

**1. Course programs with information in accordance with Article 4 of the Rulebook on the mandatory components that study programs from the second cycle of studies should have ("Official Gazette of the Republic of Macedonia", no. 25/2011 and no. 154/2011)**

FIRST YEAR

Serial number: 1

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Methodology of Scientific Research Work</b>			
2.	Code	23IMI21A010			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / first semester	7.	Number of ECTS credits	6
8.	Name of the professor	Associate prof. dr. Shpetim Rexhepi			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Training for constant search for objective truth, especially in the use of research methods, techniques and instruments; Empowering students to critically monitor and interpret research results and their applicability in specific situations; Application of basic research methods, data collection procedures and their statistical processing; Training for the application of the basic methodological rules when writing professional and scientific papers.				
11.	<b>Course Content:</b> Modern methodological approaches in the research of social phenomena; Scientific explanation, prediction, understanding; Scientific facts, scientific laws and scientific theories; Contemporary understandings of the development of scientific knowledge; Traditional and new research paradigms Scientific research; Stages, general course of scientific research: Research project/draft; Research problem; Research methods; Data collection techniques and instruments; Population and sample in research; Data processing and analysis; Writing a report on the conducted research; Types of research (quantitative, qualitative; action, empirical, developmental, comparative, longitudinal, transferal, experimental...) Ethics of scientific research work; Application of statistics in research, Basic statistical procedures.				
12.	Learning methods: lectures, seminars, exercises, independent tasks, mentoring.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	

		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests		30 points	
	17.2.	Individual work/project (presentation: written and oral)		50 points	
	17.3.	Activity and participation		20 points	
18.	Assessment criteria (points/grade)		up to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam		Attendance 80% of the teaching Submitted individual works and Completed duties of exercises		
20.	Language of instruction		Albanian, Macedonian and English language		
21.	A method of monitoring the quality of teaching		Mechanisms of internal evaluation and surveys		
22.	Literature				
	22.1.	Required reading			
		No.	Author	Title	Publisher
		1.	Mejovšek, M.	Uvod u metode znanstvenog istraživanja	Jastrebarsko: Naklada Slap
		2.	Lazar, J., Feng, J. H., and Hochheiser H.	Research Methods in Human Computer Interaction	John Wiley & Sons Ltd
		3.			
	22.2.	Additional literature			
		No.	Author	Title	Publisher
		1.	Wilhelm Hasselbring / Simon Giesecke (Hrsg.)	Research Methods in Software Engineering	Trustworthy Software Systems
		2.	Matijević, M., Muzić, V., Jokić, M.	Istraživati I objavljivati: elementi metodološke pismenosti u pedagogiji	Zagreb: HPKZ
	3.				

Serial number: 2

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Selected Topics of Mathematical Analysis</b>			
2.	Code	23IMI21A020			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / first semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Egzona Iseni Rexhepi			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> After passing the exam, the student knows the structure of metric, topological and functional spaces and their mappings. The results of the knowledge represent a natural continuation of the concepts and ideas that the graduate student encountered in analysis, geometry, probability, etc. The student is qualified for scientific-research work in several areas of mathematics and applied sciences (economy, engineering, education...).				
11.	<b>Course Content:</b> Real functions (definition and basic terms, inverse function, operations with functions and complex function, boundedness, monotonicity and extrema of a real function, elementary functions), limits and continuity of functions (limit at a point, one-sided limits, continuity of a function, asymptotes) . Derivation of a function from a real variable, geometric and kinematic interpretation of the derivative, derivative of a parametric and implicitly given function, theorems for derivatives, intervals of monotonicity and extremal problems. Indefinite and definite integral. Double integral. L-p spaces (inequalities and convex function), elementary Hilbert spaces (scalar product and linear functionals, orthonormal sets, elementary Banach spaces, Fourier coefficients of L-1 spaces, Riesz theorem. Complex numbers, trigonometric form. Euler's formula. A complex function. Limes and continuity of a function. Derivation. Analytical functions. Cauchy Riemann equations. Harmonic functions. Singular points. Complex integration, Cauchy's theorem, Morera. Maximo modulus principle, Schwartz's lemma, approximation theorem.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consulting.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests		30 points	
	17.2.	Individual work/project (presentation: written and oral)		50 points	

	17.3.	Activity and participation			20 points	
18.	Assessment criteria (points/grade)		up to 50 points		5 (five) (F)	
			from 51 to 60 points		6 (six) (E)	
			from 61 to 70 points		7 (seven) (D)	
			from 71 to 80 points		8 (eight) (C)	
			from 81 to 90 points		9 (nine) (B)	
			from 91 to 100 points		10 (ten) (A)	
19.	Requirement for signature and passing the final exam		Attendance 80% of the teaching Submitted individual works and Completed duties of exercises			
20.	Language of instruction		Albanian, Macedonian and English language			
21.	A method of monitoring the quality of teaching		Mechanisms of internal evaluation and surveys			
22.	Literature					
	Required reading					
		No.	Author	Title	Publisher	Year
	22.1.	1.	W. Rudin	Real and complex analysis	McGraw-Hill Book Company	1987
		2.	D.L. Cohn	Measure Theory	Birkhauser	1980
		3.				
	Additional literature					
		No.	Author	Title	Publisher	Year
	22.2.	1.	Н. Ивановски	Реална анализа	Скопје	2003
		2.	Л. Стојановска, З. Трифунов	Примена на ИКТ во конечна математика	УКЛЮ	2009
3.		Schaum's outline	Theory and problems of real variables	McGraw-Hill Book Company	1990	

