Jordan University of Science and Technology
Faculty of Applied Medical Sciences
Radiologic Technology Department

RA742 Advanced Nuclear Medicine And Radiation Therapy - JNQF Level: 9

Second Semester 2022-2023

Course Catalog
3 Credit Hours. This course delves into the advanced concepts, technologies, and clinical applications of nuclear medicine and radiation therapy. Emphasis is placed on advanced imaging techniques, radiopharmaceuticals, radiation dosimetry, treatment planning, and quality assurance protocols. Students will explore the integration of nuclear medicine in diagnostics and therapeutic strategies for oncologic, neurologic, and cardiologic diseases. Topics include the use of SPECT, PET, and hybrid imaging systems (e.g., PET/CT), radionuclide therapies, and external beam radiation. Ethical considerations, patient safety, and radiation protection principles are also discussed. The course aims to provide students with the critical knowledge and clinical competencies required to analyze complex cases, optimize treatment plans, and operate in multidisciplinary healthcare settings.
Teaching Method: On Campus

Text Book	
Title	Essentials of Nuclear Medicine Physics, Instrumentation, and Radiation Biology
Author(s)	Rachel A. Powsner, Matthew R. Palmer, and Edward R. Powsner.
Edition	4th Edition
Short Name	Textbook
Other Information	

Instructor	
Name	**Dr. Maram Alakhras**
Office Location	-
Office Hours	Sun : 11:30 - 13:30 Mon : 11:30 - 13:30 Tue : 11:30 - 13:30 Wed : 14:30 - 16:00
Email	mmalakhras@just.edu.jo

Class Schedule & Room

Section 1:
Lecture Time: Tue : 13:30 - 16:30
Room: M4202

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction to Advanced Nuclear Medicine and Radiation Therapy	From **Textbook**
Week 2	Advanced Imaging Techniques: PET, SPECT, and Hybrid Systems	From **Textbook**
Week 3	Radiopharmaceuticals: Development and Clinical Use	From **Textbook**
Week 4	Radiation Physics and Dosimetry in Medical Applications	From **Textbook**
Week 5	Radiation Therapy Techniques: External Beam and Brachytherapy	From **Textbook**
Week 6	Treatment Planning Systems and Simulation Techniques	From **Textbook**
Week 7	Quality Assurance (QA) and Safety Protocols in NM and Radiation Therapy	From **Textbook**
Week 8	Oncologic Applications of NM and Radiation Therapy	From **Textbook**
Week 9	Neurologic and Cardiologic Applications	From **Textbook**
Week 10	Radionuclide Therapy and Targeted Treatments	From **Textbook**
Week 11	Ethical and Legal Aspects in NM and Radiation Therapy	From **Textbook**
Week 12	Advances in Technology: Artificial Intelligence and Machine Learning	From **Textbook**
Week 13	Case Studies and Multidisciplinary Collaboration	From **Textbook**
Week 14	Future Trends and Course Wrap-Up	
Week 15	Revision	
Week 16	Final Exam	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**
Analyze the physics and technology behind nuclear medicine procedures, including imaging and therapy applications. [1PLO M1] [1L9K1]	20%	first exam
Utilize advanced techniques in radiation therapy, including planning, delivery, and patient management protocols. [1PLO M2] [1L9S1]	15%	first exam, final exam
Implement safety measures and protocols to minimize radiation exposure for patients and healthcare staff. [1PLO M4] [1L9C6]	15%	second Exam
Examine the latest research and clinical practices in nuclear medicine and radiation therapy, including emerging technologies. [1PLO M5] [1L9K3]	10%	second Exam
Evaluate and implement appropriate patient preparation protocols to ensure safety and optimize imaging outcomes. [1PLO M3] [1L9S2]	20%	final exam

Interpret diagnostic images and results accurately, recognizing normal and abnormal findings. [1PLO M3] [1L9S3]	20%	final exam

Relationship to Program Student Outcomes (Out of 100%)						
PLO M1	PLO M2	PLO M3	PLO M4	PLO M5	PLO M6	PLO M7
20	15	40	15	10		

Relationship to NQF Outcomes (Out of 100%)					
L9K1	L9K3	L9S1	L9S2	L9S3	L9C6
20	10	15	20	20	15

Evaluation	
Assessment Tool	**Weight**
first exam	25%
second Exam	25%
final exam	50%

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