

## SOA Course 5 – Application of Basic Actuarial Principles

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The examination for this course consists of five hours of multiple-choice and written-answer questions. A read-through time will be given prior to the start of the exam, 15 minutes in the morning session and 10 minutes in the afternoon session.

This course develops the candidate's knowledge of basic actuarial principles applicable to a variety of financial security systems: life, health, and property & casualty insurance, annuities, and retirement systems. The candidate will be required to understand the purpose of these systems, the design and development of financial security products, the concepts of anti-selection and risk classification factors, and the effects of regulation and taxation on these issues. The course will develop the candidate's knowledge of principles and practices applicable to the determination of premiums and rates and the valuation and funding of these financial security systems.

### Learning Objectives

#### A. Basic Principles of Design

After studying the material, the candidate should be able to:

1. Explain how financial security programs interact to combat financial insecurity.
  - a. Explain the meaning of financial insecurity.
  - b. Explain why financial security programs are necessary
  - c. Identify which programs are better suited to solve specific problems
2. Analyze the Product Development Process.
  - a. Determine why an institution would develop certain plans or products.
    - Determine if a plan or product is necessary and marketable.
    - Determine if this plan or product fits into the culture of the institution.
    - Evaluate the competitive issues involved with developing this plan or product.
  - b. Determine the steps necessary to develop these plans or products.
    - Evaluate the setting of assumptions.
    - Calculate asset shares.
    - Analyze the results of product pricing.
    - Determine profitability measures.

- c. Determine the effect of regulation and taxation on the design of these plans or products.
    - Explain why insurance regulation and taxation are necessary.
    - Evaluate the effectiveness of specific regulation and taxation on financial security programs.
    - Structure financial security programs to take into account the effect of specified taxation and regulation assumptions.
3. Distinguish between the various types of financial security products including:
- a. Life insurance (Individual, Group)
    - Identify various products.
    - Explain unique product features.
    - Select the best product to use given a set of criteria.
  - b. Health (Individual, Group, Government sponsored)
    - Identify various products.
    - Explain unique product features.
    - Select the best product to use given a set of criteria.
  - c. Retirement plans (Individual annuities, Employer sponsored, Government sponsored)
    - Identify various products.
    - Explain unique product features.
    - Select the best product to use given a set of criteria.
  - d. Property and Casualty insurance
    - Identify various products.
    - Explain unique product features.
    - Select the best product to use given a set of criteria.
  - e. Social Insurance
    - Identify various programs.
    - Explain unique features.
    - Explain differences and similarities between private insurance and social insurance.

4. Compare the various methods of distributing these products and the effectiveness of each method.
  - a. Compare current distribution systems.
  - b. Determine which distribution system is best in various situations.
  - c. Evaluate fictitious distribution systems.

#### B. Basic Principles of Risk Classification

After studying the material, the candidate should be able to:

1. Explain anti-selection.
2. Evaluate the risk classification factors used for:
  - a. Life Insurance (Individual, Group)
    - Explain the relative value of specific factors.
    - Identify the effect of a specific set of factors.
    - Evaluate the cost/benefit of gathering certain criteria.
  - b. Health (Individual, Group, Government sponsored)
    - Explain the relative value of specific factors.
    - Identify the effect of a specific set of factors.
    - Identify the effect of regulation on gathering information.
    - Evaluate the cost/benefit of gathering certain criteria.
  - c. Retirement plans (Individual annuities, Employer sponsored, Government sponsored)
    - Explain why certain factors are necessary and their relative value.
    - Identify the effect of a specific set of factors.
    - Identify the effect of regulation on gathering information.
    - Evaluate the cost/benefit of gathering certain criteria.
  - d. Property and Casualty insurance
    - Explain the relative value of specific factors.
    - Identify the effect of a specific set of factors.
    - Evaluate the cost/benefit of gathering certain criteria.
  - e. Non-traditional

- Explain the relative value of specific factors.
  - Identify the effect of a specific set of factors.
3. Determine the methods of gathering necessary information.
    - a. Compare the effectiveness of various gathering techniques.
    - b. Identify which techniques are better given a specific situation.
  4. Analyze the effect of risk classification on the design process.
    - a. Identify how risk classification affects product design.
    - b. Identify how risk classification affects distribution.

