, 19, 9	A		
Teaching Methods	10: Discussion Method, 14: Self Study Method, 16: Question - Answer Technique, 19: Brainstorming Technique, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam				
Lecture Schedule					
Sequenc e	Topics	Preliminary Preparation			
1	The overall structure of the nerve cells of the nerve cell membrane structure				
2	Action potentials in neurons, signal transduction, neurotransmitter agents and their direct-indirect effects on neurons				
3	Muscle biophysics and its dynamics				
4	Skeletal Muscle, smooth muscle, hearth muscle differences				
5	EMG				
6	Nervous system general organization				
7	Action Potential, Nerst Equation, Goldman Equation				
8	Biophysics of Visual System				
9	Biophysics of Auditory System				
10	Radiation biophysics: Light bilateral (both particle and wave) nature				
11	Electromagnetic Spectrum: cosmic rays, gamma rays, X-rays, ultraviolet, visible rays, infrared, microwaves and radio waves				
12	CT, X-Ray				
13	MR, fMRI, PET				
14	EEG, Event Related Potentials				
15	EEG, Event Related Oscillations				
Evaluation Methods		Weight(%)			
Midterm Exam		40			
General Exam		60			

Resources
Biyo fizik, Ferit Pehlivan, Hacettepe Taş Kitapevi. Nörobiyofizik, Ferhan Esen-Hamza Esen, Ankara Nobel Tıp Kitapevi, Biophysics Roland GlaserPower Point slides