



Course ID: HTH483	Course name: BIOTECHNOLOGY		
Cycle: FIRST	Year:FOURTH	Semester: VIII	ECTS credits: 5
Course status: MANDATORY		Total course hours: 75 Lectures: 45 Laboratory: 30	
Teaching participants:	Teachers and associates with expertise in the field to which the subject belongs		
Prerequisite for enrollment:	Introduction in biotechnology		
Course aims:	Fundamentals of biotechnology and biotechnological process and its application in the pharmaceutical industry, energy (fuels), mining, forestry, agriculture, chemical production		
Thematic course units:	Fundamentals of bioprocess engineering Basic of bioprocess (preparation and execution phases of the, process, final phase of the bioprocess) Bioreactors Production of fermented products Biotechnology in the pharmaceutical industry and medicine, production (hormones, antibiotics, monoclonal antibodies, interferons, ..) GMO Biotechnology in agriculture Biofuels Biomining Biotechnological production of chemicals		
Learning outcomes:	<p>Knowledge: Have an understanding of the multidisciplinary nature of biotechnology and the role of technology development in biotechnology; Have knowledge of the main elements of the global importance of biotechnology and its industries, categories of biotechnological processes and products, and the context of "traditional" and "modern" biotechnological processes; Be able to specify the categories of some biotechnological processes based on the resulting products and / or the process or substrate used and have detailed knowledge of examples of each of them; Describe the role of biotechnology in sustainable development and give examples of biotechnical applications in renewable energy, food production and waste decomposition; Be aware of some current and future issues concerning the relationship between biotechnology and government, investors, the environment and consumers and their impact on the development of future biotechnology; Be aware of opportunities, limitations and ethical issues in this area</p> <p>Skills: Students should be able to implement knowledge about principle and application of various types of Microscopy; To prepare basic type of nutrient Media for microorganism. To describe and produce biofuels from vegetable oils, yellow grease, used cooking oils, or animal fats; To produce</p>		

	<p>selected chemicals by using biotechnological methods.</p> <p>Competences: The course gives permission for independent laboratory production of selected biotech products and monitoring of parameters through production. They should be able to choose the best possible measurement technique for characterization of final products The students will be able to prepare and present technical and scientific information, both orally and in writing, with the help of laboratory assignments.</p>																																													
Teaching methodology:	Auditory lectures, Laboratory exercises																																													
Assessment methods and grading system¹:	<table border="1"> <thead> <tr> <th colspan="3">Grading criteria</th> </tr> <tr> <th>Criteria</th> <th>Maximal score</th> <th>Required score</th> </tr> </thead> <tbody> <tr> <td>1. Class attendance</td> <td>5</td> <td>3</td> </tr> <tr> <td>2. Class activities</td> <td>10</td> <td>5</td> </tr> <tr> <td>3. Midterms</td> <td>45</td> <td>25</td> </tr> <tr> <td>4. Final exam</td> <td>40</td> <td>22</td> </tr> <tr> <td>Total</td> <td>100</td> <td>100</td> </tr> <tr> <th colspan="3">Scores and grading</th> </tr> <tr> <th>Score</th> <th>Grade (B&H)</th> <th>Grade (ECTS)</th> </tr> <tr> <td>< 55</td> <td>5</td> <td>F, FX</td> </tr> <tr> <td>55-64</td> <td>6</td> <td>E</td> </tr> <tr> <td>65-74</td> <td>7</td> <td>D</td> </tr> <tr> <td>75-84</td> <td>8</td> <td>C</td> </tr> <tr> <td>85-94</td> <td>9</td> <td>B</td> </tr> <tr> <td>95-100</td> <td>10</td> <td>A</td> </tr> </tbody> </table>	Grading criteria			Criteria	Maximal score	Required score	1. Class attendance	5	3	2. Class activities	10	5	3. Midterms	45	25	4. Final exam	40	22	Total	100	100	Scores and grading			Score	Grade (B&H)	Grade (ECTS)	< 55	5	F, FX	55-64	6	E	65-74	7	D	75-84	8	C	85-94	9	B	95-100	10	A
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Literature²:	<p>Supplementary literature:</p> <ol style="list-style-type: none"> 1. Colin Ratledge, Bjorn Kristiansen, (2006), Basic Biotechnology (3rd Edition), UK, Cambridge 2. Daan J. Crommelin; Robert d. Sindelar; Bernd Meibohm; (2007), Pharmaceutical biotechnology, fundamentals and applications, Informa healthcare, New York 3. Lawrence K. Wang, Volodymyr Ivanov, Joo-Hwa Tay, (2010), Environmental Biotechnology, Vol.10, NY, USA 																																													

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