

	Course name: MATH 528 Mathematical Modelling		Department: Mathematics				Semester 2
	Methods of Education						Credit (ECTS)
	Lecture	Recitation / (Etud)	Lab	Project/Field Study	Homework	Other	Total
	60	0		60	60	60	240
Language	English						
Compulsory/Elective	Elective						
Prerequisites	None						
Course Contents	The Modelling Process, Discrete Models, Difference Equations, Continuous Models, Ordinary Differential Equations Models						
Weekly Detailed Course Contents	Weeks	Subjects					
	1	Introduction to Mathematical Modelling					
	2	Difference Equations, Linear Models, Nonlinear Models					
	3	Cobwebbing, Analyzing Nonlinear Models					
	4	Linearization at an Equilibrium, Oscillations					
	5	Bifurcations, Variations on the Logistic model					
	6	Linear Models and Matrix algebra, Projection matrices and Structure Models					
	7	Models, Eigenvalues and Eigenvectors					
	8	Nonlinear models, Linearization and Stability					
	9	Nonlinear models, Linearization and Stability					
	10	Positive and Negative Interactions					
	11	ODE models, Exponential growth and logistic growth model					
	12	Slope fields and solution curves for the ODE s					
	13	ODE models qualitative analysis					
14	Continuous models for interacting species						
Course objectives	<p>The purpose of this course is to</p> <ul style="list-style-type: none"> provide an understanding how to relate mathematics with real life. explain the applications in different disciplines such as biology, ecology and medicine with mathematical models. identify the steady state behaviour of the models 						
Learning Outcomes and Competences	<p>Upon completion of this course students will</p> <ul style="list-style-type: none"> know the basics for the derivation of basic models. know the basic discrete and continuous model problems and their characteristics. be able to determine the steady state behaviour of the basic model problems. 						

Textbook and /or References	References : <ol style="list-style-type: none"> 1. E.S. Allman, J. A. Rhodes, Mathematical Models in Biology, An introduction, Cambridge University Press, New York, 2004. 2. J. D. Murray, Mathematical Biology I: An Introduction, Springer, New York, 2002. 3. J. D. Murray, Mathematical Biology I: Spatial Models and Biomedical Applications, Springer, New York, 2003. 4. J. R. Chasnov, Mathematical Biology Lecture Notes, The Hong Kong University of Science and Technology, 2009,2010. 5. E. D. Sontag, Lecture Notes on Mathematical Systems Biology, Rutgers University, 2010. 		
Assessment Criteria		If any, mark as (X)	Percentage (%)
	Midterm Exams	X	30
	Quizzes		
	Homeworks	X	15
	Projects	x	15
	Term Paper		
	Laboratory work		
	Other		
	Final Exam	X	40