Course Specification
(Bachelor)

Course Title:	**Financial Mathematics (1)**
Course Code:	**AFM 1235**
Program:	**Bachelor of Science in Applied Mathematics**
Department:	
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**2024 – V1**
Last Revision Date:	**08/10/2024**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 (2 Lectures, 0 Lab, 2 Tutorial)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: Level 4 / Year2					
4. Course general Description:					
The First course of Financial Mathematics is designed to provide comprehensive exploration of the principles and applications of interest measurement, problem-solving techniques, and annuities. Covering essential topics such as simple and compound interest, present value, amortization, and various types of securities, the course equips students with the skills to analyze financial instruments and real-world applications. Through practical examples and theoretical foundations, learners will gain a solid understanding of how to evaluate investments, manage loans, and assess financial decisions.					
5. Pre-requirements for this course (if any):					
MAT 1102					
6. Co-requisites for this course (if any):					
None.					
7. Course Main Objective(s):					
The course equips students with quantitative skills to analyze financial data and solve real-world problems. It bridges mathematical theory with practical applications in finance, preparing students for careers in investment analysis, risk management, and further studies in advanced financial topics.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	0	0%
3	Hybrid • Traditional classroom • E-learning	0	0%
4	Distance learning	0	0%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	0

3.	**Field**	0
4.	**Tutorial**	30
5.	**Others (specify)**	0
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize key financial concepts including interest rate, annuities, accumulation function, future value, present value, discount factor, and terms like nominal rate, effective rate, and real rate of interest.	K1	3 lecture hours\week 2 tutorial hours\week Self-study	Regular Exams Assignments Short Quizzes
1.2	Describe the price, book value, amortization of premium, accumulation of discount, redemption value, par value/face value, yield rate, coupon.	K2	3 lecture hours\week 2 tutorial hours\week Self-study	Regular Exams Assignments Short Quizzes
2.0	**Skills**			
2.1	Solve real-life financial problems involving compound interest, present and future values, and annuities.	S1, S2	Self-study Real-life problems	Participations Short Quizzes
2.2	Apply logical thinking to problem solving in context to communicate results clearly and precisely both orally and in writing.	S3	Self-study Real-life problems	Participations Short Quizzes
2.3	Use appropriate technology to aid problem solving.	S4	Self-study Real-life problems	Participations Short Quizzes
2.4	Calculate appropriately the value(s) of money. the annual effective rate of interest, the loan	S3	Self-study Real-life problems	Participations Short Quizzes

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	amount or outstanding loan balance, the value of a stock.			
3.0	**Values, autonomy, and responsibility**			
3.1	work individually and in group.	V1, V3	Personal questions and teamwork.	Participation, Homework and Mini projects
3.2	Show the scientific attitude by mentioning and testing a hypothesis before accepting it.	V1, V2	Class discussion	participation

C. Course Content

No	List of Topics	Contact Hours

1.	**Interest Measurement:** The accumulation and amount functions; Effective rate of interest; Simple interest; Compound interest; Present value; Effective rate of discount; Nominal rates of interest and discount; Forces of interest and discount; Varying interest.	15
2.	Problem-Solving in Interest: The basic problem; Equations of value; Unknown time; Unknown rate of interest; Determining time periods; Practical examples	
3.	**Annuities:** Basic Annuities (Introduction to Annuities, Annuity-immediate, Annuity-due, Annuity values on any date, Perpetuities, Unknown time and unknown rate of interest, varying interest); More General Annuities (Differing payment and interest conversion periods, Annuities payable less frequently than interest is convertible, Annuities payable more frequently than interest is convertible, Continuous annuities, Payments varying in arithmetic progression, Payments varying in geometric progression, More general varying annuities, Continuous varying annuities)	15
4.	**Amortization and Securities:** Amortization Schedules and Sinking Funds (Introduction to Amortization, Finding the outstanding loan balance, Amortization schedules, Sinking funds, Differing payment periods and interest conversion periods, Varying series of payments); Bonds and Other Securities (Introduction to Securities, Types of securities, Price of a bond, Premium and discount, Valuation between coupon payment dates, Determination of yield rates, Callable and puttable bonds, Other securities)	15
5.	**Yield Rates and Practical Applications**: Yield Rates (Introduction to Yield Rates, Discounted cash flow analysis, Uniqueness of the yield rate, Reinvestment rates, Interest measurement of a fund, Time-weighted rates of interest, Portfolio methods and investment year methods); Practical Applications (Truth in lending, Automobile financing, Real estate mortgages, Approximate methods, Depreciation methods, Capitalized cost, Modern financial instruments)	15
		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	HomeWorks, Quizzes, Mini-projects	During the term	10%
2.	First Midterm	Week 5-6	25%
3.	Second Midterm	Week 10-11	25%
4.	Final Exam	Week 15-16	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	***Theory of Interest,*** 3rd Edition, Stephen Kellison, McGraw-Hill Education, 2009.
Supportive References	***Schaum's Outline of Mathematics of Finance****, Revised Edition*, 2nd Edition, McGraw-Hill Education, 2011. ***Introduction to mathematical finance***, D. Heath and G. Swindle (Eds), American Mathematical Society, 1999.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• **Classrooms:** Equipped with whiteboards, projectors, and Smart Boards for interactive lessons and group discussions. • **Laboratories:** Feature computers with internet access, enabling hands-on activities and exploration of algebraic and trigonometric concepts. • **Exhibition Rooms:** Spaces for showcasing projects and presentations to encourage collaborative learning.
Technology equipment (projector, smart board, software)	• **Data Show Projectors:** For clear presentations in classrooms and labs. • **Smart Boards:** To enhance interactivity during lessons. • **Mathematical Software:** Essential for graphing and analysis.
Other equipment (depending on the nature of the specialty)	• **Computers:** For mini-project and homework and practical applications in laboratories. • **Advanced Calculators:** For computations and problem-solving and supporting the study of limits, continuity, and differentiation. • **Whiteboards and Markers:** To facilitate brainstorming and collaboration.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student and teaching staff	Surveys and Questionnaires

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Course Coordinator	Peer Reviews
Quality of learning resources	Students and teaching staff	Classroom Observations
The extent to which CLOs have been achieved	Student Representatives	Student Performance Evaluations (exams, projects) CLOs Excel sheet.
Other	**None**	

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**MATHEMATICS AND STATISTICS DEPARTMENT COUNCIL**
REFERENCE NO.	**8/1446**
DATE	**05/04/1446 (08/10/2024)**