

**OFFICIAL SYLLABUS**  
**MATH 340 – THEORY OF INTEREST**

(Adopted Fall 2009; Committee: Z. Agustin, Ed Sewell)

**Catalog Description:** Measures of interest, annuities, yield rates, amortization schedules and sinking funds, economic rationale for interest, stochastic approaches to interest. Prerequisite: Math 152

**Textbook:** Mathematics of Investment and Credit, 3<sup>rd</sup> Edition, by Samuel Broverman

**Course Outline and Topics**

Chapter 1 – Interest Rate Measurement

- 1.1 Interest Rate Accumulation and Effective Rates of Interest
- 1.2 Present Value and Equations of Value
- 1.3 Nominal Rates of Interest
- 1.4 Effective and Nominal Rates of Discount
- 1.5 The Force of Interest
- 1.6 Inflation and the “Real” Rate of Interest

Chapter 2 – Valuation of Annuities

- 2.1 Level Payment Annuities
- 2.2 Level Payment Annuities – Some Generalizations
- 2.3 Annuities with Non-Constant Payments
- 2.4 Applications and Illustrations (except Subsections 2.4.2 and 2.4.3)

Chapter 3 – Loan Repayment

- 3.1 The Amortization Method of Loan Repayment
- 3.2 Amortization of a Loan with Level Payments
- 3.3 The Sinking-Fund Method of Loan Repayment

Chapter 4 – Bond Valuation

- 4.1 Determination of Bond Prices
- 4.2 Amortization of a Bond
- 4.3.1 Callable Bonds: Optional Redemption Bonds

Chapter 5 – Measuring the Rate of Return of an Investment

- 5.1 Internal Rate of Return and Net Present Value (except Subsection 5.1.4)
- 5.2 Dollar-Weighted and Time-Weighted Rate of Return
- 5.3 Applications and Illustrations (except Subsection 5.3.2)

Chapter 6 – The Term Structure of Interest Rates

- 6.1 Spot Rates of Interest
- 6.3 Forward Rates of Interest

Chapter 7 – Cashflow Duration and Immunization

- 7.1 Duration of a Set of Cashflows and Bond Duration
- 7.2 Asset-Liability Matching and Immunization

Chapter 8 – Additional Topics in Finance and Investment

- 8.2.1 Stock Valuation
- 8.2.4 Mutual Funds
- 8.3.1 Certificates of Deposit
- 8.3.2 Money Market Funds

**Any instructor should cover all of the material specified, additional sections are optional.**