Course Unit Descriptor

Study Programme: Engineering Management

Course Unit Title: Models of decision-making and prediction in cases of uncertainty

Course Unit Code: IM1226

Name of Lecturer(s): Ljubo Nedović

Type and Level of Studies: bachelor

Course Status (compulsory/elective): elective

Semester (winter/ summer): summer

Language of instruction: english

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

Number of ECTS Allocated: 5

Prerequisites: none

Course Aims:.

Mastering students with the necessary theoretical knowledge in several areas of mathematics, which are needed to fully understand the decision-making process. Making good business decisions, understanding the mistakes and their causes that arise, as well as the ways to avoid them, is very important in practice, especially in the conditions of uncertainty and risk. In all this, predictive (standards and new) methods play a major role.

Learning Outcomes:

Acquired knowledge is the basis for understanding basic decision making techniques. They are trained to apply appropriate methods of decision-making and forecasting the behavior of the observed phenomena. They are trained to use the appropriate software and analyze the offered solutions and make efficient and effective business decisions.

Syllabus.

Decision (spotting problems, defining problems and goals, alternatives and informing about the environment and outcomes). Methods of selection under conditions of uncertainty. Decision-making at risk. Sequential decision making. Multitributable decision-making. Group decision making. Multi-criteria decision making. Expert decision-making systems and support software.

Fuzzy sets (fuzzy arithmetic, fuzzy logic, fuzzy measure). Neural networks. Genetic algorithms. Linear regression. Nonlinear regression. Fuzzy neural network. Fuzzy regression. Combined prediction models Dempster-Shafer decision theory. Fuzzy decision making.

Required Reading:

Relevant literature in English, tbd

Weekly Contact Hours:2	**Lectures: 3**	**Practical work: 2**

Teaching Methods:

Lectures. Consultations. Practical part of the material students work and lay in the computer laboratory by solving the mandatory tasks that are being evaluated. Decision-making software is used. Students can do optional tasks and they can earn additional points here. The agreed part of the material (which makes up the whole) is orally exhibited and delivered in written form as a seminar paper. Part of the materials that make up the logical whole can be taken as partial exams that are part of the exam. Partial exams are taken in written form. The oral part of the final exam is eliminatory.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			
Tests (4x)			