



**R. A. Podar College of Commerce and Economics
(Autonomous)
Matunga, Mumbai.**



**Syllabus
and
Question Paper Pattern
of**

**Bachelor of Commerce with Actuarial Studies
B.Com (Actuarial Studies)**

Third Year (Semester V and VI)

Under Choice Based Credit System

Academic Year 2023-2024

Faculty of Commerce

www.rapodar.ac.in

Bachelor of Commerce with Actuarial Studies

B.Com (Actuarial Studies)

Under Choice Based Credit, Grading and Semester System

Course Structure

T. Y. B.Com with Actuarial

Academic Year- 2022-2023

| Course Code | Semester V | Credits | Course Code | Semester VI | Credits |
|----------------------|---------------------------------------------------------|-----------|----------------------|---------------------------------------------------------|-----------|
| 1 | <i>Discipline Related Elective (DRE) Courses</i> | | 1 | <i>Discipline Related Elective (DRE) Courses</i> | |
| 30501 | Advanced Financial Mathematics paper I | 03 | 30601 | Advanced Financial Mathematics Paper II | 03 |
| 30502 | Investment Analysis- Paper I | 03 | 30602 | Investment Analysis- Paper II | 03 |
| 30503 | Business Communication in German- I | 03 | 30603 | Business Communication in German- II | 03 |
| 30504 | Actuarial Risk Management - I | 03 | 30604 | Actuarial Risk Management - II | 03 |
| 2 | <i>Core Courses (CC)</i> | | 2 | <i>Core Courses (CC)</i> | |
| 30505 | Customer Relationship Management –Paper I | 04 | 30605 | Customer Relationship Management –Paper II | 04 |
| 3 | <i>*Project Work</i> | | 3 | <i>*Project Work</i> | |
| 30506 | Project Work I | 04 | 30606 | Project Work II | 04 |
| Total Credits | | 20 | Total Credits | | 20 |
| | | | | | |

Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme With effect from the Academic Year 2021-2022

Semester V

1. Discipline Related Elective (DRE) Courses

Course code: 30501

1. Advanced Financial Mathematics –I (03 Credits)

Course Objectives

1. In-depth understanding of interest rates, duration of assets and liabilities, studying of actuarial models.
2. Understanding and application of distributions used for calculating losses and risk models.

Course Outcome

1. The learner can describe the main factors influencing the term structure of interest rates and can explain what is meant by, derive the relationships between, and evaluate discrete spot rates and forward rates, continuous spot rates and forward rates.
2. The learner is able to explain what is meant by the par yield and yield to maturity, understand duration, convexity and immunisation of cashflows and can Explain how duration and convexity are used in the (Redington) immunisation of a portfolio of liabilities.
3. The learner can infer the concept of a stochastic investment return model, losses, risk models and the fundamental distinction between this and a deterministic model and derive algebraically, for the model in which the annual rates of return are independently and identically distributed and for other simple models, recursive relationships and independent lognormal distribution

Modules at a Glance

| Advanced Financial Mathematics - I | | |
|------------------------------------|-----------------------------------------------|-----------------|
| Sr. No. | Modules | No. of Lectures |
| 1 | Interest rate yield curves | 15 |
| 2 | Principles of actuarial modelling. | 15 |
| 3 | Fundamentals of frequency and severity models | 15 |
| 4 | Fundamentals of aggregate models | 15 |
| Total no. of Lectures: | | 60 |

| Sr.No. | Modules |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Interest Rate Yield Curves |
| | <ul style="list-style-type: none"> i. Demonstrate a clear understanding of interest rates underlying a bond yield curve. ii. Spot rate from ZCYC, b) Forward rate, c) Link between the two, d) Instantaneous forward rate, e) Link between a, b and d, f) Par yield, g) Yield to Maturity, h) Gross and Net Redemption Yield (arising from the tax implication from the differential treatment of capital gain and interest). iii. Calculate duration of liabilities and assets using first principles. iv. Apply differentiation techniques to calculate modified duration and convexity of a bond portfolio. v. Explain the principles underlying the immunization of net assets and liability driven investment of a pension fund, using Redington's Immunization Theory. The approximate change in present value due to a change in interest rate. Construct an investment portfolio to: Protect the value of an asset-liability portfolio using either Redington or full immunization Exactly match a set of liability cash flows. vi. Describe the properties of various stochastic models of the term structure of interest rates. vii. Explain the limitations of the models described above and describe attempts to address them. viii. Calculate: <ul style="list-style-type: none"> Either Macaulay or modified duration given the other. Using 1st-order linear approximation based on modified duration. Using 1st-order approximation based on Macaulay duration. |
| 2 | Principles of Actuarial Modeling |
| | <ul style="list-style-type: none"> i. Describe why and how models are used including, in general terms, the use of models for pricing, reserving, and capital modeling. ii. Explain the benefits and limitations of modeling. iii. Explain the difference between a stochastic and a deterministic model, and identify the advantages/disadvantages of each. iv. Describe the characteristics of and explain the use, of scenario-based models. v. Describe, in general terms, how to decide whether a model is suitable for any particular application. |

| | |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> vi. Explain the difference between the short-run and long-run properties of a model, and how this may be relevant in deciding whether a model is suitable for any particular application. vii. Describe, in general terms, how to analyze the potential output from a model, and explain why this is relevant to the choice of model. viii. Describe the process of sensitivity testing of assumptions in a life insurance reserving model and explain why this forms an important part of the modeling process. ix. Explain the sensitivity testing of assumptions in a defined benefit pensions model from a review Ind AS 19 disclosures from published financial statements of companies. x. Produce an audit trail enabling detailed checking and high-level scrutiny of a model. xi. Explain the factors that must be considered when communicating the results following the application of a model and produce appropriate documentation. |
| 3 | Fundamentals of Frequency and Severity Models |
| | <ol style="list-style-type: none"> 1. Explain the characteristics of distributions suitable for modeling frequency of losses, expected value, variance, and standard deviation of both the loss random variable and the corresponding payment random variable upon the application of policy adjustments for example: Poisson, mixed Poisson, binomial, negative binomial, and geometric distributions. 2. Identify applications for which each distribution may be used; explain the reasons why; and apply the distribution to the application, given the parameters. 3. Recognize classes of distributions, including extreme value distributions, suitable for modeling the distribution of severity of loss and their relationships. 4. Apply the following techniques for creating new distributions: multiplication by a constant, raising to a power, exponentiation, mixing. 5. Calculate various measures of tail weight and interpret the results to compare the tail weights. |
| 4. | Fundamentals of Aggregate Models |
| | <ol style="list-style-type: none"> 1. Compute relevant moments, probabilities and other distributional quantities for collective risk models. 2. Compute aggregate claims distributions and use them to calculate loss probabilities. 3. Evaluate the effect of coverage modifications (deductibles, limits and coinsurance) and inflation on univariate and Bi variate models. |

References:

1. ActEd Study Material Subject CM2 2019 Actuarial Education Company, acted@bpp.com
2. Actuarial Mathematics, Bowers, L. Newton, et. al., ISBN 0938959468, Society of Actuaries USA
3. An introduction to the mathematics of finance by McCutcheon, J. J., Scott, W. F., Heinemann, 1986. ISBN: 043491228X
4. Mathematics of Finance 2nd Edition Schaum's Outline Series Peter Zima, Robert Browns Tata McGraw-Hill Publishing Company Ltd.
5. Derivatives Markets (3rd edition), by Robert McDonald, Pearson India.
6. Options, Futures and Other Derivatives, by John Hull and S. Basu, 9789352866595, Pearson Education.
7. John Freund's Mathematical Statistics with Applications by Miller, 131427067, Prentice Hall.
8. The Term Structure of Interest Rates, by Robert A. Jarrow, Annual Reviews 2009.
9. Elementary Statistics by Mario Triola 9780321369185, Prentice Hall.
10. Descriptive Statistics by R. J. Shah, Sheth Publishers.
11. Statistical Methods by R. J. Shah, Sheth Publishers.

