SYLLABUS

Course Code	*Course Num.*	*Course Name*	*Credit Hours*	*Lec.*	*Lab.*	*Tut.*	*Private study*	*Pre-requisites*	*Course Level*	*Teaching Language*
MAT	**371**	**Financial Mathematics (1)**	**3**	**2**	**0**	**2**	**5**	**قصد 100**	**6[1]**	**English**

A. Course Description

This course is designed to introduce students to Financial Mathematics. They will learn about the different types of interest (simple interest, compound interest) and annuities. The topics expose as well the fundamental concepts such as cash flows, present value, and yield that form the basis for further advanced learning. More topics will also be covered.

B. Course Outcomes

At the end of this course the student will be able to:

- Work with various forms of interest rates and the basic compound interest functions in order to value cash flows
- Use the theory of compound interest and the time value of money to compute the present value of future payments.
- To set up equations of value to be solved for unknown yield rates, payment amounts, or payment times.
- To calculate both the present and accumulated values of annuities, and the price of bonds and other fixed income investments.
- To construct loan amortization schedules under various payment schedules and interest assumptions.

C. References

Required Textbook

Theory of Interest, 3rd Edition, Stephen Kellison, McGraw-Hill Education, 2009.

Other 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.

Course Website: Google Classroom Webpage: http://www.imamm.org/

[1] *B.Sc. in Applied Mathematics.*

D. Topics Outline

1. **Simple and Compound Interest:** Time Unit. Effective Rate of Interest, Accumulation at Constant Rate of Interest. Present Value at Constant Rate of Interest, Varying Rate of Interest, Precision of Calculations.
2. **Cashflows:** Accumulation and Present Values of Discrete-Time Cashflows, Level Annuities Certain, Increasing Annuities Certain, Perpetuities, Notation- Annuities Payable m-Times per Time Unit.
3. **The Yield on a Series of Cashflows:** The Equation of Value, Existence and Uniqueness of Yields, Finding Yields Approximately Using Linear Interpolation.
4. **Project Appraisal:** The Discounted Cashflow Model, Internal Rate of Return (IRR), Net Present Values (NPV), Break-Even Duration, Different Borrowing and Lending Rates.
5. **Measuring Rates of Return on a Fund:** Money-Weighted Rate of Return, Linked Internal Rate of Return, Time-Weighted Rate of Return.
6. **Loan Schedules**: Loans Repayable by Annuities, Capital and Interest Content of Repayments, Capital Outstanding, Alterations to the Terms of a Loan
7. **Fixed Interest Securities:** Overview of Fixed-Interest Securities: Pricing a Fixed Interest Security for a Given Yield, Finding the Yield on a Fixed Interest Security for a Given Price, Income Tax and Capital Gains Tax.
8. **Nominal Rates of Interest:** Interest Compounding Times m-Time Unit, Relations between Effective and Nominal Interest Rates and Discount Rates.

E. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homeworks:** During the semester.
- **Final Exam:** 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 20 %	**Midterm 2:** 20 %	**Final Exam:** 40 %
3 Quizzes, 3 Homeworks, Attendance & Participation: 20 %		

The grading distribution:

A^+	A	B^+	B	C^+	C	D^+	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)

G. Student Workload:

#	Teaching/learning activities	Contact Hours	Frequency	Total Contact hours	Self-study hours	Total self-study hours	Student Learning Time
1	Lecture	2	15	30	1	15	45
2	Tutorial	2	15	30	2	30	60
3	Lab\Practical	0	0	0	0	0	0
4	Homework	0	3	0	0.5	7.5	7.5
5	Quiz	0.25	3	0.75	1	3	3.75
6	Test (Midterm)	1.5	2	3	6	12	15
7	Final Exam	2	1	2	12	12	14
Total				**65.75**		**79.5**	**145.25**

Independent self-study = 79.5/15 ≅ 5 hrs per week

H. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. ("Immediate family" is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

Executive Rules for Study Regulations and Exams
goo.gl/ykm7t3