Serial number: 3

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Theory of Measurement and Integration</b>			
2.	Code	23IMI21A030			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / first semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Egzona Iseni Rexhepi			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> After completing the course, the student has in-depth knowledge of the basic concepts of a real function.				
11.	<b>Course Content:</b> Sets. Cardinal number. Cantor sets, Euclidean n-space, Metric spaces, some important point set theorems, continuity, uniform convergence, Cauchy sequence. Functions with bounded variation. Length of interval, length of union of intervals without intersection, length of empty set, of closed set. Notion of measure, outer measure of sets, measure of set, outer measure of sets, Lebesgue measure. Measure theorem. Borel measure. Immeasurable sets. Measurable functions. Egorov's theorem. Riemann's integral, Lebesgue's integral for measurable functions, geometric interpretation of Lebesgue's integral, Lebesgue's integral in measurable sets, Lebesgue's integral as lims of a sum, Lebesgue's theorem for uniform convergence, Lebesgue's theorem for dominant convergence. Relation between Riemann's and Lebesgue's integral. Lebesgue integral for unbounded functions. Infinite intervals.				
12.	Learning methods: interactive teaching, practical teaching, laboratory exercises, seminar work.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests		30 points	
	17.2.	Individual work/project (presentation: written and oral)		50 points	
17.3.	Activity and participation		20 points		
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	
		from 51 to 60 points		6 (six) (E)	

		from 61 to 70 points	7 (seven) (D)			
		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Schaum' outline	Theory and problems of real variables	Murray R.Spiegel	1990
		2.	J .Yeh	Real analysis		2009
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	J .Yeh	Real analysis	WSPC	2014
		2.				
3.						

Serial number: 4

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Discrete Mathematics and its Application in Programming</b>			
2.	Code	23IMI21A040			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / first semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Samet Qera			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students get to know the methods of discrete mathematics and structures, solve problems and apply them in solving different problems in programming.				
11.	<b>Course Content:</b> Finite sets. Variations, permutations, combinations. Counting subsets of a set – combinations, r-combinations with allowed repetition, Pascal's formula and Binomial theorem. Principle of inclusion and exclusion. Sequences, Mathematical Induction, and Recursion. Explicit Formulas for Sequences, Sequences in Computer Programming. Principles of mathematical induction and its application in correctness of algorithms. Defining recurrent sequences and solving them, structural induction. Latin Squares and Application. Theory of sets. Relations and properties of relations. Functions. Binary operations. Modular Arithmetic. Numerical systems. Amounts. Divisibility.				
12.	Learning methods: interactive teaching, practical teaching, laboratory exercises, seminar work.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests		70 points	
	17.2.	Individual work/project (presentation: written and oral)		20 points	
	17.3.	Activity and participation		10 points	
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	
		from 51 to 60 points		6 (six) (E)	

		from 61 to 70 points	7 (seven) (D)			
		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Quizzes, post-unit tests, progress monitoring, internal evaluation and survey of students				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	S.Lipschucz	Theory and problems of finite mathematics	McGraw-Hill	1996
		2.	Kenneth H. Rosen	Discrete Mathematics and its applications, 6 <sup>th</sup> edition.	The Mc Graw-Hill Companies	2007
		3.	Susanna S. Epp	Discrete Mathematics with application, 4 <sup>th</sup> edition	Brooks/Cole Cengage Learning	2011
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Rowan Garnier, John Taylor	Discrete Mathematics for New Technology Second Edition	Op Publishing Ltd	2002
		2.	Schaum's Outline	Discrete Mathematic	Mc Graw Hill	2000
	3.					

Serial number: 5

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Application of Advanced ICT Technologies in Education</b>			
2.	Code	23IMI21B050			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / first semester	7.	Number of ECTS credits	6
8.	Name of the professor	Associate prof. dr. Mirlinda Ebibi			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students should learn to use modern computer technologies in teaching.				
11.	<b>Course Content:</b> The course covers the following thematic units: Introductory concepts of e-learning (infrastructure, organization, principles of content development and support) Web portals for e-learning Introduction to mobile learning Application of advanced interactive whiteboards in the learning process Development of teaching content for e-learning Support for disabled people in the e-learning process.				
12.	Learning methods: Lectures, exercises, preparation of a seminar paper, practical teaching				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests		30 points	
	17.2.	Individual work/project (presentation: written and oral)		50 points	
	17.3.	Activity and participation		20 points	
18.	Assessment criteria (points/grade)		up to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	

19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	C. Spratt, P. Lajbcygier	E-Learning Technologies and Evidence-Based Assessment Approaches,	Information Science Reference	2009
		2.				
	3.					
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	W. Rice	Moodle E-Learning Course Development: A complete guide to successful learning using Moodle	Packt Publishing	2006
		2.				
3.						

