Course ID: HRH476	**Course name: RADIOCHEMISTRY**		
Cycle: FIRST	**Year: FOURTH**	**Semester: VII**	**ECTS credits: 3**
Course status: MANDATORY		**Total course hours: 45** Lectures: 30 Laboratory: 15	
Teaching participants:	**Teachers and associates with expertise in the field to which the subject belongs**		
Prerequisite for enrollment:	-		
Course aims:	The aim of this course is to investigate the basic aspects of radiochemistry with an emphasis on the determination and application of radionuclides, the application of nuclear processes and radioactive materials, as well as radiation detection and the use of radiochemical techniques.		
Thematic course units:	Discovery of radioactivity (radiation, atomic nuclei, isotopes) Fundamentals of radioactive decay Types of radioactive decay Interaction of ionizing radiation with matter Natural radioactivity Artificial radioactivity (transmutation of atoms, sources of artificial radiation) Detection of radioactive radiation Biological effects of radiation Radionuclides (selected natural and artificial radionuclides of importance) Application of radioisotopes (in medicine, industry, science,…) Uranium (physico-chemical properties of uranium, compounds of uranium, radiation properties of uranium, artificial uranium isotopes, fission uranium, exploitation of uranium from ore, processing of uranium ore) Nuclear reactors		
Learning outcomes:	Knowledge: After the course the student will be able to understands the origins of nuclear instability and the basic aspects of radioactive decay; accept knowledge related to natural and artificial radioactivity; explain the ways in which radiation interacts with matter and the relationship between the nature of these interactions and radiation detections; explain and apply the acquired knowledge related to the detection of radioactive radiation, and the use of radiometric and radioanalytical techniques; acquire knowledge of uranium (from the process of exploitation to the moment of its use as a nuclear fuel) including the chemistry of uranium and its compounds; knows and explains the type of nuclear reactions; acquire knowledge related to physico-chemical and radiochemical properties of selected radionuclides Skills: Students should be able to use radioactive materials and		

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<tr><td></td><td>radiological measurement methods in their own work. They must be able to choose the most appropriate radiochemical methods and follow the necessary radiation protection principles when working with open radioactive sources.

Competences: The course gives permission for independent use of open ionizing radiation sources. Students should be able to choose the best possible radioactive nuclide for their studies based on energy, half-life and suitability. They must be able to choose the best possible measurement technique and radiochemical method, as well as use the correct radiation protection principles. The students will be able to prepare and present technical and scientific information, both orally and in writing, with the help of laboratory assignments.</td></tr>
<tr><td>Teaching methodology:</td><td>Auditory lectures, Laboratory exercises</td></tr>
<tr><td>Assessment methods and grading system[1]:</td><td>
<table>
<tr><td colspan="4">Grading criteria</td></tr>
<tr><td colspan="2">Criteria</td><td>Maximal score</td><td>Required score</td></tr>
<tr><td>1.</td><td>Class attendance</td><td>5</td><td>2,75</td></tr>
<tr><td>2.</td><td>Class activities</td><td>10</td><td>5,5</td></tr>
<tr><td>3.</td><td>Midterms</td><td>20; 25</td><td>11; 13,5</td></tr>
<tr><td>4.</td><td>Final exam</td><td>40</td><td>22</td></tr>
<tr><td colspan="2">Total</td><td>100</td><td>55</td></tr>
<tr><td colspan="4">Scores and grading</td></tr>
<tr><td colspan="2">Score</td><td>Grade (B&H)</td><td>Grade (ECTS)</td></tr>
<tr><td colspan="2">< 55</td><td>5</td><td>F, FX</td></tr>
<tr><td colspan="2">55–64</td><td>6</td><td>E</td></tr>
<tr><td colspan="2">65–74</td><td>7</td><td>D</td></tr>
<tr><td colspan="2">75–84</td><td>8</td><td>C</td></tr>
<tr><td colspan="2">85–94</td><td>9</td><td>B</td></tr>
<tr><td colspan="2">95–100</td><td>10</td><td>A</td></tr>
</table>
</td></tr>
<tr><td>Literature[2]:</td><td>Mandatory literature:
1. G. R. Choppin, J. O. Liljenzin, J. Rydberg (2002) Radiochemistry and Nuclear chemistry, (3rd edition), Elsevier Inc, USA
Supplementary literature:
1. W. D. Loveland, D. J. Morrissey, G. T. Seaborg (2005) Modern Nuclear Chemistry, John Wiley&Sons, USA
2. M. Nuhanović (2016) Uran u okolinskim uzorcima, Prirodno-matematički fakultet, Sarajevo
3. M. Nuhanović (2021) Osnove gamaspektrometrije sa praktikumom, Prirodno-matematički fakultet, Sarajevo
4. D. Billington, G. G. Jayson, P. J. Maltby, (1992), Radioisotopes,
5. Introduction to biotechniques series, BIOS scientific, USA
6. Š. Miljanić,(2008), Nuklearna hemija-skripta, Fakultet za fizičku hemiju, Beograd</td></tr>
</table>

[1] The grading structure for each subject is determined by the Council of the organizational unit before the beginning of the academic year in which the subject is taught as per Article 64, paragraph 6 of the Law on Higher Education of Sarajevo Canton

[2] The Senate of the higher education institution, as an institution, or the Council of the organizational unit of the higher education institution, as a public institution, determines by a special decision, which is published on its website before the beginning of the academic year obligatory, mandatory and recommended textbooks and manuals, as well as other recommended literature based on which exams are prepared and taken as per Article 56, paragraph 3 of the Law on Higher Education of the Sarajevo Canton

	7. E. Zovko, Z. Pujić, (2003), Radioaktivnost u prirodi, uran i osiromašeni uran, Prirodno matematički fakultet, Sarajevo 8. M. Jovanović, (1986), Kako da se zaštitimo od radioaktivnog zračenja, Medicinska knjiga, Beograd-Zagreb