Evaluation scheme

I. Continuous Assessment (C.A.)– 40 Marks

- 1) Assessment 1 (20 Marks)
- 2) Assessment 2 (20 Marks)

II Semester End Examination (SEE)- 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

Note: 1) Attempt all Questions

2) All Questions carry equal marks

3) Attempt any 3 from the 4 sub questions given for all the questions

| Question No | Particulars | Marks |
|------------------|----------------------|----------|
| Q -1 (Unit I) | A) B) C) D) | 15 Marks |
| Q -1 (Unit II) | A) B) C) D) | 15 Marks |
| Q -3 (Unit III) | A) B) C) D) | 15 Marks |
| Q4 (Unit IV) | A) B) C) D) | 15 marks |

**Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022**

Semester V

1. Discipline Specific Elective (DSE) Courses

Course code: 30502

2. Investment Analysis-I (03 Credits)

Course Objectives

1. Understanding of different asset classes, economic influences on assets, relationship between risk and return.
2. Understanding investment policy for Indian savings, employee benefit plans, insurance companies.
3. Analysing measures of investment risk and asset valuation.

Course Outcome

1. Learners will learn to manage the business and financial objectives of a financial institution or an individual through an assessment of the portfolio assets and liabilities in an integrated manner.
2. Learners will be able to create and interpret mathematical framework for assembling a portfolio of assets such that the expected return is maximized for a given level of risk.
3. They Will learn about unitization of individual assets as well as a portfolio
4. Learners will also understand the broad set of different investment avenues

Modules at a Glance

| Investment Analysis-I | | |
|-------------------------------|--------------------------------------------------------------------|------------------------|
| Sr. No. | Modules | No. of Lectures |
| 1 | Investments and markets | 15 |
| 2 | Investment policy in long-term savings and employee benefits | 15 |
| 3 | Behavioural finance for investment and measures of investment risk | 15 |
| 4 | Equity and bond valuation | 15 |
| Total No. of Lectures: | | 60 |

| Sr. No. | Modules |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Investments and Markets |
| | <ul style="list-style-type: none"> i. Describe the characteristics of the main investment assets and of the markets in such assets ii. Describe the characteristics of the main derivative investments (including forwards, futures, General properties of options and calculations of currency swaps and Interest rate swaps) and of the markets in such investments iii. Explain the principal economic influences on investment market price levels and total returns. iv. Describe and explain the theoretical and historical relationships between the total returns and the components of total returns on the main asset classes and key economic variables. |
| 2 | Investment Policy in Long-Term Savings and Employee Benefits |
| | <ul style="list-style-type: none"> i. Regulation and investment policy in India: banks, insurers, approved provident funds, approved superannuation (pension) funds, approved gratuity funds, mutual fund schemes, national pension scheme, overseas investment ii. Investment environment: Anti-money laundering, ESG (Environmental, Social and Governance), taxation of dividend and capital gains, special purpose vehicles relevant in actuarial work e.g., tax-approved superannuation funds, provident funds, gratuity funds. iii. Assess the investment avenues for life insurance companies viz. participating fund, non-participating fund, pension plans, unit-linked plans, controlled fund. iv. Assess the investment avenues for general insurance companies. v. Assess the investment avenues for PFRDA registered pension funds. vi. Explain the investment risk-seeking avenues of the special purpose vehicles in actuarial work e.g., tax-approved superannuation funds, provident funds, gratuity funds. |
| 3 | Behavioural Finance for Investment and Measures of Investment Risk |

- | | |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ol style="list-style-type: none">1. Testing behavioural finance theories in investment decisions<ol style="list-style-type: none">i. The herd instinctii. Anchoring and adjustmentiii. Self-serving biasiv. Loss aversion<ol style="list-style-type: none">v. Confirmation biasvi. Availability biasvii. Familiarity bias.viii. Asset prices and their deviationix. Explain the main findings of behavioral finance.<p style="margin-left: 40px;">Identify empirical examples of market anomalies that show results contrary to the EMH.</p><p style="margin-left: 40px;">Understand how asset prices, especially in times of uncertainty and high volatility, can deviate significantly from their fundamental values.</p>2. Explain and analyse the various measures of investment risk.<ol style="list-style-type: none">i. Variance of return |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

References :

1. ActEd Study Material Subject CM1 2019 Actuarial Education Company, acted@bpp.com
2. ActEd Study Material Subject CM2 2019 Actuarial Education Company, acted@bpp.com
3. Derivatives Markets (3rd edition), Robert McDonald, Pearson India
4. Options, Futures and Other Derivatives, by John Hull and S. Basu, 9789352866595, Pearson Education.
5. An introduction to the mathematics of finance by McCutcheon, J. J., Scott, W. F. Heinemann, 1986. ISBN: 043491228X.
6. Behavioural Finance, by Prasanna Chandra, ISBN 9389811287, McGraw Hill India.
7. The Behavioural Investor by Daniel Crosby, ISBN 9388423623, Jaico Publishers.
8. Pension Fund ESG Risk Disclosures: Developing Global Practice, International Actuarial Association 2020.
9. The Term Structure of Interest Rates, by Robert A. Jarrow, Annual Reviews 2009.