Serial number: 5

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Comparative Education and Comparative Educational Systems</b>			
2.	Code	23IMI21B060			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / first semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Samet Qera			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> The purpose of this course is for students to become familiar with the concept and meaning of comparative education, so that after completing the course they will be familiar with the educational systems in other countries and the level of knowledge acquired by students in mathematics and informatics at different ages.				
11.	<b>Course Content:</b> Educational systems in the USA, Canada, Italy, Russia, Poland, Germany, Norway, China, Turkey, Japan and other countries, their comparison with the Macedonian educational system. The place and role of mathematics and informatics in educational systems in the USA, Canada, Italy, Russia, Poland, Germany, Norway, China, Turkey, Japan and other countries and a comparison with the place and role of mathematics and informatics in the Macedonian educational system.				
12.	Learning methods: Lectures, laboratory exercises, numerical exercises, electronic learning, seminar work, teamwork, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	
		from 51 to 60 points		6 (six) (E)	

		from 61 to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		
		from 81 to 90 points	9 (nine) (B)		
		from 91 to 100 points	10 (ten) (A)		
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises			
20.	Language of instruction	Albanian, Macedonian and English language			
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys			
22.	Literature				
	22.1.	Required reading			
		No.	Author	Title	Publisher
		1.	Г. Бижков, Н. Попов	Сравнително образование	Универзитетско издателство, Св. Климент Охридски, Софија
		2.	W.H. Schmidt, C.C. McKnight, R.T. Houang, H. Wang, D.E. Wiley, L.S. Cogan, R.G. Wolfe	Why Schools matter	Jossey-Bass, A Wiley Company
		3.			
	22.2.	Additional literature			
		No.	Author	Title	Publisher
		1.			
		2.			
3.					

Serial number: 6

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Selected Topics of Probability and Statistics</b>			
2.	Code	23IMI22A010			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / second semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Egzona Iseni Rexhepi			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students learn modern approaches in the study of contents of functions and probability, as well as learn to apply statistical techniques in research and interpretation of results.				
11.	<b>Course Content:</b> Elements of combinatorics. Probability of random events. Properties of probabilities. A discrete probability space. Classical definition. Conditional probability. Bayes rule. Bernoulli scheme. Discrete and continuous distributions. Functions of random variables. Numerous characteristics of random variables: mathematical expectation, dispersion, correlation coefficient between two random variables. Population and sample, basic data processing and descriptive statistics. Basic data processing. Normal distribution, t-distribution, Chi-square and F-distribution. Interval evaluations and hypothesis testing.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consultations				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)		
		from 51 to 60 points	6 (six) (E)		
		from 61 to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		
		from 81 to 90 points	9 (nine) (B)		
		from 91 to 100 points	10 (ten) (A)		

19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Michael Baron	Probability and statistic for computer scientists	Chapman and Hall/CRC	2007
		2.	Верица Бакева	Веројатност	Уким	2015
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Илир Спахиу	Применета Статистика и Веројатност	Тетово	2005
		2.	Лукан Пука	Веројатност и Применета Статистика	Тирана	2010
3.						

Serial number: 7

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Selected Topics from Theory of Series</b>			
2.	Code	23IMI22A020			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / second semester	7.	Number of ECTS credits	6
8.	Name of the professor	Associate Prof. dr. Shpetim Rexhepi			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students learn modern approaches in the study of content from row theory and its application.				
11.	<b>Course Content:</b> Need for Fourier series. Periodic functions. Definition of Fourier series. Dirichlet conditions. Even and odd functions. Parseval's inequality. Uniform convergence. Derivation and integration of Fourier series. Double Fourier series. Application of Fourier series. Orthogonal functions. Orthonormal sets. Decomposition of functions in orthonormal rows. Parseval's inequality for orthonormal rows. The completeness. Sturm-Liouville systems. Gram-Schmidt process. Application in boundary value problems. Gamma, Beta and other special functions. Fourier integrals (Fourier transforms, convolution theorem for Fourier transforms) and its application.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)		up to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	

		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Murray R. Spiegel	Theory and problems of fourier Analysis	McGraw-Hill Book Company	1974
		2.	Konrad Knopp	Theory and application of infinite series	Glasgow	1990
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Paul Loya	Advenced theory of infinite series	Springer, New York,	2017
		2.				
3.						

Serial number: 8

Attachment No. 3		Course program from the second cycle of studies			
1.	Name of the course	<b>Functional Analysis</b>			
2.	Code	23IMI22A030			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / second semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Teuta Jusufi Zenku			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students learn modern approaches in studying the content of functions and how to learn the application of the subject.				
11.	<b>Course Content:</b> Zorno's lemma and axiom of choice. Metric spaces. Compactness. Continuous functions. Normed spaces. Examples of Banach spaces. Elementary inequalities. Lebesgue spaces. Spaces of bounded and unbroken spaces. Bounded linear operators. Equivalent norms. Finite normed spaces. Infinite normed spaces. Hilbert spaces. Orthogonal systems. Abstract Fourier series. Bair's theorem. Open mapping theorem. Closed Mapping Theorem. Closed operator and examples. Dual spaces. Hahn Banach theorem. Reflective spaces. Poor convergence. Dual operator. Duality in Hilbert spaces. Spectral theory.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	
		from 51 to 60 points		6 (six) (E)	
		from 61 to 70 points		7 (seven) (D)	
		from 71 to 80 points		8 (eight) (C)	
		from 81 to 90 points		9 (nine) (B)	

		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Theo Buhler, Dietmar A. Salamon	Functional analysis	EtH Zurich	2017
		2.	Daniel Daner	Introduction to functional analysis	University of Sidney	2017
	3.					
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	S. Kurepa	Funkcionalna analiza	Skolska Knjiga, Zagreb	1981
		2.				
3.						

