

Description of an Individual Course Unit

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Study program		All, except Chemistry		
Module				
Type and level of studies		PhD studies		
Course title		Physical Metallurgy of Welding		
Professor (for lectures)		Zorica M. Cvijović		
Professor/assistant (for practice)				
Professor/assistant (for LAB)				
Number of ECTS		5	Type of the course (mandatory/elective)	Elective
Prerequisite				
Objective of the course The goal of this course is to provide a knowledge on the weld solidification that is a fundamentally different process to that of ingot casting, the welding parameters effect on the microstructure developed in weld metal, mechanisms and kinetics of phase transformations during thermal cycle of the base metal, mechanisms and causes of cracking. Such knowledge forms a useful basis for producing the welded joint with required characteristics.				
Learning outcomes of the course Students would be qualified to produce welded joint of required properties and without cracks by proper choice of the filler metal, welding parameters and heat treatment operations.				
Course Contents				
Theoretical contents Consider the heterogeneous structure of welded joint, solidification of fusion welds as a function of composition and welding parameters, phase transformations during cooling of weld metal, microstructural changes in heat-affected zone (HAZ), cracking and fracture in welds, residual stresses in welds, transformation and microstructure in welds of steels, aluminium, copper, magnesium, nickel and their alloys.				
Practical part (practices, LAB, study research work)				
Literature				
1	K. Easterling, "Introduction to the Physical Metallurgy of Welding", 2nd ed., Butterworth-Heinemann Ltd, Oxford, 1992.			
2	J.F. Lancaster, "Metallurgy of Welding", 5th ed., Chapman&Hall, London, 1993.			
3				
4				
5				
Number of ECTS				
Lectures	Practices	LAB	Study research work	Other activities
2				
Teaching Methods Lectures. Seminar is required to be done in conjunction with the lectures.				
Grading methods (max. number of points is 100)				
Pre-exam assesments	points	Final examination		points
activity during lectures		written exam		
practical assesments		oral exam		40
mid-term exams				
seminars	60			