Evaluation scheme I

Continuous Assessment (C.A.)– 40 Marks

- 1) **Assessment 1** (20 Marks)
- 2) **Assessment 2** (20 Marks)

II .Semester End Examination (SEE)- 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

Note: 1)Attempt all Questions

2)All Questions carry equal marks

3) Answer any 3 from the following 4 sub questions for every question

| Qu estio n N o | Pa rticu la rs | Marks |
|-----------------------|-----------------------|--------------|
| Q -1 (Un it I) | A) B) C) D) | 15 Marks |
| Q -2 (U nit II) | A) B) C) D) | 15 Marks |
| Q -3 (U nit III) | A) B) C) D) | 15 Marks |
| Q4 (Un it IV) | A) B) C) D) | 15 marks |

Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme

With effect from the Academic Year 2021-2022

Semester V

1. Discipline Specific Elective (DSE) Courses

Course code: 30503

**3. Business Communication in German– I
(03 Credits)**

Course Objectives:

1. To prepare young adults for German business communication
2. To prepare young adults to deal with German clients in business situations

Course Outcome:

Students will

1. learn vocabulary and basic grammar for business situations
2. learn about portraits of German companies
3. be able to understand basic business conversations
4. be able to write business emails in German

Modules at a Glance

| Business Communication in German– I | | |
|--------------------------------------------|---------------------------------|------------------------|
| Sr. No. | Module | No. of Lectures |
| 1 | Induction of new employee | 20 |
| 2 | Establishment of a new office | 10 |
| 3 | Official and personal work time | 10 |
| 4 | Report Writing | 10 |
| Total No. of Lectures: | | 50 |

Business Communication in German– I

| Sr. No. | Units |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit I | Induction of new employee |
| | <p>Business Etiquettes: conversations with colleagues and clients</p> <ul style="list-style-type: none"> i. Learn about Greetings and salutations in Germany and German speaking countries. ii. Introducing oneself and others iii. Learning to spell name (semantics) iv. name a profession v. visiting cards format vi. personal data and fill a personal data form vii. To understand private emails about new job and colleague viii. To close conversations ix. Contributions by German mathematical scientists: Carl Friedrich Gauss , Wilhelm Leibniz and Albert Einstein . |
| Unit II | Establishment of a new office |
| | <ul style="list-style-type: none"> i. To understand articles of a noun (Grammer) ii. To name office furniture and colors iii. To fill basic details in graphics of quality analysis iv. To select and order office stationery v. To frame private emails and messages on social media |
| Unit III | Official and unofficial meetings |
| | <p>Differences between official and unofficial clock hour To understand how to make official and unofficial appointments Vocabulary: Weekdays, months, seasons Grammar: Negative with nicht, preposition of time, conjunctions aber denn und oder</p> |
| Unit IV | Report Writing |
| | <ul style="list-style-type: none"> i. To understand an email regarding industrial visit ii. To understand rules and regulations of an industrial visit iii. To fill in an organization chart iv. To talk about one’s firm v. To describe about an industrial visit in a short email |

References:

1. DaF im Unternehmen A1 Kurs – und Übungsbuch, Klett Verlag

Teaching pedagogy:

1. Guided listening and reading comprehension at individual level
2. Practicing oral skills in pairs
3. Discussions in group

Evaluation scheme I

Continuous Assessment (C.A.)– 40 Marks

- 1) **Assessment 1** (20 Marks)
- 2) **Assessment 2** (20 Marks)

II Semester End Examination (SEE)- 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

- Note:**
- 1) Attempt all Questions
 - 2) All Questions carry equal marks
 - 3) Attempt any 3 from the 4 sub questions given below in all the questions

| Qu estio n N o | Pa rticu la rs | Marks |
|-----------------------|-----------------------|--------------|
| Q -1 (Unit I) | A) B) C) | 15 Marks |
| Q -2 (Unit II) | A) B) C) | 15 Marks |
| Q -3 (Unit III) | A) B) C) | 15 Marks |
| Q4 (Unit IV) | A) B) C) | 15 marks |

Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022

Semester V

1. Discipline Specific Elective (DSE) Courses

Course code: 30504

4. Actuarial Risk Management-I (03 Credits)

Course Objectives

1. To recognize and understand various terms used in financial market services.
2. To understand the special features of the job of an actuary.
3. To identify the risk factors (micro and macro) in insurance business.
4. To acquire skills for mitigating or avoiding the risk elements.
5. To enable the learner to estimate, compute and quantify the risk elements.
6. To be aware of the features of the Indian Insurance Market.

Course Outcome

1. The student understands the importance of actuarial services to the clients.
2. The student is acquainted with various types of risks.
3. The student learns how to deal with risks.
4. The student understands the risk environment
5. The student understands the components of business environment.
6. The student identifies the factors determining a suitable design for financial structure.
7. The student learns about the importance of data requirement

Modules at a Glance

| Actuarial Risk Management – Paper I | | |
|--------------------------------------------|---------------------------------------------------------|------------------------|
| Sr. No. | Modules | No. of Lectures |
| 1 | Introduction to Actuarial Risk Management | 15 |
| 2 | Environmental Aspects in Actuarial Risk Management - I | 15 |
| 3 | Environmental Aspects in Actuarial Risk Management - II | 15 |
| 4 | Contract Design | 15 |
| Total No. of Lectures: | | 60 |

| Sr. No. | Modules |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Introduction to Actuarial Risk Management |
| | <ul style="list-style-type: none"> • Actuarial Stakeholders and their requirements • Actuarial Services to various Stakeholders and their Importance • Duties and Responsibilities of an Actuary in carrying out his professional job – highlighting the responsibility of giving advice and for taking decisions. • Financial and other products, schemes, contracts and other arrangements (Contingent). • Financial services: Pricing, Reserving/ Provisioning and Capital Modeling and linkages. |
| 2 | Environmental Aspects in Actuarial Risk Management - I |
| | <ul style="list-style-type: none"> • Business Environment for an actuary and the various components • Risk Environment – Financial Risks and Business - Concept of Systematic, Diversifiable risk and Risk Adjusted Returns in Systematic Risk. • Concept of Risk Appetite and Attainment of Risk Efficiency • Dealing with Risks: Risk Avoidance, Risk Mitigation, Risk Transfer and Risk Retention. • Portfolio approach to the overall management of risk, including Proportionality for respective stakeholders. |
| 3 | Environmental Aspects in Actuarial Risk Management - II |
| | <ul style="list-style-type: none"> • Regulatory Environment • Investment Environment • Demographic and Social Environment • Capital Environment • Enterprise Risk Management: An Introduction. |
| 4 | Contract Design |
| | <ul style="list-style-type: none"> • Factors determining a suitable design for financial structures e.g. products, schemes, contracts or other arrangements • Nature of service e.g. Asset based (Bank Lending) and Liability based (Insurance, Deposits, Asset Management) • Use of Actuarial Techniques • Data requirement for contract designing – Problems in gathering data – Grouping of Data |

Reference Books:

1. Financial Risk Manager Handbook: FRM Part I / Part II + Test Bank (Wiley Finance) by Philippe Jorion
2. Value at Risk, 3rd Ed. by Philippe Jorion
3. Managing Investment Portfolios: A Dynamic Process (CFA Institute Investment Series) by John L. Maginn
4. Pension Fund Risk Management: Financial and Actuarial Modeling (Chapman & Hall/Crc Finance Series) by Marco Micocci
5. Actuarial Finance: Derivatives, Quantitative Models and Risk Management by Mathieu Boudreault
6. Financial Enterprise Risk Management (International Series on Actuarial Science) by Paul Sweeting
7. Financial Enterprise Risk Management (International Series on Actuarial Science) 1st Edition by Paul Sweeting (Author)

Evaluation scheme

I. Continuous Assessment (C.A.)– 40 Marks

- 1) Assessment 1 (20 Marks)
- 2) Assessment 2 (20 Marks)

II .Semester End Examination (SEE)- 60 Marks

QUESTION PAPER PATTERN OF SEMESTER

Maximum Marks: 60 Marks

Time: 2 Hours

Note: 1)Attempt all Questions

2) All Questions carry equal marks

3) Attempt any 3 from the 4 sub questions given below in all the questions

| Qu estio n N o | Pa rticu la rs | Marks |
|-------------------|----------------------|----------|
| Q -1 (Un it I) | A) B) C) D) | 15 Marks |
| Q -2 (U nit II) | A) B) C) D) | 15 Marks |
| Q -3 (U nit III) | A) B) C) D) | 15 Marks |
| Q4 (Un it IV) | A) B) C) D) | 15 marks |

**Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022**

**Semester V
2.Core Courses (CC)**

5. Customer Relationship Management Paper- I

Course Code: 30505

(04 Credits)

Course Objectives:

1. To help the Learners to understand the concepts of CRM and e-CRM.
2. To know the CRM practices in service sectors.
3. To understand the values of customer.

