هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Financial Mathematics**
Course Code:	**2024205-3**
Program:	**Bachelor in Mathematics.**
Department:	**Mathematics and Statistics Department**
College:	**Faculty of sciences**
Institution:	**Taif university**

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A. Course Identification

1. Credit hours: (3)
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 11th level, 4th year
4. Pre-requisites for this course (if any)**:** Theory of statistics (2023101-3)
5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**4Hr /Week**	100
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	40
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify) E-Learning There are many items of this course including answered examples and exercises the student should log on his blackboard to get understanding and then solve the exercises.	
	Total	40

B. Course Objectives and Learning Outcomes

1. Course 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.

2. Course Main Objective

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

1- Recognize the basics and concepts of financial instruments. Outline elements of the theory of interest.

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2- 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.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding:**	
1.1	recognize the existence and uniqueness of solutions to a given optimization problem.	K1
1.2	memorize the rate of convergence and complexity requirements of various optimization algorithms.	K1
2	**Skills:**	
2.1	design optimization algorithms on a computer	S4
2.2	develop performance of different optimization models and methods from both theoretical and numerical perspectives.	S4
2.3	explain the underlying principles and limitations of modern techniques and algorithms for optimization	S4
3	**Values:**	
3.2	Show the responsibility for their own learning and continuing personal and professional development.	V2

C. Course Content

No	List of Topics	Contact Hours
1	Interdiction. Future value Present value	4
2	Annuities: This includes determining the rate of discount and the number of periods.	4
3	Net present value - Payback rule	4
4	The internal rate of return. Bound valuations	4
5	Expected Return.	4
6	**Midterm exam,** Variance. Portfolio - Portfolio Weights - Portfolio Return - Portfolio Variance	4
7	Portfolio optimization Insurance cost and fair premiums.	4
8	Expected cost claims	4
9	Timing of incomes claims.	4
10	Administrative costs and profit loading.	4
Total		40

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D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding:**		
1.1	recognize the existence and uniqueness of solutions to a given optimization problem.	• Lectures • Group discussions	• Quizzes • Assignments
1.2	memorize the rate of convergence and complexity requirements of various optimization algorithms.	• Lectures • Group discussions	• Exams • Assignments
2.0	**Skills:**		
2.1	design optimization algorithms on a computer	• Interactive classes • Group discussions	• Quizzes • Assignments
2.2	develop performance of different optimization models and methods from both theoretical and numerical perspectives.	• Lectures • Group discussions	• Exams • Quizzes
2.3	explain the underlying principles and limitations of modern techniques and algorithms for optimization	• Lectures • Self-learning through the website	• Exams • Quizzes • Assignments
3.0	**Values:**		
3.2	Show the responsibility for their own learning and continuing personal and professional development.	Projects.	Through the oral presentation of the projects.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Quizzes + Home works**	**Continues**	**10 %**
2	**Midterm exam**	**5th-6th**	**30 %**
3	**Class Work (Homework- report- class test….)**	**8th**	**10 %**
4	**Final exam**	**11th**	**50 %**

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

6 hours per week (as defined in the teaching schedule of the faculty member) for academic advice and consultations.
Teaching staff is also available using Blackboard web site and Taif University "Edugate" System.

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F. Learning Resources and Facilities

1.Learning Resources

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

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**Lecture halls, containing white boards, and electronic monitors - The seats fit the number of students.**
Technology Resources (AV, data show, Smart Board, software, etc.)	
Other Resources (Specify, e.g., if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Peer Reviewer Students	Direct Indirect
Extent of achieving the course learning outcomes	Peer Reviewer Students	Direct Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department of Mathematics and Statistics
Reference No.	11
Date	12-7-1443 H

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