SYLLABUS

Basic information of the course	
University:	**University "Ukshin Hoti" - Prizren**
Academic unit:	**Faculty of Computer Science**
Study program:	**Information and Telecommunication Technologies**
Course:	**Discrete Math**
Study level:	**Bachelor**
Course status:	**Mandatory**
Study year:	**2**
Number of hours per week:	**2+2**
Credit value - ECTS:	**6**
Time / location:	**It will be published in the university web site!**
Lecturers:	**Prof. Asoc. Dr. Ismet Temaj** **Ass. Rigon Sallauka, Ph. D. c.**
Contact details:	**ismet.temaj@uni-prizren.com** **rigonsallauka@gmail.com**
Course description:	In this course will be given the basic concepts and assertions of discrete mathematics: mathematical logic, induction and recursion, combinatorics, graphs and their basic properties, number theory. These concepts are illustrated with practical examples from the different areas of sciences.
Course objectives:	In this course will be given the basic concepts and assertions of discrete mathematics: mathematical logic, set theory, relations, functions, numerical sets and cardinality, induction and recursion, combinatorics, graphs and their basic properties, number theory. These concepts are illustrated with practical examples from the different areas of sciences.
Learning outcomes:	Upon the completion of this course, students will be able to: - Describe and apply the mathematical induction; - Interpret and apply the elements of combinatorics;

	- Formulate graphs, including special types of graphs, isomorphism and connection of graphs; - Apply the basic concepts from number theory; - Apply knowledge gained from this course to solve problems in various fields of science and everyday life.

Contribution on student load (must correspond with learning outcomes)			
Activity	**Hours**	**Days/week**	**Total/hours**
Lectures	2	15	30
Exercise theoretical/laboratory	2	15	30
Practice work	1	2	2
Contact with lecturer/consultations	1	5	5
Field exercises	1	1	1
Midterms	2	2	4
Laboratory exercises	2	2	4
Individual time spent studying (at the library or home)	3	10	30
Final preparation for the exam	5	6	30
Time spent in evaluation (tests, quiz, final exam)	2	3	6
Projects, presentations, etc.	4	2	8
Total			**150**
Notice: 1 ECTS credits = 25 hours commitment, e.g. if the course has 6 ECTS credits student must have 150 hours during the semester.			

Teaching methods:	The course is a combination of lectures, discussions, numerical and laboratory exercises, while the assignments are presented by the laboratory course lecturers!
Assessment methods:	- Periodic tests. - Homework and seminar work. - Activity. - Final exam. **Periodic tests** Two tests, each with maximum points 60; Exams are in writing. **Homework and seminar work** There will be two homework problems (which will be evaluated), one in the period before the first test

	and one before the second test. They will be problems of the same type as those to be done in exercises. The deadline for submission will be one week. The maximum number of points for each problem is 10 points. Problems are not mandatory. Those who do not choose will have zero points. **Activity** During exercises regularly, and in lectures occasionally will be given problems to solve independently. Students who are successful in solving these problems receive 5 points for each problem. The maximum number of points that can be collected in this section is 20. With 10 points collected, students will have the option of exemption from the final exam. **Final exam** The exam is oral; verifies the understanding of the content discussed in the lectures. The requirement to enter the final exam is a total of at least 50 points collected in two tests, homework and classroom activities. The maximum number of points possible to get to the final exam is 40 points. Students who through classroom activities collect at least 10 points are not required to enter the final exam, but can take grades based on two periodic tests, tasks and classroom activity. **Improvement Exam** Improvement of points can be done mostly in one of the tests or the final exam. After the second test, students can choose which test they want to improve their score. Students who are not satisfied with the outcome of the final exam and who have not been subjected to the corrective test as above may enter the final exam test. This test will be at the same time the final exam for students who have requested an upgrade test in one of the two periodic tests. **Final grade**