Serial number: 9

Attachment No. 3		Course program from the second cycle of studies			
1.	Name of the course	<b>Programming Techniques</b>			
2.	Code	23IMI22A040			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / second semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Bekim Fetaji			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students learn to use modern computer technologies and the latest programming techniques in the education.				
11.	<b>Course Content:</b> Programming languages - history and development, C and C++ - comparison, Development environment of C++, General structure of a C++ program, Types of variables, Operators, Input and output statements, Control statements, Input/output streams, Functions, Non-numeric data types (char, string), Numeric data types and output formatting, Input statements and Control structure selection, Control structure repetition, Switch statements, do-while and for in C++, Functions that return a value, void functions, Recursive functions. User-defined data type enum, Structures, Strings, Introduction to pointers. Thongs. Files.				
12.	Learning methods: Lectures, exercises, preparation of a seminar paper, practical teaching				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)		up to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	

		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	N. Dale, C. Weems, M. Headington	"Programming and Problem Solving with C++"	Jones and Bartlett Publishers, Sudbury	1996
		2.				
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		Bekim Fetaji	Hyrje në Programim në C++	Mother Teresa University	2020	Беким Фетаји
		B.W. Kernlghan, D.M. Ritchie	"The C Programming Language"	Prentice hall software series	1978	B.W. Kernlghan, D.M. Ritchie
Agni Dika		Bazat e Programimit	UEJL	2005	Agni Dika	

Serial number: 10

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Educational Software for Mathematics and Informatics</b>			
2.	Code	23IMI22B050			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / second semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Stojan Kitanov			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> The student is trained to use mathematical/informatics educational software for the visualization of teaching and the achievement of educational goals and tasks in the appropriate area.				
11.	<b>Course Content:</b> 1. Need and benefits of using educational software in mathematics / informatics teaching, standardization and evaluation 2. Software packages: Mathematca, Math Lab, La Tex, Maple, Cabri, GeoGebra, EduBuntu and others 3. Development and practical realization of teaching content in one of the program packages				
12.	Learning methods: interactive teaching, practical teaching, laboratory exercises, seminar work.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	<b>Method of assessment</b>				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)		

		from 51 to 60 points	6 (six) (E)			
		from 61 to 70 points	7 (seven) (D)			
		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	
		1.	Judith Hohenwarter, Markus Hohenwarter	Вовед во Геогѐбра	<a href="http://geogebra.org/mk_LFS_VP3.pdf">http://geogebra.org/mk_LFS_VP3.pdf</a>	2009
		2.		EDUBuntu Manual	EU	2010
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	
		1.				
		2.				

Serial number: 10

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Creation of Digital Educational Contents</b>			
2.	Code	23IMI22B060			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	First year / second semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Stojan Kitanov			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students to understand the principles and technologies in multimedia systems, as well as familiarization with the ways of processing, exchanging and extracting multimedia data.				
11.	<b>Course Content:</b> Algorithms and standards for compression of data, images, video, 3D graphics and audio; Color patterns; Forensics and multimedia security – digital watermarks and Digital Rights Management, data hiding and hidden channels; Protocols for video transport, signaling, session description and presentation; Architecture of integrated services and provision of QoS, QoS in wireless networks.				
12.	Learning methods: interactive teaching, practical teaching, laboratory exercises, seminar work.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	<b>Method of assessment</b>				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)		
		from 51 to 60 points	6 (six) (E)		
		from 61 to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		
		from 81 to 90 points	9 (nine) (B)		

		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	P. Havaldar, G. Medioni	Multimedia Systems: Algorithms, Standards, and Industry Practices	Course Technology	2009
		2.	Ze-Nian Li, Mark S. Drew	Fundamentals of multimedia	Prentice Hall	2003
	3.					
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.				
		2.				
3.						

SECOND YEAR

Serial number: 1

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Analysis and Design of Software Systems</b>			
2.	Code	23IMI23A010			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / third semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Bekim Fetaji			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> IS life cycle phases: requirements determination, logical design, physical design and implementation planning; interpersonal communication, interview and presentation skills; dynamics of group work; feasibility analysis and risk planning; group-based approach to: project management, joint application development (JAD) and structural reviews; structural versus object-oriented methodologies; rapid application development, development with prototypes; IS database design; software package evaluation, acquisition and integration; global and inter-organizational problems and integration systems; professional code and ethics of conduct.				
11.	<b>Course Content:</b> Structural analysis of requirements. DFD and ER models for requirements analysis and representation. Object-oriented analysis, design and modeling of information systems. Using UML to represent the processes of analysis, design and implementation of information systems. Analysis, design and implementation of web-based information systems (WIS). Integration of WIS with non-WIS systems based on databases and transaction processing. Information access and retrieval. Testing and tracking the development of information systems. Principles for maintaining information systems.				
12.	Learning methods: Lectures, exercises, preparation of a seminar paper, practical teaching				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	

		from 51 to 60 points	6 (six) (E)			
		from 61 to 70 points	7 (seven) (D)			
		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Julie E. Kendall	Systems Analysis and Design	Prentice Hall	2008
		2.				
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.				
		2.				
3.						