### C. Basic Principles of Pricing/Ratemaking/Funding

After studying the material, the candidate should be able to:

1. Describe the objectives for the various coverages.
2. Evaluate the assumptions used in pricing.
  - a. Claims (frequency and severity)
    - Decide what assumptions should be considered.
    - Explain the relative value of certain assumptions.
  - b. Expenses/taxes
    - Decide what assumptions should be considered.
    - Explain the relative value of certain assumptions.
  - c. Interest
    - Decide what assumptions should be considered.
    - Explain the relative value of certain assumptions.
  - d. Decrements (lapse/termination, retirement, death, disability)
    - Decide what assumptions should be considered.
    - Explain the relative value of certain assumptions.
3. Describe the major pricing/funding techniques/methods for:
  - a. Life Insurance (Individual, Group)
  - b. Health (Individual, Group)
  - c. Retirement Plans (Individual, Group)

- d. Property and Casualty insurance
- 4. Evaluate the profit/surplus implications for pricing/funding.
  - a. Life insurance (Individual, Group)
    - Describe methods of evaluating pricing.
    - Develop different types of profit/surplus measures.
  - b. Health (Individual, Group)
    - Describe methods of evaluating pricing.
    - Develop different types of profit/surplus measures.
  - c. Retirement Plans
    - Describe methods of evaluating cost/funding.
  - d. Property and Casualty insurance
    - Describe methods of evaluating pricing.
    - Develop different types of profit/surplus measures.

#### D. Basic Principles of Valuation

After studying the material, the candidate should be able to:

1. Explain, in general, what a valuation is and the different purposes of performing a valuation.
  - a. Explain ways in which regulation can impact valuation.
  - b. Explain non-regulation purposes of valuation.
2. Evaluate valuation techniques and methodology.
  - a. Prospective (PVFB—PVFP)
    - Determine the actuarial value resulting from applying the methodology.
    - Determine the purposes for which the technique/method is appropriate.
    - Explain the limitations or implications of the valuation technique.
    - Evaluate the choice of assumptions.
    - Explain how the results can be verified.
  - b. Retrospective (accumulation type/deposit fund liabilities)

- Determine the actuarial value resulting from applying the methodology.
  - Determine the purposes for which the technique/method is appropriate.
  - Explain the limitations or implications of the valuation technique.
  - Evaluate the choice of assumptions.
  - Explain how the results can be verified.
- c. Claims Reserves
- Determine the actuarial value resulting from applying the methodology.
  - Determine the purposes for which the technique/method is appropriate.
  - Explain the limitations or implications of the valuation technique.
  - Evaluate the choice of assumptions.
  - Explain how the results can be verified.
3. Interpret the results of the valuation.
- a. Describe the components of a report/opinion.
  - b. Explain the variances or limitations of the results.

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## **Texts**

- *A Problem Solving Approach to Pension Funding and Valuation*, (Second Edition), 1996, by Aitken, W.H., Chapters 1–4.
- *Fundamentals of Private Pensions*, (Seventh Edition), 1996, by McGill, D.M., Brown, K.N., Healy, J.J., and Schieber, S.J., Chapters 22–24.
- *† Group Insurance*, (Fourth Edition), 2003, edited by Bluhm, W.F., Chapters 1, 4 (exclude Federal Income Tax Implications and Statutory Considerations), 5-7, 11-13, 16 (Begin with Government Programs) 17-18, 22-23, 27-28, 32, 38-39, 42 (exclude from Network Development through Test Marketing)
- *Individual Health Insurance*, 1988, by O’Grady, F.T., Chapters 1, 2 (sections 2.1.6–2.1.8, and 2.4), 3, 4 (sections 4.6–4.7)
- *Life Insurance Products and Finance*, 2000, by Atkinson, D., and Dallas, J., Chapters 1–11 and 13.

- # *Introduction to Ratemaking and Loss Reserving for Property and Casualty Insurance*, (Second Edition), 2001, by Brown, R.L., Chapters 1–4.