KINGDOM OF SAUDI ARABIA
AL-IMAM MOHAMMAD BIN SAUD
ISLAMIC UNIVERSITY
FACULTY OF SCIENCES
DEPARTMENT OF MATHEMATICS

المملكة العربية السعودية
جامعة الإمام محمد بن سعودالإسلامية
كلية العلوم
قسم الرياضيات والإحصاء

Course Code	Course Num.	Course Name	Credit Hours	Lec	Lab	Tut	Prerequisites
MAT	371	Financial Mathematics(1)	3	3	0	1	

Objectives:

Students will learn how the theory of compound interest and the time value of money are used to compute the present value of future payments. Students will be able to calculate both the present and accumulated values of annuities, and the price of bonds and other fixed income investments. They will be able to construct loan amortization schedules under various payment schedules and interest assumptions. They will be able to set up equations of value to be solved for unknown yield rates, payment amounts, or payment times.

Syllabus:

-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.

-Cashflows: Accumulation and present values of discrete-time cashflows. Level annuities certain. Increasing annuities certain. Perpetuities. Notation -- annuities payable times per time unit.

The yield on a series of cashflows: The equation of value. Existence and uniqueness of -yields. Finding yields approximately using linear interpolation.

Project appraisal: The discounted cashflow model. Internal rate of return (IRR). Net present values (NPV). Break-even duration. Different borrowing and lending rates.

Measuring rates of return on a fund: Money-weighted rate of return. Linked internal -rate of return. Time-weighted rate of return.

Loan schedules: Loans repayable by annuities. Capital and interest content of repayments. Capital outstanding. Alterations to the terms of a loan.

-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.

Nominal rates of interest: Interest compoundingtimes per time unit. Relations between effective and nominal interest rates and discount rates.

References:

-Schaum's Outline: Mathematics of Finance, By P. Zima & R. L. Brown. (2nd Edition),- McGraw Hill 1996.

-An Elementary Introduction to Mathematical Finance, by: Sheldon M. Ross, University of California, Berkeley.

-Introduction to mathematical finance, by: D. Heath and G. Swindle (Eds), American Mathematical Society, 1999.