Serial number: 2

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Selected Topics of Algebra and Geometry</b>			
2.	Code	23IMI23A020			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / third semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Zoran Trifunov			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> After completing the course, the student has in-depth knowledge of basic algebraic structures. Understands the fundamental concepts, main constructions and basic theorems of the theory of groups, rings and fields, as well as elementary number theory. He is able to solve tasks from the specified areas and apply them practically. He is able to follow other courses in which they are used and has a basis for involvement in scientific research work.				
11.	<b>Course Content:</b> Elements of general algebra: notion of algebraic structure, generating sets, subalgebras, homomorphisms, direct products, congruences, factor algebras, manifolds. Boolean algebras: Partially ordered sets and networks, axioms of Boolean algebras, examples, identities and equations, description of finite Boolean algebras. Groups: Semigroups, monoids, groups, Lagrange's theorem, order, normal subgroups, group isomorphism theorem and applications, cyclic groups, permutation groups, Sylow's theorems, inner direct products of subgroups, finitely generated Abelian groups, examples. Rings: Axioms and their consequences, Boolean algebras as rings, subrings, homomorphisms and congruences, ideals. Fields: Axioms and consequences, characteristic, subfields, homomorphisms, extensions, automorphisms, ring polynomials over a field, finite fields, algebraic extensions, elements of Galois theory, applications. Modules and vector spaces: Modules, submodules, bases of modules and vector spaces, homomorphisms, examples. Inversion method in proving theorems and solving problems, application of complex numbers in planimetry, geometry of masses, combinatorial geometry. Non-standard problems of Euclidean geometry in plane and space.				
12.	Learning methods: Lectures, laboratory exercises, numerical exercises, electronic learning, seminar work, team work, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests		30 points	

	17.2.	Individual work/project (presentation: written and oral)	50 points			
	17.3.	Activity and participation	20 points			
18.	Assessment criteria (points/grade)		up to 50 points	5 (five) (F)		
			from 51 to 60 points	6 (six) (E)		
			from 61 to 70 points	7 (seven) (D)		
			from 71 to 80 points	8 (eight) (C)		
			from 81 to 90 points	9 (nine) (B)		
			from 91 to 100 points	10 (ten) (A)		
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Shaldon Axler	Linear algebra done right	Springer	2014
		2.	Glyn James, Phil Dyke	Modern Engineering Mathematics	Pearson Education, LTD	2020
		3.	G. Kalajdzic	Algebra	Faculty of Mathematics, University of Belgrade	1998
		Additional literature				
	22.2.	No.	Author	Title	Publisher	Year
		1.	Z. Mijalovic	Algebra	Milgor, Belgrade	1998
		2.	Gj. Chupona, B. Trpenovski	Algebra II	UKIM	1973
3.						

Serial number: 3

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Advanced Algorithms and Data Structures</b>			
2.	Code	23IMI23A030			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / third semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Aleksandar Dimovski			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Introducing students to advanced programming techniques and data organization and operations techniques.				
11.	<b>Course Content:</b> Introduction to Algorithms. Description of the concept of algorithm and data structures in the context of computer applications. It shows the importance of algorithms in comparison with developments in other areas of information technologies. The properties of the algorithms are described. Then the ways of representing algorithms are presented. Analysis of Algorithms. The foundation of our approach to algorithm performance analysis is the scientific method. We begin by performing computer experiments to measure the running time of our programs. We use these measurements to develop hypotheses about performance. Next, we create mathematical models to explain their behavior. Finally, we analyze the memory usage of our computer programs. Sorting algorithms. We introduce the sorting problem. We study two elementary sorting methods (selection sort and insertion sort) and a variation of one of them (shellsort). We also consider two algorithms with practical application ie. QuickSort and MergeSort. Furthermore, we introduce the priority queue data type and an efficient implementation using the binary heap data structure. Tables of symbols. We define an API for symbol tables (also known as associative arrays, maps, or dictionaries) and describe two basic implementations using an ordered array (binary search) and a non-linear list (sequential search). A stack and a row. We consider two fundamental data types for storing collections of objects: the stack and the queue. We implement each using either a singly linked list or a resizable array. We consider various applications of stacks and queues, ranging from parsing arithmetic expressions to simulating queuing systems. Binary Balanced Trees. In this lecture, our goal is to develop a symbol table with guaranteed logarithmic performance for lookup and insertion (and many other operations). We start with 2–3 trees, which are easy to analyze but difficult to implement. Next, we consider black-red binary search trees, which we consider a new way to implement 2–3 trees as binary search trees. Finally, we introduce B-trees, a generalization of 2–3 trees that are widely used for implementing file systems. Hash tables. We begin by describing the desired properties of a hash function and how to implement them in programming languages, including a fundamental principle known as the uniform hashing assumption that underlies the potential success of a hashing application. Then, we consider two strategies for implementing hash tables - separate chaining and linear probing. Both strategies yield performance in constant search and insertion times under the uniform hashing assumption.				
12.	Learning methods: Lectures, exercises, preparation of a seminar paper, practical teaching				
13.	Total available time	180 hours			

