Basic data of the subject	
Academic unit:	**Faculty of Engineering and Informatics** **Applied Informatics**
Title of the subject:	**Operational Research**
Level:	**Bachelor**
Course Status:	**Obligatory**
Year of studies:	**II**
Number of hours per week:	**3**
Value of Credits - ECTS:	**5**
Time / location:	
Course lecturer:	**Prof.Ass.Dr.Bashkim Çerkimi**
Contact details:	Bashkim.cerkini@ushaf.net
Course Description:	*The component will discuss a range of methods used in Operational Research for assisting with the analysis of problems from a wide range of real life settings. Many of the examples given will concern the application of Operational Research to problems related to Applied Informatics.*
Objectives of the course:	*The component will introduce mathematical modelling methods frequently used in Operational Research, including linear programming, integer programming, stochastic analysis, queuing theory and compartmental modelling. Students will also be introduced to the practical problem solving methodology of Operational Research and the processes involved in developing a mathematical modelling structure.*
Expected learning outcomes:	*Upon successful completion of this course, student will be able to:* • *Classify mathematical programs on the basis of the number and types of their solutions* • *Apply linear programming to real-world decision problems with real and integer-valued variables* • *Model adversarial decision problems using linear programming* • *Select an appropriate solution method or synthesise a new method for a given mathematical program* • *Formulate mathematical programs used for decision-making and decision-making under uncertainty* • *Formulate an adversarial decision problem in terms of a game*

Contribution to the student load (which must correspond with learning outcomes)			
Activity	**Hour**	**Day/Week**	**In total**
Lectures with numerical exercises	3	15	45
Internship			
Contacts with teacher / consultations			

Field exercises			
Midterm, seminars and projects.	3	2	6
Homework			
Self-learning time student (at the library or at home)	3	15	45
Final preparation for the exam	7	2	14
Time spent on evaluation (tests, quiz and final exam)			
Projects and presentations.	3	5	15
Total			**125**

Teaching methodology:	*The course takes 15 weeks with 2 hours of lectures and 2 hours weekly individual and group exercises.* *Exercises will be held in the form of individual and group work in which concrete examples will be discussed.* *Active participation is extremely important, so students are encouraged to attend lectures and exercises regularly and contribute to the discussions that take place in lectures. Lectures, exercise, individual work, discussions and group work.*
Assessment methods:	Test 1, Test 2, Attendance and Activity. Final exam: 100%
The ratio of theory and practice:	*100% Theory with numerical exercises.*
Literature	
Basic Literature:	1. *Introduction to mathematical programming. Operations research. Volume 1 Winston, Wayne L. 4th ed., Pacific Grove, CA: Thomson/Brooks/Cole* 2. *Linear and nonlinear programming Luenberger, David G., 1937- author. Fourth edition., Cham: Springer*
Additional Literature:	3. *Thoma Mitre & Bashkim Ruseti, Matematika e Zbatuar, Tiranë 2008* 4. *Operations research: an introduction Taha, Hamdy A., Tenth edition, global edition., Pearson Education Limited,*
Designed learning plan	
Week:	**Lectures and exercises to be held**
Week one:	*Presentation of the subject*
Week two:	*Introduction to Operations Research*
Week three:	*Linear Programming. Simplex algorithm*
Week four:	*Graphical Analysis of Linear Programming Problems*
Week five:	*Linear Programming Problems (LPP)*
Week six:	*Transportation Problem*
Week seven:	*Test 1*
Week eight:	*Mathematical Formulation of the Problem. Routing Problem*

Week nine:	*Infinite Queuing Models*
Week ten:	*Finite Queuing Models*
Week eleven:	*Simulation*
Week twelve:	*Simulation Monte-Carlo Method*
Week thirteen:	*Game Theory*
Week fourteen:	*Test 2*
Week fifteen:	*Course summary and exam preparation*
Academic policies and rules of conduct	
Regular attendance of lectures and exercises is necessary, as well as active participation with discussion and solution of tasks. Not impeding the progress required for learning using mobile phones turned off or in silent mode.	