وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

الجامعة: وارث الانبياء (ع)
الكلية/ المعهد: كلية الطب
القسم العلمي: الفسلجة الطبية وطب الفضاء
للعام الدراسي : 2025-2026
تاريخ ملأ الملف:2025/12/23

التوقيع:
المعاون العلمي: أ.م.د علي عبد الرضا الغرة

التاريخ : 23 \ 12 \ 2025

التوقيع :
رئيس الفرع
التاريخ : 23 \ 12 \ 2025

دقق الملف من قبل
مدير شعبة ضمان الجودة والأداء الجامعي
ا.د.علي موسى مهدي
٢٠٢٥ / ١٢ / ٣

مصادقة السيد العميد
الاستاذ الدكتور
علي عبد سعدون
23 \ 12 \ 2025

Course Description Form

1. Course Name:
Medical Physics
2. Course Code:
MED-102
3. Semester / Year:
First and second semesters for 1st year
4. Description Preparation Date:
2-8-2025
5. Available Attendance Forms:
Direct attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
120 hours/ 6 units
7. Course administrator's name (mention all, if more than one name)
Name: Prof Dr. Ahmed Jumaah Mhawes Email: ahmed.jumaah@uowa-edu.iq
8. Course Objectives

Course Objectives	• introduce fundamental principles of physics relevant to medical sciences. • Develop understanding of physical concepts underlying human physiology and diagnostic techniques. • Relate physical laws to medical applications such as imaging, radiation, biomechanics, and instrumentation. • Enhance problem-solving skills and analytical thinking in a medical context. • Provide a foundation for advanced courses in medical and clinical sciences.

9. Teaching and Learning Strategies

Strategy	• **Lectures:** Present core concepts with real-life medical examples. • **Interactive Discussions:** Encourage questions and clarify doubts. • **Problem-Solving Sessions:** Apply physics to medical scenarios and case studies. • **Demonstrations & Simulations:** Visualize principles like radiation, mechanics, and electricity in medicine. • **Assignments & Quizzes:** Reinforce understanding and promote continuous learning. • **Laboratory Sessions :** Hands-on experiments for practical understanding of medical physics concepts.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	3	Modeling Measuremen	Terminology	Theory lectures practica Small groups	Quizzes Monthly written exa mid coarse exam
2nd	1	Describe how muscles and bo	Forces on and in the boc		
	2	operate to produce body movements	Simple pendulum		
3rd	1	Gives examples of levers in t	Forces on and in the boc		
	2	muscular-skeletal system of t body.	Simple pendulum Revie		
4th	1	Provide a simple analysis of:	Forces on and in the boc		
	2	(a) The forces involved in standing, lifting and bending. (b) The interactions of the bo with the ground in walking ar running	Skill lab-skeleton		
5th	1	1. What is the bone made of?	Physics of skeleton		
	2		Tutor lab –measure bon tension		
6th	1	How strong are your bones?	Physics of skeleton		
	2		Tutor lab –measure bon tension Review		
7th	1	Lubrication of bone joints.	Physics of skeleton		
	2	Measurements of bone miner the body.	Skill lab-bone joints		
8th	1	1. Estimate the power typical provided by muscle.	Energy , Work ,and Pov of the Body		
	2	2. Describe how the body maintains a constant tempera	Specific heat capacity		

		and give examples of how th may be assisted			
9th	1	3 Conservation of Energy in t Body	Energy , Work ,and Pow of the Body		
	2		Specific heat capacity Review		
10th	1	1. Give a simple description o the human circulatory system including typical blood pressu and flow rates, and give exam of the diagnostic importance their measurement 2. Describe the use of the sphygmomanometer to measu blood pressure	Pressure		
	2		Laboratory Boyle's law		
11th	1	3. Give examples of other flu pressures within the body 4. Give examples of invasive methods of measuring blood pressure, including those usin resistance, capacitance and inductance transducers	Pressure		
	2		Skills – B.P different methods		
12th	1	5. Give examples of other flu pressures within the body.	Pressure		
	2		Skills – B.P different methods Review		
13th	1	1. Describe the action of the h as a pump to the circulation system. 2. Ohms law	The physics of Cardiovascular System		
	2		Stock law (viscosity)		
14th	1	3. Blood flow 4. Blood viscosity	The physics of Cardiovascular System		
	2		Stock law (viscosity) Review		
15th	1	5. How fast dose your blood flow? 6. Poiseuilles law 7. Work done by the heart	The physics of Cardiovascular System		
	2		Poiseuilles law		
Mid Term Exam					
16th	2	1. Give an illustrated account the origin of biopotentials in human nervous system. 2. Describe the method of measuring an electrocardiogr (ECG), recall its main feature and explain its use in diagnos 3. Give examples of other measurements of the body's electrical activity, and of the therapeutic use of electricity	Electricity within the Bo		
	2		Tutor lab-nerve conduct (AP)		
17th	2	4.Type of nerve fibers (myelinated and unmyelinated nerves) 5.Factors affect speed of acti potentials 6. Electromyogram (EMG). 7.The heart beat 8. What's a dipole? 9. Measurements of the volta associated with a dipole. 10.Electrical events of a hear cycle	Electricity within the Bo		
	2		Cathode ray oscilloscop (CRO)		
18th	2	Sound in Medicine	Sound in Medicine		
	2	Physics of Hearing	Velocity of sound		
19th	2	1. Use the following scientifi terms correctly: total internal reflection, coherent, numeric aperture, resolution, and laser 2. Explain the principles of th transmission of light by optic fibers	Light and vision in Med		
	2		Refractive index		
20th	2	3. Describe how the fiber opt endoscope is constructed; compare the operation of the	Light and vision in Med		
	2		Visual acuity		