14.	Allocation of available time	2+1				
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours		
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours		
16.	Other forms of activities	16.1.	Project tasks	45 hours		
		16.2.	Independent tasks	30 hours		
		16.3.	Home study - assignments	60 hours		
17.	Method of assessment					
	17.1.	Tests			30 points	
	17.2.	Individual work/project (presentation: written and oral)			50 points	
	17.3.	Activity and participation			20 points	
18.	Assessment criteria (points/grade)		up to 50 points	5 (five) (F)		
			from 51 to 60 points	6 (six) (E)		
			from 61 to 70 points	7 (seven) (D)		
			from 71 to 80 points	8 (eight) (C)		
			from 81 to 90 points	9 (nine) (B)		
			from 91 to 100 points	10 (ten) (A)		
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	R. Sedgewick, K.Wayne	Algorithms 4th edition	Addison – Wesley	2014
		2.	Thomas H.Cormen, et al.	Data Structures And Algorithm Analysis in C++	Addison - Wesley	2007
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Bruno Preiss	Data Structures and Algorithms with Object Oriented Design Patterns in Java	John Wiley	2000

		2.	Thomas H.Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein	Introduction to Algorithms	MIT Press	1990
		3.				

Serial number: 4

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Individual Software Project</b>			
2.	Code	23IMI23A040			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / third semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Fisnik Doko			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Acquisition of knowledge on managing the life cycle of a system; managing the expectations of management, clients, team members and others; Acquiring knowledge about cost-effectiveness analysis; Adoption of presentation techniques and preparation of reports; Familiarity with project tracking and monitoring software tools and teamwork software tools.				
11.	<b>Course Content:</b> Introduction to project management. Specifics of software projects and selection of an appropriate project model for development. Defining the goals of the software project and creating an ideal software team. Agile software project planning techniques – Architecture Decomposition View and Work Breakdown Structure. Software Project Planning Techniques - Critical Path Method. Software project planning techniques - PERT Method. Visual techniques of software project planning, material and human resources – Gantt charts. Estimation techniques in software projects - software size estimation, pragmatic estimation techniques. Estimation techniques in software projects - theory-based and SLIM. Regression estimation techniques in software projects - COCOMO, Monte Sarlo, local calibration. Techniques of measurement and control of software processes. Assessment and risk management in software projects.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		

	17.3.	Activity and participation	20 points			
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)			
		from 51 to 60 points	6 (six) (E)			
		from 61 to 70 points	7 (seven) (D)			
		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Bob Hughes, Mike Cotterell	Software Project Management	McGraw-Hill Education	2010
		2.	R. S. Pressman	Software Engineering: A Practitioner Approach	McGraw-Hill	2008
		3.	Roger Pressman	Web Engineering: A Practitioner's Approach	Addison Wesley	2015
		Additional literature				
	22.2.	No.	Author	Title	Publisher	Year
		1.	Joseph Phillips	IT Project Management: On Track From Start to Finish	McGraw-Hill/Osborne	2009
		2.	Flew Terry.	Preservation Management of Digital Materials: The Handbook	Oxford University Press	2008
3.						

Serial number: 5

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Game Theory</b>			
2.	Code	23IMI23B050			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / third semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Aleksandar Dimovski			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students will learn the basic models in game theory. They will gain knowledge of how to formulate game-theoretic models of simple problems and how to solve such problems.				
11.	<b>Course Content:</b> Game representations, basic concepts. Equilibrium, existence of equilibrium and complexity of calculations. Submodular and potential games. Games with incomplete information. Extensive games, games with repetition, stochastic games. Evolutionary games. Coalition games. Implementation theory and design mechanism.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)		
		from 51 to 60 points	6 (six) (E)		
		from 61 to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		
		from 81 to 90 points	9 (nine) (B)		
		from 91 to 100 points	10 (ten) (A)		

19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Martin J. Osborne, Ariel Rubinstein	A Course in Game Theory	MIT Press	1994
		2.	Martin J. Osborne	An introduction to game theory	Oxford University Press	2003
		3.	Drew Fudenberg, Jean Tirole	Game Theory	MIT Press	2001
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Edited by Krzysztof R. Apt, Erich Gradel	Lectures in Game Theory for Computer Scientists	Cambridge University Press	2011
		2.				
	3.					

Serial number: 5

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Contemporary Approaches in the Study of the Content of Functions, Probability and Statistics</b>			
2.	Code	23IMI23B060			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / third semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Zoran Trifunov			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students learn modern approaches in the study of contents of functions and probability, as well as learn to apply statistical techniques in research and interpretation of results.				
11.	<b>Course Content:</b> Functions. Selected subchapters and more important function theorems. Selected chapters from probability. Mathematical and statistical basics, data collection, data processing, point and interval estimations, hypotheses, correlation and regression, multivariate analysis, presentation of output data.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)		
		from 51 to 60 points	6 (six) (E)		
		from 61 to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		
		from 81 to 90 points	9 (nine) (B)		

		from 91 to 100 points	10 (ten) (A)		
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises			
20.	Language of instruction	Albanian, Macedonian and English language			
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys			
22.	Literature				
	22.1.	Required reading			
		No.	Author	Title	Publisher
		1.	Michael Baron	Probability and statistic for computer scientists	Chapman and Hall/CRC
		2.	Verica Bakeva	Probability	UKIM
	3.				
	22.2.	Additional literature			
		No.	Author	Title	Publisher
		1.	Ilir Spahiu	Primeneta Statistika i Verojatnost	Tetovo
		2.	Lukan Puka	Verojatnost i primeneta statistika	Tirana
3.					