Course Outcome

After completion of this course, the student will be able to

1. Apply the concept of CRM, the benefits delivered by CRM, the contexts in which it is used, the technologies that are deployed and how it can be implemented.
2. Implement how CRM practices and technologies enhance the achievement of marketing, sales and service objectives throughout the customer life-cycle stages of customer acquisition, retention and development whilst simultaneously supporting broader organizational goals.
3. Implement various technological tools for data mining and also successful implementation of CRM in the Organizations
4. Design customer relationship management strategies by understanding customers' preferences for the long-term sustainability of the Organizations.

Modules at a Glance

| Sr.No. | Modules | No. of Lectures |
|---------------|------------------------------------------|------------------------|
| 1 | Introduction of CRM and its Fundamentals | 20 |
| 2 | Customer Acquisition | 20 |
| 3 | Customer Retention | 20 |
| 4 | CRM Mechanics | 20 |
| | Total | 80 |

Customer Relationship Management Paper-I

| Sr.No. | Modules/Units |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit I | Introduction of CRM and its Fundamentals |
| | <ul style="list-style-type: none"> i. Concept and Context of Relationship Management: Internal and External relationship management, Need and Importance of relation with customers and other stakeholders ii. Approach towards Marketing: A Paradigm Shift- Transition from Product focus to Customer focus, Transactional Vs Relationship Marketing, Linkage between customer satisfaction-Customer Loyalty and business performance, Relationship Management Theories, Building Brands through Relationship Marketing, Service Level Agreements. iii. Defining CRM, Levels of CRM, CRM as a strategic marketing tool, CRM significance to the stakeholders, Strategic CRM, Operational CRM, Analytical CRM, Collaborative CRM, and Models of CRM. |
| Unit II | Customer Acquisition |
| | <ul style="list-style-type: none"> i. Acquisition of new customer, understanding customer value, sources of customer value, Values from products, services, people, physical evidence, customer communication, Channels etc., customer value estimates, KPI of a customer acquisition program, Customer Touch Points, Customer Equity. ii. Conceptual frame work of Customer Relationship and its Management. Evaluation customer Relationship Marketing, Types of CRM – Win Back, Prospecting, Loyalty, Cross Sell and Up Sell, Significance and Importance of CRM in Modern Business Environment. iii. Concept of Loyalty at CRM: Definition of Loyalty, Customer Loyalty and Customer decency, Process of Developing Customer Loyalty. Status of CRM in India. |
| Unit III | Customer Retention |

| | |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none">i. Concept of Customer retention. Role of CRM in Customer in retention, Economics of customer retention, Managing customer retention or value retention/ Strategies of customer retention,ii. KPI of customer retention program, Terminating customer relationship and its strategies, Concept and Significance of Customer Loyalty.iii. Customer Life Cycle and Customer Life Time Value (CLTV), Recency, Frequency and Monetary Value (RFM) Analysis, Customer Loyalty Ladder, Impact Of Customer Defections, Types of Defectors, Strategies to reduce customer defections, CRM Framework- Switching. |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Unit IV | CRM Mechanics |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> <li>i. Maintaining customer database, Desirable database attributes, Data marts, Data warehousing, Data integration, Data mining and Privacy issues. <li>ii. Customer Portfolio Management-Concept and basic disciplines, Market segmentation-sales forecasting and CPM, CPM in B2B, Seven core customers' management strategies. <li>iii. CRM and Customer Experience Management: Concept of Customer experience, experiential marketing strategies and Tactics, Customer experience and Role of CRM. |

RECOMMENDED BOOK

Jagdish N Sheth, Parvatiyar Atul, G Shainesh, Customer Relationship Management: Emerging Concepts, Tools and Applications, 1st Edition, Tata McGraw Hill, June 2008

REFERENCE BOOKS

Judith W .Kincaid , Customer Relationship Management Getting it Right, Pearson Education

H.Peeru Mohamed , A Sagadevan, Custmer Relationship Management, A Step by Step Approach, Vikas Publishing House

Customer Centricity –Focus on right customer for strategic advantage, by Peter Fader, Wharton Digital Press, 2012

Evaluation scheme

I. Continuous Assessment (C.A.) 40 Marks

1) **Assessment 1** (20 Marks)

2) **Assessment 2** (20 Marks)

II Semester End Examination (SEE) 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

Note: 1) Attempt all Questions

2) All Questions carry equal marks

3) Attempt any 3 from the following 4 sub questions for every question

| Qu estio n N o | Pa rticu la rs | Marks |
|-----------------------|-----------------------|--------------|
| Q -1 (Un it I) | A) B) C) D) | 15 Marks |
| Q -2 (U nit II) | A) B) C) D) | 15 Marks |
| Q -3 (U nit III) | A) B) C) D) | 15 Marks |
| Q4 (Un it IV) | A) B) C) D) | 15 marks |

**Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022**

Semester V

Course Code: 30506

3. Project Work I (04 Credits)

Course Objectives

1. Understanding the process of doing research is conducted from introduction to conclusion.
2. Learning about research methodology, literature review, data analysis and project appraisal.

