

**THEORY OF INTEREST  
MATH 3400**

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**1.0 Course Objectives**

- 1.1 Overview of Content and Purpose:** (3 hours) A study of the measurement of interest, annuities, amortization schedules and other miscellaneous topics.
- 1.2 For whom Intended:** For students who may have an interest in an actuarial career or persons presently employed by the insurance community who may be interested in taking the third actuary examination.
- 1.3 Prerequisite:** MATH 1970

**2.0 Objectives**

- 2.1 Performance Objectives for the Students:** To introduce students to the theory of interest which plays a large role in the insurance and banking world.

**3.0 Content and Organization**

- 3.1 Topics:**
1. The measurement of interest
    - a. Introduction
    - b. The accumulation and amount functions
    - c. The effective rate of interest
    - d. Simple interest
    - e. Compound Interest
    - f. Present value
    - g. The effective rate of discount
    - h. Nominal rates of interest and discount
    - i. Varying interest
    - j. Summary of results
  2. Solution of problems in interest
    - a. Introduction
    - b. Obtaining numerical results
    - c. The basic problem
    - d. Equations of value
    - e. Unknown time
    - f. Unknown rate of interest
  3. Elementary annuities
    - a. Introduction
    - b. Annuity-immediate
    - c. Annuity-due
    - d. Annuity values on any date
    - e. Perpetuities
    - f. Fractional terms
    - g. Unknown time
    - h. Unknown rate of interest
    - i. Varying interest

4. More general annuities
  - a. Introduction
  - b. Annuities payable less frequently than interest is convertible.
  - c. convertible.
  - d. Annuities payable more frequently than interest is convertible.
  - e. convertible.
  - f. Continuous annuities
  - g. Unknown time and unknown rate of interest
  - h. Elementary varying annuities
  - i. More general varying annuities
  - j. Continuous varying annuities
5. Amortization schedules and sinking funds
  - a. Introduction
  - b. Finding the outstanding principal
  - c. Amortization schedules
  - d. Sinking funds
  - e. Differing payment periods and interest conversion periods.
  - f. Yield rates
  - g. Reinvestment rates
6. Bonds and other securities
  - a. Introduction
  - b. Types of securities
  - c. Price of a bond
  - d. Premium and discount
  - e. Valuation between interest payment dates
  - f. Determination of yield rates
  - g. Capable bonds
  - h. Serial bonds
  - i. Some generalizations
  - j. Other securities

## **4.0 Teaching Methodology**

- 4.1 Methods to be Used:** The class will be presented primarily in lecture form.

## **5.0 Evaluation**

- 5.1 Basis for Evaluating Student Performance:** The grade will be determined primarily from examinations and problem assignments.

## **6.0 Resource Material**

- 6.1 Textbook(s) or Other Required Readings:** Parmenter, *Theory of Interest and Life Contingencies with Pension Applications*, Actex publishers, ISBN 1-56698-333-9