Serial number: 6

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Introduction to Data Science</b>			
2.	Code	23IMI24A010			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / fourth semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Bekim Fetaji			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> This course introduces students to the field of data science, big data, and the life cycle of data analytics as a tool for solving business challenges that underpin big data. The course provides a foundation for basic and advanced analytical methods and an introduction to big data analytics technologies and tools.				
11.	<b>Course Content:</b> Introduction to Data Science as a Fourth Scientific Paradigm, Designing Experiments and Identifying Problems. Data collection and processing, Data analysis, Identification of patterns in data; Explanation of derived hypotheses, Hypothesis testing and feedback.				
12.	Learning methods: Lectures, laboratory exercises, numerical exercises, electronic learning, seminar work, team work, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)		
		from 51 to 60 points	6 (six) (E)		
		from 61 to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		

		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Jeffrey S. Saltz and Jeffrey M. Stanton	An Introduction to Data Science	SAGE Publications	2017
		2.	Igual, Laura, Seguí, Sant	Introduction to Data Science: A Python Approach to Concepts, Techniques and Applications	Springer International Publishing	2017
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Jake VanderPlas	Python Data Science Handbook: Essential Tools for Working with Data	O'Reilly	2017
		2.				
3.						

Serial number: 7

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Internet Technologies</b>			
2.	Code	23IMI24A020			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / fourth semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Andrej Cvetkovski			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> The course is tasked with shedding light on the development, functioning and use of the Internet at a conceptual level. The history and structure of the Internet, standardization, protocols, addressing, routing, the most important Internet services and applications, security will be studied, and the technologies for transmitting voice and image over IP, multimedia applications and connecting embedded systems (Internet of things).				
11.	<b>Course Content:</b> The history of the development of the Internet and www. OSI and TCP/IP reference models. Internet standards. Types of networks and network topologies. Physical media for digital transmission. Data layer technologies and protocols. IP protocol and IP addressing. IPv6. Protocols at the transport level (TCP, UDP). Protocols and algorithms for routing in IP networks. Application level protocols. (DHCP, HTTP, FTP, DNS, IMAP, SMTP, SSH). WWW. Internet telephony. Multimedia on the Internet. Internet Security. Internet of Things (IoT).				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consulting.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	
		from 51 to 60 points		6 (six) (E)	
		from 61 to 70 points		7 (seven) (D)	
		from 71 to 80 points		8 (eight) (C)	
		from 81 to 90 points		9 (nine) (B)	

		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	D. Comer	Internetworking with TCP/IP, Vol.1: Principles, Protocols and Architecture	Prentice Hall	2013
		2.	A. Tanenbaum	Computer Networks	Pearson	2010
	3.					
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	David Reed	A Balanced Introduction to Computer Science	Pearson	2010
		2.				
3.						

Serial number: 8

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Mathematical Logics and its Application in Programming</b>			
2.	Code	23IMI24A040			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / fourth semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Teuta Jusufi Zenku			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students learn modern approaches in the study of set theory content.				
11.	<b>Course Content:</b> Syntax of first-order languages, semantics of first-order languages, sequence calculus, completeness theorem, Lowenheim-Skolem theorem and compactness theorem, content of first-order logic, syntactic interpolation and normal forms, extension of first-order logic , application in programming.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consulting.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests		30 points	
	17.2.	Individual work/project (presentation: written and oral)		50 points	
	17.3.	Activity and participation		20 points	
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	
		from 51 to 60 points		6 (six) (E)	
		from 61 to 70 points		7 (seven) (D)	
		from 71 to 80 points		8 (eight) (C)	

		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	Heinz-Dieter Ebbinghaus, Jorg Flum, Wolfgang Thomas	Mathematical logic	Springer	2021
		2.				
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Elliot Mendelson	Introduction to mathematical logic	Chapman ,Hall	2001
		2.				
3.						

