MTH221e Principles of Financial Mathematics

Level: 2

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JULY

E-Learning: BLENDED - Learning is done MAINLY online using interactive study materials in Canvas. Students receive guidance and support from online instructors via discussion forums and emails. This is supplemented with SOME face-to-face sessions. If the course has an exam component, this will be administered on-campus.

Synopsis:

Financial mathematics is the application of mathematics to finance. Whatis finance? Generally, it concerns the study of how one allocates resources over time. Activities of allocating resources are usually called investments.In plain words, an investment is the current commitment of dollars for a period of time to derive future payments that will compensate the investors for the time the funds are committed, the expected rate of infation, and the uncertainty of future payments.MTH221 aims to provide an introduction to the fundamentals of financial mathematics such as the theory of interest, utility theory, risk aversion and single-period portfolio optimization.

Topics:

- Some basic principles.
- Typical problems in financial mathematics.
- Basic theory of interest.
- Present and future values of streams.
- Fixed-income securities.
- Yield, duration and immunization.
- Yield curve.
- Forward rates and term structure explanations.
- Expectations dynamics.
- Floating rate bonds and duration.
- Applied interest rate analysis.
- Dynamic cash flow processes

Textbooks:

: Mastering Financial Calculations: A step-by-step guide to the mathematics of financial market instruments (eTextbook) 3rd Edition Pearson
ISBN-13: 978027370604-AA

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Learning Outcome:

● Describe the fundamental principles and concepts of corporate finance and investment science such as cash flow streams, arbitrage, risk aversion, pricing of firms and finance instruments, interest rate term structure, fixed income instruments duration, bond portfolio immunization.
● Interpret the FV and PV of a single sum of money, ordinary annuity, a perpetuity (PV only), an annuity due, or a series of uneven cash flows.
● Identify an implied forward rate for any future period based on actual rates of interest prevailing in the market at a specific time.
● Describe the spot-rate curve from a list of bonds in the market.
● Discuss duration, modified duration, and convexity to calculate estimate changes in price of bonds accompanying a shift in yield to maturity.
● Calculate/Illustrate bond portfolio immunization against interest changes.
● Solve problems involving the time value of money as applied, for example, to mortgages and savings.
● Examine and appraise capital investment alternatives using the concepts of time value of money.
● Apply a range of mathematical techniques to solve a variety of quantitative problems.
● Analyze and solve problems individually and as part of a group.
● Solve a number of problem sets within strict deadlines.
● Solve problems related to financial mathematics using IT.

Assessment Strategies:

Continuous Assessment Component	Weightage (%)
COMPUTER MARKED ASSIGNMENT	8
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PRE-CLASS QUIZ	2
PRE-CLASS QUIZ	2
PRE-CLASS QUIZ	2
Sub-Total	**30**

Examinable Component	Weightage (%)
Written Exam	70
Sub-Total	**70**

Weightage Total   **100**