



University of  
Zagreb



University of Zagreb  
FACULTY OF MINING,  
GEOLOGY AND PETROLEUM  
ENGINEERING



1. GENERAL INFORMATION				
1.1. Course teacher	Tenured Professor Nediljka Gaurina-Međimurec, PhD		1.6. Year of the study	II.
1.2. Name of the course	Wellbore fluids		1.7. ECTS credits	5
1.3. Associate teachers	Teaching Assistant Petar Mijić, PhD		1.8. Type of instruction (number of hours L + E + S + e-learning)	28,5L+28,5E+0S+3e-learning
1.4. Study programme (undergraduate, graduate, integrated)	graduate		1.9. Expected enrolment in the course	15
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 3, 5% online
2. COUSE DESCRIPTION				
2.1. Course objectives	The student will acquire knowledge about cement slurries, well completion and workover fluids and well stimulation fluids. Student will be able to analyse the laboratory results and select appropriate fluid composition.			
2.2. Enrolment requirements and/or entry competences required for the course	Completed course <i>Drilling Engineering</i> , from the 1 <sup>st</sup> year of study.			
2.3. Learning outcomes at the level of the programme to which the course contributes	Independently solve complex engineering problems in petroleum engineering and geoenery engineering; Design wellbore for hydrocarbon and geothermal water exploitation; Assess the environmental impact of petroleum engineering and geoenery engineering; Plan the methods and procedures for avoiding or minimizing environmental impact of petroleum engineering and geoenery engineering activities.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Design cement slurries for different applications and HPHT conditions; Compare different well completion and workover fluids; Suggest acids and other well stimulation fluids; Formulate fluids in the laboratory and test their properties.			
2.5. Course content (syllabus)	Portland cement; Well cement; Cement slurry design; Properties of cement slurry (density, thickening time, rheological properties, filtration) and cement additives; Properties of set cement (permeability, compressive strength, sulphate resistance of set cement); Cements for geothermal wells; Well completion and workover fluids (solid-free fluids, solid-laden fluids, brines, packer fluids); Well stimulation fluids; Fracturing fluids and additives.			

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2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work		<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)		2.7. Comments:			
					-			
2.8. Student responsibilities	Active participation in lectures and laboratory exercises, writing preliminary exam, taking written and oral exams.							
2.9. Monitoring student work	Class attendance	YES		Research		NO	Oral exam	YES
	Experimental work	YES		Report		NO		
	Essay		NO	Seminar paper		NO		
	Preliminary exam	YES		Practical work		NO		
	Project		NO	Written exam	YES		ECTS credits (total)	5
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>					<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	Nelson, E.B., Guillot, D. (2000.): <i>Well Cementing</i> , Schlumberger, Houston, Texas. - selected chapters					NO	YES	
	Smith, D.K. (1990.): <i>Cementing</i> , SPE Monograph Series. - selected chapters					NO	YES	
	Bridges, K.L. (2000.): <i>Completion &amp; Workover Fluids</i> , Monograph Vol. 19, SPE. - selected chapters					NO	YES	
	M.J. Economides, K.G. Nolte (2000.): <i>Reservoir Stimulation</i> , Third edition, John Wiley & Sons Ltd, England. - selected chapters					NO	YES	
	Kalfayan, L. (2008.): <i>Production Enhancement with Acid Stimulation</i> , Penn Well, Tulsa, Oklahoma. - selected chapters					NO	YES	
2.11. Optional literature	OnePetro papers.							
2.12. Other (as the proposer wishes to add)	-							