Serial number: 9

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Master Thesis</b>			
2.	Code	23IMI24A040			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / fourth semester	7.	Number of ECTS credits	6
8.	Name of the professor	The teaching staff of the Faculty of Information Sciences and the University "Mother Teresa" in Skopje can be a mentor for a master's thesis			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students aim to develop a software application and analyze it in detail, using knowledge from the subjects they have followed during their studies.				
11.	<b>Course Content:</b> Each student works individually with the help of the chosen mentor on the chosen topic, which it must be previously approved by the Teaching and Research Council of the Faculty of Information Sciences. After completing the mentoring phase and checking the student's file, the student submits an Application for the public defense of the master's thesis before the Commission and the audience to the Teaching and Research Council of the Faculty of Information Sciences during the regular examination session. If the Educational Scientific Council of the Faculty of Information Sciences accepts the Application, the Educational Scientific Council of the Faculty of Information Sciences makes a decision on the establishment of a commission for the review of the master's thesis, which includes the mentor as a member. If the Academic Scientific Council of the Faculty of Information Sciences accepts the peer review, the Academic Scientific Council of the Faculty of Information Sciences makes a decision on the formation of a committee for the public defense of the master's thesis, which includes the mentor as a member. Then as the final act is the public defense of the master's thesis before a committee and an audience.				
12.	Learning methods: interactive teaching, practical teaching, laboratory exercises, seminar work.				
13.	Total available time	180 hours			
14.	Allocation of available time	2			
15.	Forms of teaching activities	15.1.	Consultations	2 x 15 = 30 hours	
		15.2.			
16.	Other forms of activities	16.1.	Independent learning and working	150 hours	
		16.2.			
		16.3.			
17.	Method of assessment				
	17.1.	Individual work/project (presentation: written and oral)		80 points	
	17.2.	Activity and participation		20 points	
	17.3.				

18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)			
		from 51 to 60 points	6 (six) (E)			
		from 61 to 70 points	7 (seven) (D)			
		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Passed all courses in the study program				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.				
		2.				
	3.					
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.				
		2.				
3.						

Serial number: 10

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Multimedia Technologies</b>			
2.	Code	23IMI24B050			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / fourth semester	7.	Number of ECTS credits	6
8.	Name of the professor	Prof. dr. Andrej Cvetkovski			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students to understand the principles and technologies in multimedia systems, as well as familiarization with the ways of processing, exchanging and extracting multimedia data.				
11.	<b>Course Content:</b> Introduction to Multimedia. Elements of multimedia, image, video, sound, movement, text and typography, interactivity. Projecting multimedia. Challenges in multimedia content acquisition, processing and transmission systems. Images: digitization, sampling, quantization. Colors, color patterns in images and video. Raster and vector graphics, image compression algorithms, formats. Basic concepts of video, compression and coding algorithms, video standards, formats and delivery. Animation. Fundamentals of audio signals, digitization, processing, speech and music compression algorithms, delivery. Production and synthesis of sound and music. MIDI interface. Multimedia architecture of the Internet. Search and filter multimedia data.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consultations.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points		5 (five) (F)	
		from 51 to 60 points		6 (six) (E)	
		from 61 to 70 points		7 (seven) (D)	

		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	P. Havaldar, G. Medioni	Multimedia Systems: Algorithms, Standards, and Industry Practices	Course Technology	2009
		2.	Ze-Nian Li, Mark S. Drew	Fundamentals of multimedia	Prentice Hall	2003
	3.					
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.				
		2.				
3.						

Serial number: 10

<b>Attachment No. 3</b>		<b>Course program from the second cycle of studies</b>			
1.	Name of the course	<b>Practical Course in Mathematics and Informatics</b>			
2.	Code	23IMI24B060			
3.	Study program	Mathematics and Informatics for Teaching, one year studies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Mother Teresa University Faculty of Information Sciences, Skopje			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Second year / fourth semester	7.	Number of ECTS credits	6
8.	Name of the professor	Assistant prof. dr. Stojan Kitanov			
9.	Prerequisites for enrolling in the course	None			
10.	<b>Course objectives (competencies):</b> Students are expected to learn to use a program package (MATLAB or similar) in solving mathematical tasks and practical problems from informatics.				
11.	<b>Course Content:</b> An introduction to working with the mathematical packages Mathematica and MATLAB. Elementary arithmetic. Algebraic manipulations. Equations. Mathematical analysis. Linear algebra. Drawing graphs. Derivatives and integrals. Differential equations. Polynomial interpolation. Application of numerical methods in solving derivatives, integrals and differential equations.				
12.	Learning methods: Lectures, books, articles, e-learning, term paper, project, consulting.				
13.	Total available time	180 hours			
14.	Allocation of available time	2+1			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching .	2 x 15 = 30 hours	
		15.2.	Exercises (laboratory, classroom), seminars, teamwork.	1 x 15 = 15 hours	
16.	Other forms of activities	16.1.	Project tasks	45 hours	
		16.2.	Independent tasks	30 hours	
		16.3.	Home study - assignments	60 hours	
17.	Method of assessment				
	17.1.	Tests	30 points		
	17.2.	Individual work/project (presentation: written and oral)	50 points		
	17.3.	Activity and participation	20 points		
18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)		
		from 51 to 60 points	6 (six) (E)		
		from 61 to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		
		from 81 to 90 points	9 (nine) (B)		

		from 91 to 100 points	10 (ten) (A)			
19.	Requirement for signature and passing the final exam	Attendance 80% of the teaching Submitted individual works and Completed duties of exercises				
20.	Language of instruction	Albanian, Macedonian and English language				
21.	A method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys				
22.	Literature					
	22.1.	Required reading				
		No.	Author	Title	Publisher	Year
		1.	L. Stojanovska, Z. Trifunov	Voved vo Geogebra	UKLO	2008
		2.	Glyn James, Phil Dyke	Modern Engineering Mathematics	Pearson Education, LTD	2020
		3.	Ivan Graham	MatLab manual and Introductory tutorials	University of Bath	2005
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	Stefanova N. , Podhodova N.,...	Metodika I tehnologija na uchenje matematika	DROFA	2007
		2.				
	3.					