Course Objectives

1. The learners are able to formulate hypotheses and are equipped to write research papers.
2. The learner cultivates a research-oriented approach at an early age and is able to put his/her thoughts across precisely and concisely

Modules at a Glance

| Project Work I | | |
|-------------------------------|--------------------------------------------------------------|------------------------|
| Sr. No. | Modules | No. of Lectures |
| 1 | Introduction to research paper writing and Literature Review | 15 |
| 2 | Research Methodology and data analysis | 15 |
| 3 | Review papers | 15 |
| 4 | Project report and Presentation | 15 |
| Total No. of Lectures: | | 60 |

| Sr. No. | Modules |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Paper Review |
| | <ul style="list-style-type: none"> ● Introduction to Research Paper Writing and Literature Review Introduction- In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner. ● Research Methodology A student is expected to generate independent knowledge, ideas, and dimensions as well as distil the existing theory from the research papers listed below. ● Review Papers Literature Review- This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on same issue. ● Report and Presentation Students are expected to draft two reports based on the three research paper options as provided below. |
| 2 | Data Science using R Programming and Python |
| | <p>Understand how approaches may differ compared to using an ordinary least squares model, including lasso, ridge regression, and KNN.</p> <ul style="list-style-type: none"> -Explain the purpose and uses of decision trees. -Explain and interpret decision trees, considering regression trees and recursive binary splitting. -Explain and interpret bagging, boosting, and random forests -Explain and interpret classification trees, their construction, Gini index, and entropy -Compare decision trees to linear models -Interpret the results of a decision tree analysis -Conduct risk analysis. <p>Use a decision tree to model future outcomes and analyze real options embedded in a project.</p> |
| 3 | Retirement planning - Pension Plans and Benefits |
| | <ul style="list-style-type: none"> - Describe and compare defined contribution and defined benefit pension plans including final salary and career average earning plans. - Describe retiree health care plans - Identify and interpret the common states and decrements for pension plans, and the parametric and tabular models, including Markov chain models, associated with these decrements. |

| | |
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| | <p>Given particular participant data, plan provisions, and valuation assumptions, apply the Markov chain models to defined benefit pension plans and calculate and interpret replacement ratios, accrued benefits, gain or loss, and their expected values with adjustments such as the early retirement reduction factor.</p> <ul style="list-style-type: none"> - Given particular participant data, plan provisions, and valuation assumptions, calculate and interpret the actuarial accrued liability and the normal cost for a defined benefit plan under the projected unit credit (PUC) cost method and the traditional unit credit (TUC) cost method. - Identify and interpret the assumptions and methods for retiree health care plans. Given particular participant data, plan provisions, and valuation assumptions, calculate and interpret the expected present value of future benefits, accumulated postretirement benefit obligation (APBO), and the normal cost or service cost for retiree health care plans. - Calculate and interpret the effect of changes in underlying valuation assumptions such as mortality, discrete salary increase changes, other decrements and interest. - Apply appropriate approximation methods such as uniform distribution of deaths, constant force, Woolhouse, and Euler. |
| 4 | Option Greeks and Risk Management (Semester 5 or 6) |
| | <ul style="list-style-type: none"> - Explain the calculation and use of option price partial derivatives. <ul style="list-style-type: none"> o Compute and interpret Option Greeks, including Delta, Gamma, Theta, Vega, Rho, and Psi. o Compute the elasticity, Sharpe ratio, and risk premium for both an individual option (call or put) and a portfolio consisting of both options of multiple types and the underlying stock. o Approximate option prices using Delta, Gamma, and Theta. - Explain how to control risk by using options in a hedging context. <ul style="list-style-type: none"> o Perform delta hedging by calculating the quantities of option units and stock shares to hold, and whether those positions should be long or short. o Perform gamma hedging by calculating the quantities of option units (of various types) and stock shares to hold, and whether those positions should be long or short. - Apply options and other derivatives in the context of actuarial-specific risk management. <ul style="list-style-type: none"> o Understand how life insurers use derivatives to hedge long-term risks from the asset portfolio. o Understand how P&C insurers use derivatives to hedge short-term risks from the liability portfolio. o Understand how investment guarantees can be formed from equity-linked insurance & annuities. |

| | |
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| | o Understand how options are employed in both pension funding and asset/liability management. |
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Viva will be conducted on the day of presentations.

Research paper review

At the end of the course, students should write a 750 words paper review on any two of the following three research papers :

1. Assessing the enabling environment for disaster risks financing – a country diagnostic toolkit, Asian Development Bank, 2020.

<https://www.think-asia.org/bitstream/handle/11540/12131/disaster-risk-financing-country-diagnostics-toolkit.pdf?sequence=1>

- a. An appreciation of the principles of disaster risks financing,
- b. The role of various types of insurance for disaster risks financing,
- c. A country’s macro- and meso-level interventions to finance disaster risks,
- d. Tools to assess a country’s macro- or public finance-readiness for disaster risk,
- e. Coordinates of the tool to assess a country’s meso- or insurance industry-readiness for disaster risks: Government Policy, Economic Conditions & Support Functions, Product Availability & Affordability, Credibility of Insurance & Capital market stakeholders, Social Protection Policy, and Unlicensed & Informal Players.

2. Teaching ethics to actuaries, AF Marais, Actuarial Society of South Africa (2015).

<https://actuarialsociety.org.za/convention/convention2015/wp-content/uploads/2015/10/2015-Marais.pdf>

- a. Arguments for ethics education especially in the actuarial profession,
- b. An appreciation of the ‘value’ proposition within normative skills,
- c. A comparison of ethics education embodied in the medical and accounting professions,
- d. Sequential integration of ethics into technical subjects,
- e. Ethical dimensions: Cognitive competence, behavioural competence, managerial competence.

3. A Mathematician’s Apology, G H Hardy, 1940.

<https://www.math.ualberta.ca/mss/misc/A%20Mathematician%27s%20Apology.pdf>

- a. Mathematics as an art and beauty as the first test of mathematics,
- b. A commentary on the great mathematicians’ contributions,
- c. An appreciation of the difference between pure and applied areas,
- d. The principles underlying elegant, timeless theorems viz. Euclid’s “Infinity of primes”, Fermat’s “Two squares theorem on primes”, Pythagoras’ proof of “Irrationality of $\sqrt{2}$.”
- e. Skills that are relevant and irrelevant to pure mathematicians.

Evaluation scheme for Project- 04 Credits

Continuous Assessment (C.A.)– 40 Marks

- Class test- 1 (20 Marks)
- Class test-2 (20 Marks)

**Semester End Examination (SEE)- 60 Marks Two
Paper review submission (750 words approx.)**

The review should comprise:

- Outline of the theme
- Key ideas of the paper
- Own comprehension of a few ideas
- Relevance of the discussed ideas to actuarial work.

Viva will be conducted for both the submissions.

**Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022**

**Semester VI
Discipline Specific Elective (DSE) Courses**

Course Code: 30601

1. Advanced Financial Mathematics

II

(3 Credits)

Course Objectives

1. Capital requirement, capital modeling and time series.
2. Valuation and Pricing of options using different models like Black-Scholes model, binomial model. Learning in detail about credit risk.

