

Study programmes: Master studies – Mathematics				
Course name: 2M4.04 - Mathematical Modeling				
Lecturers: Milan Dražić				
Status: Optional				
ECTS: 8				
Attendance prerequisites: Mathematical Modeling Basics, Differential Equations, Partial Differential Equations, Numerical Analysis 2A and 2B				
Course aims: Application of theoretical mathematics in development of mathematical models in various fields of applied mathematics as well as effective solving of these problems by numerical mathematics and optimization techniques.				
Course outcome: After completing this course, the student is able to construct mathematical models for many problems requiring the knowledge from undergraduate studies. Student is also able to apply modern numerical mathematics and optimization algorithms to solve these problems.				
Course content: Modeling with ordinary and partial differential equations. Fluid dynamics models. Conservational laws. Perturbations. Conformal mappings. Modeling with PDEs. Parameter estimation in mathematical models.				
Literature: A.B. Tayler: Mathematical Models in Applied Mechanics, Clarendon Press, 1986. J. Caldwell, D.Ng: Mathematical Modelling – Case Studies and Projects, Kluwer, 2004. S. Howison: Practical Applied Mathematics Modelling, Analysis, Approximation, Oxford University, 2003. A.v.d. Bos: Parameter Estimation for Scientists and Engineers, Wiley, 2007.				
Number of hours: 5	Lectures: 3	Tutorials: 2	Laboratory: -	Research: -
Teaching and learning methods: Frontal / Interactive / Exercises				
Assessment (maximal 100 points)				
Course assignments	points	Final exam	points	
Lectures	-	Written exam	-	
Exercises / Tutorials	-	Oral exam	50	
Colloquia	-	Written-oral exam	-	
Essay / Project	50			