		video endoscope which uses charge couple devise. 4. Give examples of the use o endoscope in diagnosis and treatment. 5- Explain the principles of operation of the laser and giv examples of its medical application			
21st	2	Heat and cold in medicine . 1-The airways. 2. Lung volumes	Heat and cold in medici The Physics of Lungs a Breathing		
	2		Focal length		
22nd	2	3. Pressure airflow volume relationships of the lungs	The Physics of Lungs a Breathing		
	2	4. Physics of the alveoli. 5.The breathing mechanism 6. Airway resistance	Surface tension		
23rd	2	7. Work of breathing. 8. Physics of some common l diseases.	The Physics of Lungs a Breathing Radiation (introduction)		
	2	Radiation (introduction)	Tutor lab –PFT		
24th	1	1.Physics of diagnostic x-ray	Radiation		
	2	ray production 2.X-ray interaction with mate	Hospital visit (CT scan ray)		
25th	2	3.Using x-ray in diagnosis 1.Terminology 2. Properties of alpha, beta a gamma radiations.	Radiation Physics of Nuclear Medicine(Radioisotopes Medicine)		
	2	3. Give an example of produc of radionuclides	Gamma ray		
26th	2	4. Production and use of technetium-99 and iodine-13	Physics of Nuclear Medicine(Radioisotopes Medicine)		
	2	5. Uses of radioisotopes for diagnosis and therapy 6.Introduction to MRI & PE Scan	Hospital visit (MRI)		
27th	2	1. Define, know the units of, use in calculations, the follov	Radiation Protection in Medicine		
	2	terms: activity, exposure, absorbed dose, dose equivale exposure rate constant 2. Use the following terms correctly: committed dose equivalent, effective dose equivalent, collective dose equivalent, linear energy tran quality factor, relative biolog effectiveness.	Radiation Dose measurement		
28th	2	3. The background levels of radiation, and give examples	Radiation Protection in Medicine		
	2	some common medical doses such as chest X-ray. 4. Discuss, in general terms , by giving examples, the relationships between radiati levels and the incidence of damage or disease.	Laser 1		
29th	2	5. The general principles und which the use of radioisotope	Radiation Protection in Medicine		
	2	permitted, and gives example maximum permitted dose lev	Laser 2		
30th	4	Medical Physics pre-exam general revision			
Final Examination					

11. Course Evaluation

70 marks for final exam and 30 marks for mid exam

12. Learning and Teaching Resources

Required textbooks (curric books, if any)	"Medical Physics" by R. K. Hobbie & B. R. Roth – Fundamental concepts and clinical applications.

	"Introduction to Medical Physics" by Paul Suetens – Focus on imaging and instrumentation. "Physics in Medicine & Biology" by R. P. M. Larkin – Covers radiation, imaging, and physiology applications
Main references (sources)	Khan, F. M. "The Physics of Radiation Therapy" – For radiol and radiation principles. Hall, E. J. & Giaccia, A. J. "Radiobiology for the Radiologist" – Radiation effects in medicine. Bushberg, J. T., Seibert, J. A., Leidholdt, E. M., & Boone, J. M. " Essential Physics of Medical Imaging" – Imaging physics and techniques. .
Recommended books and references (scientific journals, reports…)	Journal articles: Physics in Medicine & Biology, Medical Phy Journal.
Electronic References, Website	Online resources: WHO, IAEA medical physics guidelines

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