Incoming student mobility

UNIOS University Unit: DEPARTMENT OF MATHEMATICS

COURSES OFFERED IN FOREIGN LANGUAGE
FOR ERASMUS+ INDIVIDUAL INCOMING STUDENTS

Department or Chair within the UNIOS Unit	**Department of Mathematics**

Study program	*Graduate university study programme in mathematics (Master level)* ***Branch:*** • ***Financial Mathematics and Statistics-elective*** • ***Mathematics and Computer Science-elective*** *Graduate Mathematics and Informatics Education Study Programme*

Study level	Graduate (master)

Course title	**Graphs and Applications**
Course code (if any)	MI001
Language of instruction	English
Brief course description	**Syllabus.** 1. Introduction. Graphs: undirected, directed, weighted. Degree of a graph. Subgraph. Special graphs. Graph modeling with application in computer science, physics, chemistry, biology, sociology. Complex networks. 2. Graph isomorphism. Walks. Connectivity. Matrices associated to graphs. Bipartite graphs. Trees. Dijkstra's algorithm. Spanning tree. Kirchhoff's matrix tree theorem. Prim's and Kruskal's algorithms. 3. Vertex and edge cut in a graph. K-connectivity. Menger's theorem. Fan lemma. Eulerian and Hamiltonian graphs. Dirac's and Ore's theorem. Closure of a graph. 4. Matchings in graphs. Berge's , Hall's and Tutte's theorem. 5. Graph vertex and edge coloring. Chromatic polynomial. 6. Planar graphs. Dual graph. Kuratowski graph. Euler's formula. Planar graph coloring. The four color problem. Genus. 7. Directed graphs. The flow network problem.

Form of teaching	Consultative teaching.
Form of assessment	Lectures and exercises are obligatory. The exam consists of a written and an oral part. Upon completion of the course, students can take the exam. Successful midterm exam scores replace the written exam. Exercises are both auditory and laboratory. Laboratory exercises include the usage of computers. Students can improve their grades by writing homework assignments and seminars.
Number of ECTS	**6**
Class hours per week	**2+2+0**
Minimum number of students	
Period of realization	**Winter semester**
Lecturer	*Snježana Majstorović*