Course Outcomes:

1. The learner is able to describe the assumptions, principal results and uses of the Sharpe-Lintner- Mossin Capital Asset Pricing Model (CAPM).
2. The learner can discuss the limitations of the basic CAPM and some of the attempts that have been made to develop the theory to overcome these limitations. Perform calculations using the CAPM.
3. The learner is able to show how to use binomial trees and lattices in valuing options and solve simple examples.
4. The learner can Derive the risk-neutral pricing measure for a binomial lattice and describe the risk-neutral

Modules at a Glance

| Advanced Financial Mathematics II | | |
|------------------------------------------|-------------------------------|------------------------|
| Sr. No. | Modules | No. of Lectures |
| 1 | Capital and economic modeling | 15 |
| 2 | Option theory-1 | 15 |
| 3 | Option theory-2 | 15 |
| 4 | Credit risk models | 15 |
| Total No. of Lectures: | | 60 |

| Sr. No. | Modules |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Capital and Economic Modeling |
| | <ol style="list-style-type: none"> 1. Explain why financial institutions need capital and describe different capital measures, including regulatory capital and economic capital. (B2) 2. Describe the process of capital modeling 3. Describe different methods of risk aggregation and explain their relative advantages and disadvantages. 4. Describe and apply the main concepts underlying the analysis of time series models. 5. Describe the effect of capital structure on a company. 6. Calculate the effect from changes in capital structure on a company's overall value, equity beta, cost of debt, cost of equity, and weighted-average cost of capital, assuming the two Modigliani and Miller propositions hold. 7. Understand the effect of corporate tax and costs of financial distress, including the threat of bankruptcy, on the capital structure of a company. 8. Understand the role of agency costs and asymmetric information in affecting a company's array of financing choices. |
| 2 | Option Theory-1 |

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| | <ol style="list-style-type: none"> 1. Option pricing and valuations: Explain the cash flow characteristics and terms relating to various options. Define and recognize the following terms relating to option classification: call and put options, expiration date, strike price, moneyness, and option style. Calculate the payoff and profit on both long and short positions with respect to both call and put options. 2. State what is meant by arbitrage and a complete market. 3. Outline the factors that affect option prices: Calculate the payoffs on exotic options: Asian (arithmetic and geometric), barrier, compound, gap, and exchange. Calculate the payoffs on exotic options: lookback, chooser, shout, rainbow, and forward start. 4. Show how to value a forward contract. 5. Develop upper and lower bounds for European and American call and put options: Understand how the following option strategies can be used as tools to manage financial risk or speculate on price or volatility: option spreads (bull, bear, ratio), collar, straddle, strangle, and butterfly spread. Evaluate the payoff and profit of the option strategies described above Explain the general properties of options that affect option prices. Apply put-call parity to European options on stocks with no dividends, stocks with continuous dividends, stocks with discrete dividends, currencies, and bonds. Compare options with respect to term-to-maturity and strike price. Identify factors affecting the early exercise of American options and the situations where the values of European and American options are the same. 6. Explain what is meant by put-call parity. 7. Show how to use binomial trees and lattices in valuing options and solve simple examples. 8. Derive the risk-neutral pricing measure for a binomial lattice and describe the risk-neutral pricing approach to the pricing of equity options: Understand the concepts underlying the risk-neutral approach to valuing derivatives securities in the context of the Binomial Option Pricing Model Use the Binomial Option Pricing Model to calculate the value of European and American call and put options, along with the value of Asian and barrier options. Price options under a one-period binomial model on a stock with no dividends. Extend the binomial model to multi-period settings for pricing both European and American call and put options. Extend the binomial model to other underlying assets, including stock indices with continuous dividends, currencies, and futures contracts. 9. Explain the difference between the real-world measure and the risk-neutral measure: Apply option strategies in a risk management context. 10. Explain why the risk-neutral pricing approach is seen as a computational 11. tool (rather than a realistic representation of price dynamics in the real world). |
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12. State the alternative names for the risk-neutral and state-price deflator approaches to pricing.
13. Recognize that a long put can be used as an insurance strategy for a long stock position and a long call can be used as an insurance strategy for a short stock position.
14. Explain the concept of no arbitrage and the risk-neutral approach to valuing derivatives securities.
15. Understand the concept of no arbitrage when comparing actual and synthetic calls, or when comparing actual and synthetic puts.
16. Describe the characteristics and terms of the main derivatives instruments (including forwards and futures).
17. Distinguish between long and short positions for both assets (including short selling of stocks) and derivatives on assets.
18. Recognize the transaction costs affecting profit calculations for both assets and derivatives on assets (including commissions and bid-ask spread).
19. Describe the characteristics and terms relating to both forward contracts and prepaid forward contracts.
20. Define and recognize the following terms relating to the timing of stock purchases: outright purchase, fully leveraged purchase, prepaid forward contract and forward contract.
21. Determine payoffs and profits for both long and short positions on forward contracts.
22. Calculate prices for both forward contracts and prepaid forward contracts on stocks with no dividends, continuous dividends, and discrete dividends.
23. Construct a synthetic forward from the underlying stock and a risk-free asset and identify arbitrage opportunities when the synthetic forward price is different from the market forward price.
24. Describe the characteristics and terms relating to both futures contracts and the associated margin accounts.
25. Define and recognize the following terms relating to the mark-to-market process:
26. Marking to market, margin balance, maintenance margin, and margin call.
27. Evaluate an investor's margin balance based on changes in asset values.

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| 3 | Option Theory-2 |
| | <ol style="list-style-type: none"> 1. Demonstrate an understanding of the Black–Scholes derivative-pricing model. 2. Explain what is meant by risk-neutral pricing and the equivalent martingale measure. 3. Demonstrate how to price and hedge a simple derivative contract using the martingale approach. 4. Explain the Black-Scholes Formula. Derive the Black–Scholes partial differential equation both in its basic and Garman–Kohlhagen forms. Recognize the assumptions underlying the Black-Scholes model. Estimate a stock’s historical volatility from past stock price data. Use the Black-Scholes Formula to value European calls and puts on stocks with no dividends, stock indices with continuous dividends, stocks with discrete dividends, currencies, and futures contracts. Generalize the Black-Scholes Formula to value gap calls, gap puts, and exchange options, chooser options, and forward start options. Show how to use the Black–Scholes model in valuing options and solve simple examples. 5. Demonstrate an awareness of the commonly used option structures. 6. Explain the properties of the lognormal distribution and its applicability to option pricing. 7. Calculate lognormal-based probabilities and percentiles for stock prices. 8. Calculate lognormal-based means and variances of stock prices. 9. Calculate lognormal-based conditional expectations of stock prices given that options expire in-the-money. |
| 4 | Credit Risk Models |
| | <p>Explain the various approaches to bond valuation e.g., statistical factor-based, intensity-based (e.g., generator matrix), and capital-structure based (e.g., Merton model).</p> <p>Evaluate the value of a bond using the structure based and intensity models.</p> <p>Examine the transformation of transition intensity to probability of a bond’s default and thereby on value.</p> <p>Appreciate a bond’s rating to its default transition intensity and probability.</p> |

References :

1. ActEd Study Material Subject CM1 2019 Actuarial Education Company, acted@bpp.com
2. ActEd Study Material Subject CM2 2019 Actuarial Education Company, acted@bpp.com
3. Derivatives Markets (3rd edition), Robert McDonald, Pearson India
4. Options, Futures and Other Derivatives, by John Hull and S. Basu, 9789352866595, Pearson Education.
5. An introduction to the mathematics of finance by McCutcheon, J. J., Scott, W. F., Heinemann, 1986. ISBN: 043491228X.
6. Pension Fund ESG Risk Disclosures: Developing Global Practice, International Actuarial Association 2020.
7. The Term Structure of Interest Rates, by Robert A. Jarrow, Annual Reviews 2009.

