

<b>Study program: Industrial Engineering</b>			
<b>Course title: Waste Management</b>			
<b>Professor/assistant: Ph DBiljana Milutinovic</b>			
<b>Type of course:</b> elective			
<b>ECTS credits:</b> 6			
<b>Pre-requisites:</b> -			
<b>Aims of the course:</b> Prepare students to: <ul style="list-style-type: none"> <li>- recognize both non-hazardous and hazardous waste and familiarize with sources of waste,</li> <li>- recognize non-hazardous and hazardous waste treatment techniques,</li> <li>- realize the possibilities of using waste as energy and secondary raw materials source</li> <li>- use all legislation and standards in the area of waste management.</li> </ul>			
<b>Learning outcomes:</b> Students are able to: <ul style="list-style-type: none"> <li>- apply the acquired knowledge of waste selection, recycling and composting of waste in practice,</li> <li>- apply the acquired knowledge of industrial and hazardous waste and their proper management in practice</li> <li>- design a waste management plan.</li> </ul>			
<b>Syllabus</b>			
<u>Theoretical part</u> Integrated waste management. Waste management hierarchy. Sources, characteristics, types and quantities of solid waste. Physical, chemical and biological properties of solid waste. Sources, types, properties and classification of hazardous waste. Collection, transportation and transfer of waste. Types of transfer stations. Primary and secondary selection of waste. Reduction of waste generation at source and material recovery. Material recovery facilities. Composting of waste. The process of composting. Disposal of waste to sanitary landfills. Classification of landfills. Waste disposal methods. Creation, control and separation of landfill gas. Exploitation of landfill gas. Exploitation of landfills. Mechanization at the landfill. Closing and remediation of the landfill. Thermal waste treatments. Waste incineration. Emission of gases during thermal treatment of waste. Composition of combustion products. Recycling materials from municipal waste. Basics of material recycling. Legislation in waste management.			
<u>Practical part</u> Practice, other forms of teaching, study research work			
<b>Literature</b>			
<ol style="list-style-type: none"> <li>1. S. Đarmati: Solid and hazardous waste (in Serbian), Belgrade polytechnics, Belgrade 2007.</li> <li>2. G. Vujić et al.: Waste management in developing countries (in Serbian), Faculty of Technical sciences Novi Sad, 2012.</li> <li>3. N. Jovičić: Solid waste management (in Serbian), Faculty of Mechanical Engineering Belgrade, 2005.</li> <li>4. Jovanović, Petrović, Vujanović, Waste materials logistics (in Serbian), Belgrade polytechnics, Belgrade 2012.</li> </ol>			
<b>Number of active classes</b>			Other forms of teaching:
Lectures: 3	Practical classes: 2	Research work:	
<b>Teaching methods</b> Combined, interactive approach with practical problem solving.			
<b>Grading system</b> (maximum 100 points), <b>grading scale</b> from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.			
<b>Pre-exam obligations</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
activity during theoretical lectures	<b>10</b>	written exam	<b>30</b>
practical training		oral exam	
colloquium(s)/seminar papers	<b>40+20</b>		
<b>Sum</b>	<b>70</b>	<b>Sum</b>	<b>30</b>