BACHELOR'S PROGRAMME

MEDICAL CHEMISTRY

3ST YEAR OF STUDY, 2ST SEMESTER

COURSE TITLE	**RADIATION SOURCES USED IN DIAGNOSIS AND TREATMENT**
COURSE CODE	31010030050SL1223215
COURSE TYPE	full attendance
COURSE LEVEL	1st cycle (bachelor's degree)
YEAR OF STUDY, SEMESTER	3styear of study,2thsemester
NUMBER OF ECTS CREDITS	5
NUMBER OF HOURS PER WEEK	4 (2lecture hours + 2 seminar hours)
NAME OF LECTURE HOLDER	Lecturer PhD MirelaGOANŢĂ
NAME OF SEMINAR HOLDER	Lecturer PhD MirelaGOANŢĂ
PREREQUISITES	Metal chemistry bloc "s" and "p", Transition metal chemistry

A	**GENERAL ANDCOURSE-SPECIFICCOMPETENCES**
	General competences: The student: → Can pass on relevant scientific knowledge both written and oral → Can solve problems individually or as an active member in a team **Course-specific competences**: The student: → Is able to define an duse nomenclature, units and properties of radiation and radiochemistry → Can perform calculations in nuclear chemistry and utilize these in applied radiochemical sciences → Is able to assess radiation and radiation exposure from a radiation protection point of view
B	**LEARNINGOUTCOMES**
	• Can define radioactive decay processes and nuclear radiation • Knows the priciples of utilizing radioactivity applied to chemistry, chemical processes and adjacent fields where chemistry is an integral part • Knows the principles of radiation hygiene and the interaction of radiation and matter • Can update him self/her self on current methods in nuclear chemistry • Can definite the radiopharmaceuticals
C	**LECTURE CONTENT**
	Radioactivity in Nature. Nuclear Radiation. Radioelements, Isotopes and Radionuclides. Physical Properties of Atomic Nuclei and elementary particles. . Measurement of nuclear radiation. Radioactive decay.

	Artificial Radioactivity. Successive transformations. Nuclear reactions. Uses of radioisotopes in medicine. The main methods of diagnosis and treatment using radioactive isotopes. Scintigraphic diagnosis in oncology, detection by SPECT, PET and PET-CT techniques. Metabolic radiotransfer. Radiopharmaceuticals, which are studied throughout a radiopharmacy course, are radioactive drugs made up of an isotope and carrier molecule that can be safely put in the body. The role of the carrier molecule is to deliver the radioactive isotope to the area of the body that needs diagnosing or analysis. Students in a radiopharmacy course learn about radiopharmaceutical quality control. Students learn the characteristics of radiopharmaceuticals, how they are used in clinical settings and how to determine the correct dosage amounts.
D	**RECOMMENDEDREADING FOR LECTURES**
	1. K. H. Lieser, „Einfürung in die Kernchemie", Wiley, 2013 2. Werner Stolz, „Radioaktivität: Grundlagen-Messungen-Anwendungen", Teubner, 2005 3. D. L. Bailey, J.L. Humm, A. Todd-Pokropek, A van Aswegen, *Nuclear medicine Physics: A Handbook for Teachers and Students, IAEA 2014*
E	**SEMINAR CONTENT**
	Radiation protection and nuclear safety Calculation of radiation doses and thickness of protective screens. Determination of the absorption coefficient of γ radiation by Al, Fe, Pb. Determination of the half-life of a long-lived isotope. Determining the activity of a ^{60}Co source. Detection and staging by SPECT, PET (^{99m} Tc, Ga) and PET-CT.
F	**RECOMMENDEDREADING FOR SEMINARS**
	Alexandru Cecal, Karin Popa*, Lucrări practice de radiochimie*, Ed. Univ. "Alexandru Ioan Cuza" Iaşi, 2001 Set of applications corresponding to the seminar topics. D. L. Bailey, J.L. Humm, A. Todd-Pokropek, A van Aswegen, *Nuclear medicine Physics: A Handbook for Teachers and Students, IAEA 2014*
G	**EDUCATION STYLE**
LEARNINGANDTEACHINGMETHODS	Lectures, exercises and visits related to radioactivity will be provided
ASSESSMENTMETHODS	The exam contains theoretical questions to discuss and exercises to solve. Final exam: 60% Homework: 10% Quizzes: 30%
LANGUAGE OF INSTRUCTION	English / Romanian