Evaluation scheme

I. Continuous Assessment (C.A.)– 40 Marks

- 1) Assessment 1 (20 Marks)
- 2) Assessment 2 (20 Marks)

II .Semester End Examination (SEE) - 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

- Note:**
- 1) Attempt all Questions
 - 2) All Questions carry equal marks
 - 3) Attempt any 3 from the following 4 sub questions for every question

| Qu estio n N o | Pa rticu la rs | Marks |
|-------------------|----------------------|----------|
| Q -1 (Un it I) | A) B) C) D) | 15 Marks |
| Q -2 (U nit II) | A) B) C) D) | 15 Marks |
| Q -3 (U nit III) | A) B) C) D) | 15 Marks |
| Q4 (Un it IV) | A) B) C) D) | 15 marks |

Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022

Semester VI

1. Discipline Specific Elective (DSE) Courses

Course code: 30602

2. Investment Analysis II (03 Credits)

Course Objectives

1. Understanding asset Liability modelling, risk budgeting, portfolio management, mean-variance portfolio theory.
2. Learning about investment disclosure, financial accounting, and unitisation.

Course Outcomes

1. Learners will learn to manage the business and financial objectives of a financial institution or an individual through an assessment of the portfolio assets and liabilities in an integrated manner.
2. Learners will be able to create and interpret mathematical framework for assembling a portfolio of assets such that the expected return is maximized for a given level of risk
3. They Will learn about unitization of individual assets as well as a portfolio.
4. Learners will also understand the broad set of different investment avenues.

Modules at a Glance

| Investment Analysis II | | |
|-------------------------------|-------------------------------------------------|------------------------|
| Sr. No. | Modules | No. of Lectures |
| 1 | Investment strategy and performance measurement | 15 |
| 2 | Investment accounting and disclosures | 15 |
| 3 | Portfolio management | 15 |
| 4 | Unitisation | 15 |
| Total No. of Lectures: | | 60 |

| Sr. No. | Modules |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Investment Strategy and Performance Measurement |
| | <ul style="list-style-type: none"> i. Explain how asset/liability modelling can be used to develop an appropriate investment strategy ii. Explain methods of quantifying the risk of investing in different classes and sub-classes of investment iii. Explain the use of a risk budget for controlling risks in a portfolio iv. Analyse the performance of an investment portfolio relative to a benchmark v. The greater decision between asset allocation and stock selection especially in efficient markets vi. Risk decomposition between diversifiable and non-diversifiable components vii. Adjusted optimization techniques for risk-adjusted returns. |
| 2 | Investment Accounting and Disclosures |
| | <ul style="list-style-type: none"> i. Disclosures in India: Fact sheets (MF, life insurers), under IFRS-adapted accounting standards for proprietary assets, employee benefit fund assets. ii. Examine the mapping of disclosures to appropriate regulator guidance. iii. Disclosure trends: NGFM (Network for Greening the Financial System), TCFD (Task force on Climate related Financial Disclosures) iv. Assess the use of valuation models for accounting of equity, debt, property, ESOP, etc. v. Assess the accounting for financial instruments e.g., Ind AS 109 (financial investments' measurement and recognition on Balance Sheet), vi. Accounting under Ind AS 102 (share based payments measurement and recognition for accounting purposes) |
| 3 | Portfolio Management |

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| | <ul style="list-style-type: none"> i. Explain the principles and objectives of investment management and analyse the investment needs of an institutional or individual investor ii. Describe methods for the valuation of asset portfolios and explain their appropriateness in different situations iii. Explain how to use mean-variance portfolio theory to calculate an optimum portfolio and describe the limitations of this approach iv. Use mean-variance portfolio theory to calculate the expected return and risk of a portfolio of many risky assets, given appropriate inputs, Mean - Standard deviation diagram. v. Explain asset pricing models for modeling the required rate of returns (e.g., Capital Asset Pricing Model) and valuation of an equity share (e.g., dividend growth model). Explain the Capital Asset Pricing Model (CAPM). Recognize the assumptions and properties of CAPM. Calculate the required return on a particular asset, a portfolio or a project using CAPM. Perform mean-variance analysis. Understand the mean-standard deviation diagram and the resulting efficient market frontier. Calculate the optimal portfolio and determine the location of the capital market line. Understand how portfolio risk can be reduced through diversification across multiple securities or across multiple asset classes. vi. Explain the properties of single and multifactor models of asset returns. vii. Explain factor models. Recognize the assumptions of a factor model for security returns. Identify the expected return, factors, factor betas, and firm-specific components of a security from its factor equation. Calculate the required return on a particular asset, a portfolio or a project using a single-factor and a multi-factor model. |
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| | vii. Explain the assumptions of mean-variance portfolio theory and its principal results |
| 4 | Unitisation |
| | <ul style="list-style-type: none"> i. Explain the basic techniques of unitization e.g., in mutual funds/ unit trusts and life insurance ii. Appreciate the benefits of unitization on transparency, monitoring and valuation iii. Evaluate the benefits and costs of unitization of financial assets iv. Examine the effect of unitization on secondary financial transactions e.g., duration measurement of bond funds, pledge of equities, bonds, mutual funds, ETF. |

References :

1. ActEd Study Material Subject CM1 2019 Actuarial Education Company, acted@bpp.com
2. ActEd Study Material Subject CM2 2019 Actuarial Education Company, acted@bpp.com
3. Derivatives Markets (3rd edition), Robert McDonald, Pearson India
4. Options, Futures and Other Derivatives, by John Hull and S. Basu, 9789352866595, Pearson Education.
5. An introduction to the mathematics of finance by McCutcheon, J. J., Scott, W. F.
6. Heinemann, 1986. ISBN: 043491228X.
7. Behavioural Finance, by Prasanna Chandra, ISBN 9389811287, McGraw Hill India.
8. The Behavioural Investor by Daniel Crosby, ISBN 9388423623, Jaico Publishers.
9. Pension Fund ESG Risk Disclosures: Developing Global Practice, International Actuarial Association 2020.
10. The Term Structure of Interest Rates, by Robert A. Jarrow, Annual Reviews 2009.