	Points will be collected from the first test (max 60 points), the second test (max 60 points), the homework (max 20 points), the classroom activity (max 20 points) and the final exam (max 40 points). (Students who are exempt from the final exam will only collect points from the first four components.	
Assessment and grading:	**Vlerësimi në %**	**Nota përfundimtare**
	91% - 100%	10
	81% - 90%	9
	71% - 80%	8
	61% - 70%	7
	51% - 60%	6
	0% - 50%	5
Literature		
Basic literature:	1. K.H. Bllaca: Matematika I (shënimet e ligjëratave). 2. K. H. Rosen, Discrete Mathematics and Its Applications, Mc-Graw Hill, 2011.	
Additional literature:	1. S.Lipschutz, M.L.Lipson, 2000 Solved Problems in Discrete Mathematics, McGraw-Hill, 2003. 2. R. L. Graham, D. E. Knuth, O. Patashnik, Concrete Mathematics, Addison-Wesley, 1989.	

Study plan	
Week	**Lectures**
First week:	• Introducing the syllabus of the course to the students and informing them for all academic procedures.
Second week:	• Some basic notions of mathematical logic
Third week:	• Sequences, sums and products. Mathematical induction.
Fourth week:	• Basic counting. The product rule, the sum rule, the inclusion-exclusion principle and pigeon rule principle. Examples.
Fifth week:	• Basic counting. The product rule, the sum rule, the inclusion-exclusion principle and pigeon rule principle. Examples. (contin.).
Sixth week:	• Some elements of combinatorics: permutations and combinations (with and without repetition). Examples.
Seventh week:	• Permutations and combinations with repetition.

	Examples.
Eighth week:	• Binomial coefficients. Pascal triangle.
Ninth week:	• First test
Tenth week:	• Some problems with recursion: Honoi tower problem, problem of lines on plane. First order recursions and their solutions.
Eleventh week:	• Graphs: Definitions and basic notions. Examples.
Twelfth week:	• Divisibility theory in integers. The division algorithm. The greatest common divisor. The Euclidean Algorithm. Integers.
Thirteenth week:	• Prime numbers. Distribution of primes. The Fundamental Arithmetic Theorem..
Fourteenth week:	• Factorization methods and the Fermat Numbers
Fifteenth week:	• Second test

Exercises

Study plan	
Java	**Exercises**
First week:	• Introducing the syllabus of the course to the students and informing them for all academic procedures.
Second week:	• Some basic notions of mathematical logic
Third week:	• Sequences, sums and products. Mathematical induction.
Fourth week:	• Basic counting. The product rule, the sum rule, the inclusion-exclusion principle and pigeon rule principle. Examples.
Fifth week:	• Basic counting. The product rule, the sum rule, the inclusion-exclusion principle and pigeon rule principle. Examples. (contin.).
Sixth week:	• Some elements of combinatorics: permutations and combinations (with and without repetition). Examples.
Seventh week:	• Permutations and combinations with repetition. Examples.
Eighth week:	• Binomial coefficients. Pascal triangle.
Ninth week:	• First test
Tenth week:	• Some problems with recursion: Honoi tower problem, problem of lines on plane. First order recursions and their solutions.
Eleventh week:	• Graphs: Definitions and basic notions. Examples.
Twelfth week:	• Divisibility theory in integers. The division algorithm. The greatest common divisor. The Euclidean Algorithm. Integers.

Thirteenth week:	• Prime numbers. Distribution of primes. The Fundamental Arithmetic Theorem..
Fourteenth week:	• Factorization methods and the Fermat Numbers
Fifteenth week:	• Second test

Academic policies and rules of conduct
• Generally lecture presentations will be made through MS PowerPoint, tables, material usage, computer programs and numeric exercises. • Additional resources (scientific papers, publications, national bulletins, as well as recent discoveries and research) will be provided by professors. • In the absence of the opportunity for practical work to be organized weekly, in cooperation with the management of the university, this activity will be organized on certain days in: organizations, companies, etc. • During each session will be organized the conversation and co-participation with the students! • Students are required to be regular in lectures and exercises! • It will be evaluated when the students collaborate and participate in the lectures and course exercises! • Timely arrival in lectures and exercises is mandatory!