SYLLABUS

1. Course title:

RADIOPHARMACEUTICALS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

3

5. Type of course:

○ Mandatory ◉ Elective

6. Prerequisites:

None

7. Class restrictions:

8. Duration / semester:

1 4

9. Weekly contact hours:

9.1. Lectures:	2
9.2. Seminars:	0
9.3. Laboratory/Practice classes:	0

10. Faculty:

Faculty of Pharmacy

11. Department/study program:

Pharmacy (integrated academic study I and II cycle)

12. Lecturer:

Dr.sc. Amra Džambić, assistant professor

13. Lecturer's e-mail:

amra.dzambic@untz.ba

14. Web site:

www.frmf.untz.ba

15. Course aims:

Introducing students to the necessary knowledge about radionuclides and radiopharmaceuticals. Understanding the basic concepts of radiopharmacy and application of acquired knowledge in the production and quality control of radiopharmaceuticals.

16. Learning outcomes:

Mastering the basic knowledge for the most successful application of radiopharmaceuticals, quality control and radiation protection.

17. Course content:

Sources and types of ionizing radiation in the biosphere. Types of radioactive decay. Alpha decay. Beta decay. Gamma decay and internal conversion. Physical quantities in radiopharmacy. Law of radioactive decay. Half-life. Effective half-life. Activity of a radioactive source. Absorbed dose. Kerma. Stopping power. Relative biological efficiency (RBE). Equivalent dose. Effective dose. Biologically significant fission and activation radionuclides.
Methods of application of radionuclides: direct or in the form of radiopharmaceuticals. Radiopharmaceuticals, definitions, basic characteristics and production. Radiopharmaceuticals for diagnostic purposes
Radiopharmaceuticals for therapeutic purposes. Effectiveness of therapy from physical, chemical and biological characteristics of radiopharmaceuticals. Diagnostic efficiency from physical, chemical and biological characteristics of radiopharmaceuticals. Biological aspects of radiation protection. Effects of radiation. Deterministic effects. Stochastic effects. Effects of dose and dose strength.

18. Learning methods:

Lectures, tests. Teaching will be done through lectures and exercises. Attendance is mandatory for all students, along with active participation in teaching. This includes solving specific tasks and problems, as well as a broader discussion.

19. Assessment methods:

Knowledge assessment consists of Activity, attendance at lectures, and taking two tests during the semester.Activity: 0–10 pointsSeminar paper: 0–10 pointsTest I: Sources and types of ionizing radiation in the biosphere. Types of radioactive decay. Alpha decay. Beta decay. Gamma decay and internal conversion. Physical quantities in radiopharmacy. Law of radioactive decay. Half-life. Effective half-life. Activity of a radioactive source. Absorbed dose. Kerma. Stopping power. Relative biological effectiveness (RBE). Equivalent dose. Effective dose. Biologically significant fission and activation radionuclides. 20–40 pointsTest II: Methods of application of radionuclides. Radiopharmaceuticals, definitions, basic characteristics and production. Radiopharmaceuticals for diagnostics. Radiopharmaceuticals for therapy. Efficiency of therapy depending on physical, chemical and biological characteristics of radiopharmaceuticals. Efficiency of diagnostics depending on physical, chemical and biological characteristics of radiopharmaceuticals. Biological aspects of radiation protection. Radiation effects. Deterministic effects. Stochastic effects. Effects of dose and dose rate. 20–40 points. Test I and Test II will be conducted during lectures, and the final exam will be conducted after the end of the semester.If a student does not achieve the minimum number of points in any of the knowledge assessments during the semester, each form of assessment may be taken within the final exam and makeup exams within regular exam periods.

20. Assessment components:

The final grade consists of: attendance and active participation in classes (lectures and exercises), passed tests and final exam.

< 55,00	5	F
55,00 – 64,99	6	E
65,00 – 74,99	7	D
75,00 – 84,99	8	C
85,00 – 94,99	9	B
95,00 – 100	10	A

21. Required reading list:

N. Vanlić-Razumenić, Radiofarmaceutici sinteze, osobine i primjena,
F. Adrović, Jonizujuće i nejonizujuće zračenje i njihovi biološki efekti
Gopal B. Saha, Fundamentals of Nuclear Pharmacy, fifth edition, Springer 2005,

22. Web sources:

23. Applicable starting from the academic year:

2018/2019

24. Adopted in the Faculty/Academy session:

17.11.2025.