Course Description/ First Year Medical Physics/Second semester

Course Instructor: Professor Dr. Hussein Nasser Khalaf Al-Salman

Subject: Medical Physics

This course description provides a concise summary of the main course features and the learning outcomes expected of the student, demonstrating whether the student has made the most of the available learning opportunities. It must be linked to the program description.

1. Educational institution	College of Science - Shatt al-Arab University
2. Scientific Department/Center	Physics
3. Course Name/Code	Medical Physics
4. Available attendance forms.	In-person + online
5. Chapter/Year	2024-2025
6. Number of study hours (total)	hours 30
7. Date this description was prepared.	2025

8. Course objectives

1. Learn the basics of radiation physics

2.Identify the applications of radiation physics.

9.Course outcomes, teaching, learning and assessment methods

A- Cognitive Objectives

1. The student will learn about the various laws of radiation physics and their applications in the human body.
2. The student will learn about the applications of the laws of radiation physics to the locations and parts of the human body's organs.
-3. The student will learn about the general and specific details of the human body's response to radiation in both healthy and diseased states.

B- Course Skill Objectives

1. The student will acquire a skill in understanding the laws of radiation.
2-The student will acquire a skill in how to work with the laws of physics.

C- Affective and Value-Based Goals

1- Work diligently and sincerely to achieve a distinguished academic level.
2-Make full use of all the resources and facilities available at the college or university.

Teaching and Learning Methods

1. Competitive seminars- Presentations
2.Lectures

Assessment Methods

1. Daily exams and surprise quizzes.
2. Termly exams.

D - General and transferable skills (other skills related to employability and personal development).
1. The student acquires the ability to gather and work with information.
2-The student acquires the ability to understand important aspects and how to deal with the laws of radiation physics in real life.

10.Course structure (theoretical)

week	hours	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
1	2hours	The student understands the subject	General concepts: physics method and standards; thermodynamic system and system properties	Presented lectures in PowerPoint format and written lectures	Daily exam
2	2hours	The student understands the subject.	Principle of conservation of energy; application of thermodynamics; zeroth law	Presented lectures in PowerPoint format and written lectures	Daily exam
3	2hours	. The student understands the subject	Pressure; Temperature and Temperature Scales [Celsius, Fahrenheit, Kelvin temperature equations for an ideal gas	Presented lectures in PowerPoint format and written lectures	Daily exam
4	2hours	The student understands the subject	Heat and energy effects; work and mechanical forms of work; power	Presented lectures in PowerPoint format and written lectures	Daily exam
5	2hours	The student understands the subject	The first law of thermodynamics; Boyle's law and Charles's law; practical exercises.	Presented lectures in PowerPoint format and written lectures	Daily exam
6	2hours	The student understands the subject	The Second Law of Thermodynamics; Reversible and Irreversible Processes	Presented lectures in PowerPoint format and written lectures	Daily exam
7	2hours	The student understands the subject	Entropy and enthalpy; internal energy; heat capacity and adiabatic process	Presented lectures in PowerPoint format and written lectures	Daily exam
8	2hours	The student understands the subject	The relationship between pressure, volume and temperature in an adiabatic process.	Presented lectures in PowerPoint format and written lectures	Daily exam

9	2hours	The student understands the subject	Fundamentals of Physics: Kinetic Theory of Gas; Electromagnetic Waves	Presented lectures in PowerPoint format and written lectures	Daily exam
10	2hours	The student understands the subject	Maxwell's equations; physical optics.	Presented lectures in PowerPoint format and written lectures	Daily exam
11	2hours	The student understands the subject	Radiation: Kirchhoff's Law; Planck's Law; Stefan-Boltzmann Law; Wien's Law	Presented lectures in PowerPoint format and written lectures	Daily exam
12	2hours	The student understands the subject	Black body and reflection; heat transfer (radiation, convection, conduction.(	Presented lectures in PowerPoint format and written lectures	Daily exam
13	2hours	The student understands the subject	X-ray production and X-ray spectra; X-ray absorption; UV and IR effects	Presented lectures in PowerPoint format and written lectures	Daily exam
14	2hours	The student understands the subject	Medical and biological effects of radiation; radiotherapy.	Presented lectures in PowerPoint format and written lectures	Daily exam
15			monthly exam		

11. Practical laboratory course					
week	**hours**	**Required learning outcomes**	**Unit name/topic**	**Teaching method**	**Evaluation method**
1	2practical	The student understands the subject	Verifying Ohm's law using a large resistance	Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
2	2practical	The student understands the subject		Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
3	2practical	The student understands the subject		Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
4	2practical	The student understands the subject		Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
5	2practical	The student understands the subject		Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
6	2practical	The student understands the subject		Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
7	2practical	The student understands the subject		Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
monthly exam					8
9	2practical	The student understands the subject	Blood sugar test	Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
10	2practical	The student understands the subject	The experience of a body falling through a viscous medium	Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
11	2practical	The student understands the subject	Calculating the refractive index of glass and calculating the refractive index of the medium	Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam

12	2practical	The student understands the subject	Blood viscosity assessment	Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
13	practical 2	The student understands the subject	How to calculate the hematocrit value on a special ruler	Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
14	practical 2	The student understands the subject	General review of medical physics topics	Presented lectures in PowerPoint format and written lectures	Make a report with a daily exam
15	monthly exam				

12. Infrastructure.

THE PHYSICS OF RADIATION THERAPY THIRD EDITION, 1993 FAIZ M. KHAN.	Required textbooks
RADIATION ONCOLOGY PHYSICS: INTERNATIONAL ATOMIC ENERGY AGENCY VIENNA, 2005 **Essential Nuclear Medicine Physics** **Rachel A. Powsner**, **Edward R. Powsner,** © 2006 Rachel A. Powsner and Edward R. Powsner Published by Blackwell Publishing Ltd	Main references (references)