Course Unit Descriptor

Study Programme: Engineering Management

Course Unit Title: Expert Systems

Course Unit Code: OAS015

Name of Lecturer(s): Associate Professor Vladimir Brtka, PhD; Assistant Professor Višnja Ognjenović, PhD

Type and Level of Studies: Bachelor Academic Degree

Course Status (compulsory/elective): Compulsory

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: 4

Prerequisites: None

Course Aims:

Course aims are introduction to Knowledge Based Systems (KBS) and Expert Systems (ES) and their applications. Students are familiar with the concepts, structure and functioning of KBS and ES. Students need to master formalism for knowledge presentation and decision making procedures, as well as to implement and use ES and KBS.

Learning Outcomes:

Students are trained to understand theoretical and practical basis of KBS and ES and their applications. Also, students are prepared to implement concrete ES or KBS.

Syllabus:

Theory

Introduction to ES and KBS. Components of ES and KBS. Knowledge representation. Predicate calculus. Inference mechanisms. State-space search algorithms and Resolution. Prolog-like languages. Fuzzy logic. Artificial neural networks. Regressions. Software environments for implementation and application of ES and KBS.

Practice

MS Excel applications in domains of ES and KBS. Prolog implementation of ES and KBS. Implementation and application of fuzzy logic controllers and ANNs in Matlab or GNU Octave. Python numpy, pandas and matplotlib libraries and their capabilities. Jupyter lab. Rough sets Rosetta and RSES software applications.

Required Reading:

1. Vladimir Brtka, "Soft Computing", Technical faculty "Mihajlo Pupin", Zrenjanin, 2013.
2. Engelbrecht Andreas, "Computational Intelligence, An Introduction", John Wiley & Sons, Ltd, England 2002.
3. Vladimir Brtka, "Machine Learning Part I", Technical faculty "Mihajlo Pupin", Zrenjanin, 2018.

Weekly Contact Hours: 4	**Lectures:** 2	**Practical work:2**

Teaching Methods:

Lectures and students group work

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	**Final exam**	points
Active class participation	30	written exam	50
Test I and Test II	20	oral exam	