

<b>Title</b>	<b>Aquatic toxicity tests</b>						
<b>Code</b>	ZDIB16						
<b>Study Program</b>	Postgraduate study						
<b>Semester</b>							
<b>ECTS</b>	5						
<b>Status</b>	<input type="checkbox"/> obligatory <input type="checkbox"/> <u>elective</u>						
<b>Lecturer</b>	Dr. sc. Janja Horvatić, Associate Professor						
<b>Co-Lecturers</b>							
<b>Requirements for Enrolment</b>							
<b>Objectives</b>	Acquiring knowledge about the activities of the known factors on plant or animal test organism in the laboratory, as well as its potential impact on wildlife in the environment.						
<b>Learning Outcomes</b>	<p>After completing the course:</p> <ol style="list-style-type: none"> <li>1. Student will be able to describe the application and the significance of aquatic toxicity tests.</li> <li>2. Student will acquire knowledge of all types of tests that are recommended by the national legislation and EU</li> <li>3. Student will gain theoretical and practical experience related to the application of tests in the aquatic environment</li> <li>4. Students will be able to understand all key theoretical processes and practical aspects associated with identifying, understanding and assessing the impact of contaminants to water and sediments.</li> </ol>						
<b>Connection between Learning Outcomes, Curricular and Student Activities</b>	<b>Student Activities</b>	<b>ECTS</b>	<b>Learning Outcomes</b>	<b>Curricular Activities</b>	<b>Methods of Assessment</b>	<b>Credits*</b>	
						<b>min</b>	<b>max</b>
	Attending lectures	Presence in class with active participation	1-4	1,5	Record of attending	6	10
	Attending exercises	Active participation on exercises	2-3	1	Evaluation of completed tasks	12	20
	Knowledge test (written exam)	Preparation for written exams	1-4	1	Written exam	18	30
	Final exam	Preparation for final exam	1-4	1,5	Oral exam	24	40
	<b>Total</b>					<b>60</b>	<b>100</b>
<b>Consultations</b>							
<b>Learning Activities</b>	<b>Lectures</b>		<b>Seminars</b>		<b>Practice</b>		
<b>Hours</b>	10				5		
<b>Contents / Teaching Units</b>	The types of tests. The test organisms. Algae and macrophytes in aquatic toxicity tests. Algae as environmental indicators. Nutritional elements and the growth potential of algae in laboratory conditions. Laboratory bioassays. The degree of trophic level and toxicity of water: miniaturized bioassay. Single display toxicity of metals and xenobiotics on algae. Lemna test. Structural damage of unicellular algae treated with wastewater. Aquatic invertebrates and fish as a test organisms. Collection of animals in the field and maintenance in the laboratory conditions. Determination of mortality LC <sub>50</sub>						

	and LC <sub>100</sub> . Acute, sub-chronic and chronic poisoning. Histopathological changes. The biochemical changes as indicators of the intensity of toxicity. Working with individual toxicants (metals, petrochemical compounds, especially volatile aromatic hydrocarbons, pesticides). Statistical analysis of the data.
<b>Obligatory Literature</b>	Rand, G.M., 2016. Fundamentals of Aquatic Toxicology: Effects, Environmental Fate, and Risk Assessment, 3rd. Edition, Taylor & Francis. OECD GUIDELINES FOR THE TESTING OF CHEMICALS Alga, Growth Inhibition Test <a href="http://www.oecd.org/chemicalsafety/risk-assessment/1948257.pdf">http://www.oecd.org/chemicalsafety/risk-assessment/1948257.pdf</a> OECD GUIDELINES FOR THE TESTING OF CHEMICALS- Revised proposal for a new guideline 221 Lemna sp. Growth Inhibition Test ( <a href="http://www.oecd.org/dataoecd/16/51/1948054.pdf">http://www.oecd.org/dataoecd/16/51/1948054.pdf</a> )
<b>Recommended literature</b>	ISO 8692:2012 Water quality -- Fresh water algal growth inhibition test with unicellular green algae ISO 20079:2005 Water quality -- Determination of the toxic effect of water constituents and waste water on duckweed (Lemna minor) -- Duckweed growth inhibition test
<b>Requirements for Aquiring Signature</b>	Regular attendance of lectures and exercises.
<b>Type of Exam</b>	From all the elements of monitoring and checking the student can earn a maximum of 100 graded points in 100% of the grade. The ratings are calculated as follows: the teacher during the lectures monitors and evaluates the performance of each student which makes up 30% of the final grade, 30% of the final grade makes written exam and 40% of the final grade oral examination.
<b>Lectures Language</b>	Croatian
<b>Quality Monitoring</b>	The survey, where students evaluate the quality of teaching. Analysis of Students' exams.