اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Financial Mathematics
Course Code:	MTH 313
Program:	BS-Mathematics
Department:	Mathematics
College:	College of Sciences, AlZulfi
Institution:	Majmaah University, Saudi Arabia

Table of Contents

A. Course Identification

1. Credit hours: 4(3+1)	
2. Course type	
a. University ☐ College ☐ Department ☑ Others ☐	
b. Required ☐ Elective ☑	
3. Level/year at which this course is offered: 1st & 2nd Semester, Fourth Level/Second year	
4. Pre-requisites for this course (if any)**: NA**	
5. Co-requisites for this course (if any)**: NA**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	10	35 %
2	**Blended**	4	14 %
3	**E-learning**	14	51 %
4	**Correspondence**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Learning Hours
	Contact Hours	
1	**Lecture**	16
2	**Laboratory/Studio**	
3	**Tutorial**	11
4	**Others** (specify) Project	1
	Total	28
	Other Learning Hours*	
1	**Study**	10
2	**Assignments**	5
3	**Library**	5
4	**Projects/Research Essays/Theses**	10
5	**Others** (specify)	
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description:

This course covers financial market, income statement, interest rate, present value and future value, forward contracts, Valuation of forward contract on a security that provides no income, Valuation of forward contract on a security that provides known cash income, Options, Definition of option contracts., European call option, European put option, Option pricing, trading strategy involving option, The Black-Scholes option pricing model , The Black-Scholes PDE, The boundary conditions for Black-Scholes PDE , Solving for the Black-Scholes PDE for the price of European call option, Evaluation of the European put option, Evaluation of European option contracts on a security that provides dividends, Introduction to insurance.

2. Course Main Objective

This course aims at integrating mathematical information and utilizing it in relation to financial, investment and insurance matters by raising financial and investment problems and their solutions, identifying ways to solve them using mathematical and statistical information. This course also aims at studying insurance policies and the risks associated with working in this field against the expected returns.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Use** computer mathematical software in solving mathematical Problems. Here, student will use computer softwares such as R or excel to import some stock history prices from well-known websites such as Yahoo finance then they will create their portfolio with identified weights and return, standard deviation and how this affect their portfolios.	K2
2	**Skills :**	
2.1	**Manipulate** mathematical problems practically. Students here use the formulas of time value of stocks and investments and make decisions about their impact on companies and financial institutions, linking them with relevant decisions.	S3
3	**Values:**	
3.1	**Show** the ability for decision making. By offering to buy assets of existing companies from their expected profits, and also linking them to expected risks, the student can make some decisions for the benefit of the existing institution by knowing the time value of money and expected returns and linking them with possible risk.	C1

C. Course Content

No	List of Topics	Contact Hours

1	financial market, income statement, interest rate, present value and future value, forward contracts.	**4**
2	Valuation of forward contract on a security that provides no income, Valuation of forward contract on a security that provides known cash income.	**4**
3	Risk and return, portfolio management, investment in stocks	**4**
4	Options, Definition of option contracts., European call option, European put option, Option pricing, trading strategy involving option, The Black-Scholes option pricing model , The Black-Scholes PDE, The boundary conditions for Black-Scholes PDE , Solving for the Black-Scholes PDE for the price of European call option, Evaluation of the European put option, Evaluation of European option contracts on a security that provides dividends.	**6**
5	Introduction to insurance, insurance policies, managing insurance with possible losses.	**6**
Total		**24**

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	Know the time and actual value of money. Know the proper planning to face future plans without debt. Find out about safe investment, and risk with high returns. Know the European and American option contracts and how to manage them. Knowledge of insurance and its policies, and better insurance against expected losses.	**Direct teaching**: Inquiry-based instruction PowerPoints and discussions. Pose problems for students without solutions to stimulate their brainstorming. **Aimed teaching**: Discovery and oral questions	• Assignments • Quizzes • Midterm • Final Exam • E-exam • Oral Exam •
2.0	**Skills**		
2.1	The students will be able to make a decision regarding safe and risk-based investment as well. The student will be better able to identify the debts and loans that he can commit without risk.	**Direct teaching**: Lectures Differentiation **Aimed teaching**: Discovery and oral questions **Indirect teaching**: Peer Learning	• Assignments • Quiz • Midterm • Final Exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	The student will be better able to create and manage their own investment portfolio professionally.		
2.2	The student will be better able to use software to analyze data and include illustrations. The student will have the ability to understand figures, charts and graphs.	**Direct teaching**: Lectures **Aimed teaching**: Discovery and oral questions **Indirect teaching**: Computer softwares, Peer Learning •	• Assignments • project
3.0	**Values**		
3.1	Students should be able to understand the time values of money, the best methods for safe investment, and the ability to create portfolios and determine their expected returns, the right choice for insurance needs.	**Direct teaching**: Lectures **Aimed teaching**: Discovery and oral questions **Indirect teaching**: Cooperative Learning	• Assignments • Quizzes • Midterms • Final Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz 1	3	5%
2	Quiz 2	5	5%
3	Mid Term Exam 1	6	20%
4	Quiz 3	9	5%
5	Assignment-1	10	10%
6	Quiz 4 (MCQ)	11	5%
7	Assignment-2	12	10%
8	Project	9-11	10%
9	Black board Exam	Before final exam	10%
10	Final Exam	At the end of classes	20%
Total			100%

*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:

1-   During Covid-19 circumstances, I used also my mobile and WhatsApp to contact with my students and give an academic advises.

- Wednesday10-12. (female group).

- Monday 1-3(male group).

2-   The contact with students by e-mail and website.
3- activation of the virtual classrooms and academic guidance via Black Board **LMS**.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Ross, S.A., Westerfield, R., Jordan, B.D. and Biktimirov, E.N., 2004. Essentials of corporate finance. McGraw-Hill/Irwin. 1) John C. Hull: Options, Futures, and Other Derivatives, 9th Edition, Pearson Education Limited, Harlow, United Kingdom, 2018.
Essential References Materials	1. **Harrington, S.E. and Niehaus, G., 1999.** *Risk management and insurance*. **Second edition, McGraw-Hill/Irwin.** 2. **Ross, S.A., Westerfield, R., Jordan, B.D. and Biktimirov, E.N., 2004.** *Essentials of corporate finance*. **McGraw-Hill/Irwin.**
Electronic Materials	https://lms.mu.edu.sa/webapps/blackboard/execute/modulepage/view?course_id=_50074_1&cmp_tab_id=_51470_1&editMode=true&mode=cpview
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- The size of the room should be proportional to the number of students - Provide enough seats for students. - The number of students do not exceed on 30 in the classroom
Technology Resources (AV, data show, Smart Board, software, etc.)	- Mathematics Lab is equipped with a computer. - Provide overhead projectors and related items i.e smart Board, Wi-Fi, AV. - Updated Mathematical software packages like Excel, R
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	https://lms.mu.edu.sa/webapps/blackboard/execute/modulepage/view?course_id=_50074_1&cmp_tab_id=_51470_1&editMode=true&mode=cpview

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and

Evaluation Areas/Issues	Evaluators	Evaluation Methods
		admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
Quality of learning resources.	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)

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	Mathematics Department
Reference No.	27
Date	8/8/1442 H -21/3/2021 G 10th December 2020

Head of Department

Dr. Muqrin Almuqrin