

Annex No. 3		First Cycle Studies Course Programme			
1.	Course Title	Financial and Actuary Mathematics			
2.	Code	MST 430			
3.	Study programme				
4.	Organizer of the study programme (university unit i.e. institute, chair, department)	Ss. Cyril and Methodius University in Skopje Faculty of Economics - Skopje Chair of Mathematics and Statistics			
5.	Level (first, second, third cycle)	First cycle			
6.	Academic year / semester	2022-2023 8 th (summer semester)	7.	Number of ECTS credits	7.5
8.	Professor	Prof. Igor Ivanovski, PhD			
9.	Preconditions for enrolment	None			
10.	<p>Course Objectives (Competencies): After taking this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Understand advanced mathematical methods and models and their application in long-term financial operations. 2. Understand variable annuity models and combined models in finance, banking and insurance operations. 3. Understand the advanced models of continuous interest 4. Get acquainted with the technical basis of the insurance mechanism, types and calculation of premiums and technical provisions in insurance 5. Become capable of actuarial calculations when creating life insurance products 6. Become capable of using and solving practical methods and models necessary for preparing economic and financial analysis, planning and calculations of insurance tariffs and premiums. 				
11.	<p>Course content:</p> <p>I. Interest calculation models</p> <ol style="list-style-type: none"> 1. Complex interest account <ol style="list-style-type: none"> 1.1. Discreet and continuous interest calculation 1.2. Relative, conform, and effective interest rate 1.3. Accumulated value of capital <p>II. Periodic investments</p> <ol style="list-style-type: none"> 1. Constant investments <ol style="list-style-type: none"> 1.1. Decursive periodical investments 1.2. Anticipative periodical investments 1.3. Reconciling the investment with the interest 2. Variable periodical investments <p>III. Periodic income (rents)</p> <ol style="list-style-type: none"> 1. Constant rent <ol style="list-style-type: none"> 1.1. Sum of the discounted value of rents 2. Variable rent 3. Eternal and lifetime rent <p>IV. Models of loan amortization</p> <ol style="list-style-type: none"> 1. Equal and rounded annuities 2. Variable annuities <ol style="list-style-type: none"> 2.1. Successive variable annuities 2.2. Periodical variable annuities 3. Amortization of loans divided into bonds 4. Equal and variable repayments 5. Relationships between the elements of the amortization plan 				

	V. Anticipative interest calculation 1. Nominal, relative, equivalent and effective rate 2. Periodical investments and rents 3. Loan amortization with anticipative interest rate VI. Combined models of loan amortization with variable annuities VII. Technical fundamentals of insurance 1. Commutative numbers and mortality tables VIII. One-time premium for certain types of annuities and equity insurance 1. Capital insurance in case of living 2. Lifetime rent 3. Capital insurance IX. Annual and under-annual premium 1. Lifetime premium and occasional annual net premium 2. Under-annual net premium 3. Gross premium X. Mathematical (premium) reserves 1. Calculation methods for premium reserve 2. Natural, risk and savings premium 3. Combined examples			
12.	Learning methods: Interactive lectures, video presentations, guest speakers, case studies, directed discussions, individual or group papers, seminar projects, and homework.			
13.	Total hours	7.5 ECTS x 30 classes = 225 classes		
14.	Allocation of hours per activity	60+30+30+15+90 = 225 classes		
15.	Types of teaching activates	15.1.	Lectures	60 classes
		15.2.	Exercises (Seminars)	30 classes
16.	Other types of activities	16.1.	Projects	30 classes
		16.2.	Writing Assignments	15 classes
		16.3	Homework	90 classes
17.	Grading method: 90+10 =100 points			
	17.1.	Tests (Domain, Essay, Multiple choice exam, Case)	50 %	
	17.2.	Individual or Group Assessment / projects (Case Presentation, Case Analysis, Quizzes, Writing Assignments)	40 %	
	17.3.	Attendance and class participations	10 %	
18.	Grading scale	less than 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.	Preconditions for taking the final exam	Realized activities from points 15 and 16		
20.	Language	Macedonian (or English)		
21.	Evaluation method	Internal evaluation and survey		

22.	Literature					
	22.1.	Compulsory literature				
		No.	Author	Title	Publisher	Year
		1.	Janev, Drage	<i>Financial and Actuary Mathematics</i>	Faculty of Economics - Skopje	2016
	2.	Janev, Drage & Ivanovski, Igor	<i>Actuary models of life insurance</i>	Faculty of Economics - Skopje	2014	
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
1.		Booth, Philip et al.	<i>Modern Actuary Theory and Practice, 2nd Edition</i>	Chapman & Hall	2005	