



Course Specification

— (Bachelor)

Course Title: Financial Mathematics

Course Code: 2024205-3

Program: Mathematics Program.

Department: Department of Mathematics and Statistics

College: Faculty of science

Institution: Taif university

Version: 1

Last Revision Date: *Pick Revision Date.*



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	6
E. Learning Resources and Facilities	6
F. Assessment of Course Quality	6
G. Specification Approval	7



A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

A. University College Department Track Others
 B. Required Elective

3. Level/year at which this course is offered: (8th level, 4th year)

4. Course general Description:

This is an introductory course in mathematical finance. The course covers the following topics: Interdiction, Future value, Present value, Annuities, Net present value, Payback rule, the internal rate of return, Bound valuations, Expected Return, Variance, Portfolio (Portfolio Weights- Portfolio Return- Variance- Portfolio optimization), Insurance cost and fair premiums, expected cost claims, Timing of incomes claims, administrative costs and profit loading.

5. Pre-requirements for this course (if any):

Theory of statistics (2023101-3)

6. Co-requirements for this course (if any):

None

7. Course Main Objective(s):

In this course, the student should be taught as follows:

- Recognize the basics and concepts of financial instruments. Outline elements of the theory of interest.
- Recognize various applications on time value of money. Use some elements of stochastic calculus in mathematical finance and analyze the basics of rates of return.





2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3hours/Week	100
2	E-learning	0	0
3	Hybrid <ul style="list-style-type: none"> 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	45
2.	Laboratory/Studio	0
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
Total		45

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 the existence and uniqueness of solutions to a given optimization problem.	K1	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Assignments
1.2	memorize the rate of convergence and complexity requirements of various optimization algorithms.	K1	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Exams Assignments
...				
2.0	Skills			
2.1	design optimization algorithms on a computer	S4	<ul style="list-style-type: none"> Interactive classes Group discussions 	<ul style="list-style-type: none"> Quizzes Assignments
2.2	develop performance of different optimization models	S4	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Exams Quizzes



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	and methods from both theoretical and numerical perspectives.			
2.3	explain the underlying principles and limitations of modern techniques and algorithms for optimization.	S4	<ul style="list-style-type: none"> Lectures Self-learning through the website 	<ul style="list-style-type: none"> Exams Quizzes Assignments
3.0	Values, autonomy, and responsibility			
3.1	Show the responsibility for their own learning and continuing personal and professional development.	V2	<ul style="list-style-type: none"> Projects 	<ul style="list-style-type: none"> Through the oral presentation of the projects

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction about financial mathematics and Future value.	3
2.	Present value	3
3.	Annuities: This includes determining the rate of discount and the number of periods.	3
4.	Net present value.	3
5.	Payback rule.	3
6.	<ul style="list-style-type: none"> The internal rate of return. Bound valuations. 	3
7.	1 st midterm Exam Expected Return.	3
8.	Variance.	3
9.	<ul style="list-style-type: none"> Portfolio <ul style="list-style-type: none"> Portfolio Weights Portfolio Return Portfolio Variance 	3
10.	Portfolio optimization	3
11.	Insurance cost and fair premiums.	3
12.	Expected cost claims.	3
13.	2 nd midterm Exam.	3
14.	Timing of incomes claims.	3
15.	Administrative costs and profit loading.	3
Total		45





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Continuous Evaluation	10 %
2.	Assignments	Continuous Evaluation	10 %
3.	Midterm 1 Exam	8-9	15%
4.	Midterm 2 Exam	12-13	15%

*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	Vaaler, Leslie Jane Federer; Daniel, James W, Mathematical Interest Theory, American Mathematical Society/ 2008.
Supportive References	S. Kellison, Theory of Interest, Irwin/McGraw-Hill, 2009, ISBN: 978-0073382449.
Electronic Materials	Lectures available in Blackboard.
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture halls, containing white boards, and electronic monitors - The seats fit the number of students.
Technology equipment (Projector, smart board, software)	Yes, all of these equipment are important
Other equipment (Depending on the nature of the specialty)	Programming software (MATLAB-Maple)

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of Students assessment	Students	Indirect
Quality of learning resources	Students	Indirect





Assessment Areas/Issues	Assessor	Assessment Methods
The extent to which CLOs have been achieved	Peer reviewer	Direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT OF MATHEMATICS AND STATISTICS
REFERENCE NO.	4
DATE	October 2023

