Study Programme: Applied Mathematics (MB)

Course Unit Title: Modeling Seminar 1

Course Unit Code: MB05

Name of Lecturer(s): Dusan Jakovetic

Type and Level of Studies: Master Academic Degree

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 6

Prerequisites: -

Course Aims:

Provide students with necessary knowledge and skills to be able to formulate, analyze, and numerically implement selected mathematical models applicable to a wide range of real world systems. In addition, the course aims to improve students' abilities to work within groups, effectively communicate their results orally, and in writing.

Learning Outcomes:

The student gains a solid knowledge on selected principles and methods for the formulation and analysis of mathematical models of systems that arise in various application domains. The student has some insight into the possibilities for performing analytical and numerical computations based on the model. The student has ability and experience in implementing mathematical models in selected programming languages.

Syllabus:

Theory

Students will learn how to formulate and analyze selected classes of mathematical models. The covered mathematical tools include dimensional analysis, optimization, selected elements of probability and stochastic processes, as well as selected topics on differential equations. The taught concepts will be illustrated through modeling real-world problems from various domains including finance, engineering, and biology.

Practice

Students will gain ability and experience in simulating mathematical models in selected programming languages.

Required Reading:

[1] K. K. Tung: Topics in Mathematical Modeling, Princeton University Press, 2007

[2] J. Caldwell, D. Ng: Mathematical Modeling: Case Studies and Projects, Kluwer, 2004

[3] D. Edwards, M. Hamson: Guide to Mathematical Modelling, Palgrave, 2001

Weekly Contact Hours:	**Lectures: 1**	**Practical work: 5**

Teaching Methods:

Lectures; problem-solving sessions; students' team work on a selected real world problem, including oral and written presentation of the results; written reports by the students

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	Points	**Final exam**	points

Course project	60	written exam	40
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			