Course Title	**Advanced Radiopharmaceutical Chemistry**				
Course Code	**PHA421**				
Course Type	Pharmacy Elective				
Level	Integrated MSc (Level 2)				
Year / Semester	4th year / 8th Semester				
Teacher's Name	Dr Charalampos Triantis				
ECTS	6	Lectures / week	3	Laboratories/week	-
Course Purpose	The aim of the course is to provide students with knowledge of the principles and practice of radiopharmaceutical science. Specifically, it will equip students with the knowledge required to understand radioisotopes production and development of radiopharmaceuticals, participate in interdisciplinary discussions, and undertake research in the field. Recent scientific findings presented in selected scientific literature on the subject will also be discussed.				
Learning Outcomes	**By the end of this course, the students should be able to**: • Recognize the importance of radioactivity in diagnosis and therapy. • Distinguish the types of radioactive decay. • Explain the chemistry of radiopharmaceuticals. • Describe the production of radionuclides and the synthesis, quality control and radiopharmacology of radiopharmaceuticals. • Analyse the principles of radiation doses and protection. • Apply the Regulations and Pharmacovigilance for radiopharmaceuticals in Nuclear Medicine Practice • Critically describe scientific findings in radiopharmaceutical chemistry				
Prerequisites	PHA302	Corequisites	None		
Course Content	• Fundamental of nuclear science: a) Production of Radionuclides, e.g., generators, Cyclotron, etc. b) Radioactive decay, e.g., alpha-particle decay, gamma decay, etc. c) Radiation interaction with matter, e.g., photon interactions, attenuation of charged particles, etc. d) Detection and measurement of radiation, e.g., scintillation detectors, personal dosimeters, etc. e) Radiation doses and hazard assessments, e.g., effective dose, risk- related limits, etc. f) Medical applications, e.g., diagnostic imaging (SPECT and PET imaging), radionuclide therapy, etc. • Advanced Radiopharmaceutical chemistry and radiolabeling methods • Radiopharmaceutical design, formulation and manufacturing • Representative Radiopharmaceuticals of ^{99m}Tc, ^{18}F, ^{111}In, etc.: a) Quality control of Radiopharmaceuticals b) Radiopharmacology c) Diagnostic and therapeutic application of Radiopharmaceuticals				

	d) Theranostic applications • Principles of Radiation Protection and Dosimetry • Regulations and Pharmacovigilance for radiopharmaceuticals ❖ Specialized lectures on specific radiopharmaceutical topic by experts on the field
Teaching Methodology	Teaching/learning methods and strategies include: a) lectures, offering the theoretical background for a better perception. b) case studies, from development to application of new radiopharmaceuticals. c) directed reading, recent publications and results. d) tutorial, reviewing the lectures, Q&A, practice calculations, discuss the latest publications. All the methods above will be used to enhance students' participation.
Bibliography	**A. <u>Textbooks:</u>** • Chiotellis E. Radiopharmaceutical Chemistry. Greek Ed. Pigasos, 2000 • Saha G. Fundamentals of Nuclear Pharmacy. Springer, 7th Ed. 2018 **B. <u>References:</u>** • Radiochemistry and Nuclear Chemistry. Basic Principles and Applications. Misailidis P, Noli F. Ed. Ziti, 2020 • Teacher's notes • Recent scientific publications in international journals
Assessment	**All written exams include with open questions and multiple-choice questions** **Coursework (Midterm exam, small project and presentation) 50% Final written exam 50%** The evaluation of the course is performed by: a) a written mid-term exam during the semester, which examines specific modules of the course (30% of the overall grade), b) presentation of a project (20% of the overall grade), and c) a written final exam, which examines all course modules (50% of the overall grade). Students will be prepared for the mid-term and final exams through a tutorial, discussion, Q&A session and case studies related to the field of Radiopharmaceutical Chemistry. The final assessment of the students is formative and summative and is assured of complying with the expected learning outcomes and the quality of the course.
Language	Greek, English