Evaluation scheme

I. Continuous Assessment (C.A.)– 40 Marks

1) Assessment 1 (20 Marks)

2) Assessment 2 (20 Marks)

II .Semester End Examination (SEE) - 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

Note:

1) Attempt all Questions

2) All Questions carry equal marks

3) Attempt any 3 from the following 4 sub questions given for every question

| Question No | Particulars | Marks |
|------------------|----------------------|----------|
| Q -1 (Unit I) | A) B) C) D) | 15 Marks |
| Q -2 (Unit II) | A) B) C) D) | 15 Marks |
| Q -3 (Unit III) | A) B) C) D) | 15 Marks |
| Q4 (Unit IV) | A) B) C) D) | 15 marks |

**Syllabus of courses of T.Y.B. Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022**

**Semester VI
Discipline Specific Elective (DSE) Courses**

Course Code: 30603

3. Business Communication in German– II (03 Credits)

Course Objectives:

1. To prepare young adults for German business communication
2. To prepare young adults to deal with German clients in business situations

Course Outcome:

Students will

1. learn vocabulary and basic grammar for business situations
2. learn about portraits of German companies
3. be able to understand basic business conversations
4. be able to write business emails
5. be able to communicate with their business clients

| Modules at a Glance | | |
|---------------------|--------------------------------------------------|-----------------|
| Sr. No. | Module | No. of Lectures |
| 1 | Business over lunch and visit to a client office | 15 |
| 2 | Celebration of milestones in a German company | 15 |
| 3 | Trainee: Experience in different departments | 15 |
| 4 | Organizational Visit and Report | 15 |
| | Total | 60 |

| Sr. No. | Modules |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit I | Business meetings (outside office) |
| | <ul style="list-style-type: none"> i. Planning a lunch discussion ii. understand and initiate a small talk on weather, family and hobbies iii. understand a menu card iv. select and ordering a German meal v. payment etiquettes in a restaurant |
| Unit II | Celebration of milestones in a German company |
| | <ul style="list-style-type: none"> i. To understand an invitation to company event and how to accept or decline it ii. to understand email about events management iii. to give suggestions and to make suggestions iv. to understand a welcome speech v. to understand a valedictory speech |
| Unit III | Trainee: Experience in different departments |
| | <ul style="list-style-type: none"> i. To understand a sitemap ii. To understand Timetable of Transportation iii. To match tasks with various departments iv. To understand protocols v. To understand a travel expense report vi. To give and understand computer commands vii. To understand a newspaper interview with a trainee viii. To answer questions during an interview |
| Unit IV | Organisational visit and report |
| | <ul style="list-style-type: none"> i. To understand flight and train connections ii. To understand weather charts and weather reports iii. To understand conversation about formal and informal clothing iv. To deliver a speech on company development |

References:

1. DaF im Unternehmen A1 Kurs – und Übungsbuch, Klett Verlag

Teaching pedagogy:

1. Guided listening and reading comprehension at individual level
2. Practicing oral skills in pairs
3. Discussions in group

Evaluation scheme

I Continuous Assessment (C.A.)– 40 Marks

- 1) Assessment 1 (20 Marks)
- 2) Assessment 2 (20 Marks)

II Semester End Examination (SEE) - 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

Note: 1) Attempt all Questions

2) All Questions carry equal marks

| Qu estio n N o | Pa rticu la rs | Marks |
|-------------------|----------------------|----------|
| Q -1 (Un it I) | A) B) C) D) | 15 Marks |
| Q -2 (U nit II) | A) B) C) D) | 15 Marks |
| Q -3 (U nit III) | A) B) C) D) | 15 Marks |
| Q4 (Un it IV) | A) B) C) D) | 15 marks |

**Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022**

Semester VI

1. Discipline Specific Elective (DSE) Courses

Course code: 30604

4. Actuarial Risk Management II (03 Credits)

Course Objectives

1. To explain the various components of Actuarial Control Cycle.
2. To understand multiple applications and Limitations of Actuarial Control Cycle.
3. To identify components of and different tools used in Risk Management.
4. To be acquainted with the Methods of Risk Evaluation.
5. To understand Approaches to Problem Definition and Ways to Developing Solution
6. To be acquainted with the implementation of Actuarial Models and Monitoring.
7. To appreciate the framework of Institute of Actuaries of India, Faculty of Actuaries and the financial Reporting Councils

Course Outcome

1. The student acquaints himself with the Actuarial Control Cycle.
2. The student understands various aspects of risk management.
3. The student learns the various stages in producing the solution.
4. The student learns to control and manage the cost of payments arising on contingent events.
5. The student becomes aware of monitoring assessment of actuarial experience.

Modules at a Glance

| Actuarial Risk Management II | | |
|-------------------------------------|---------------------------------------------------|------------------------|
| Sr. No. | Modules | No. of Lectures |
| 1 | Actuarial Control Cycle | 15 |
| 2 | Risk Management | 15 |
| 3 | Defining the Problem and Developing the solution | 15 |
| 4 | Implementation of Actuarial Models and Monitoring | 15 |
| Total No. of Lectures: | | 60 |

| Sr. No. | Modules |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Actuarial Control Cycle |
| | <ul style="list-style-type: none"> i. Meaning and Definition. ii. Process of Actuarial Control Cycle. iii. Essential information for Actuarial Control Mechanism. iv. Multiple Application of Actuarial Control Cycle - Situations and Events. v. Practical Limitations of Actuarial Control Cycle |
| 2 | Risk Management |
| | <ul style="list-style-type: none"> i. Components of Risk Management. ii. Different tools used in Risk Management. iii. Methods of Risk Measurement used by the main providers of benefits on contingent events. iv. Management of Risks with low likelihood but high impact. v. Risk Evaluation using scenario analysis, stress testing and stochastic modeling. |
| 3 | Defining the Problem and Developing the solution |
| | <ul style="list-style-type: none"> i. Approaches to Problem Definition. ii. Use of Actuarial Models and Suitability Analysis. iii. Assumption Setting and Provisioning. iv. Testing the Solution. |
| 4 | Implementation of Actuarial Models and Monitoring |
| | <ul style="list-style-type: none"> i. Principles of Profitability and Surplus Management. ii. Principles of Asset Management and Allocation. iii. Principles of Capital Management. iv. Monitoring the Process. v. Principles of Actuarial Code. |

References:

1. Financial Risk Manager Handbook: FRM Part I / Part II + Test Bank (Wiley Finance) by Philippe Jorion
2. Value at Risk, 3rd Ed. by Philippe Jorion
3. Managing Investment Portfolios: A Dynamic Process (CFA Institute Investment Series) by John L. Maginn
4. Pension Fund Risk Management: Financial and Actuarial Modeling (Chapman & Hall/Crc Finance Series) by Marco Micocci
5. Actuarial Finance: Derivatives, Quantitative Models and Risk Management by Mathieu Boudreault
6. Financial Enterprise Risk Management (International Series on Actuarial Science) by Paul Sweeting
7. Financial Enterprise Risk Management (International Series on Actuarial Science) 1st Edition by Paul Sweeting (Author)

Evaluation scheme

I. Continuous Assessment (C.A.)– 40 Marks

- 1) Assessment 1 (20 Marks)
- 2) Assessment 2 (20 Marks)

II .Semester End Examination (SEE)- 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

Note: 1)Attempt all Questions

2)All Questions carry equal marks

3) Attempt any 3 sub questions from every question

4.

| Qu estio n N o | Pa rticu la rs | Marks |
|-------------------|----------------------|----------|
| Q -1 (Un it I) | A) B) C) D) | 15 Marks |
| Q -2 (U nit II) | A) B) C) D) | 15 Marks |
| Q -3 (U nit III) | A) B) C) D) | 15 Marks |
| Q4 (Un it IV) | A) B) C) D) | 15 marks |

**Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme
With effect from the Academic Year 2021-2022**

Semester VI

2. Core Courses (CC)

Course Code: 30605

5. Customer Relationship Management Paper-II (04 Credits)

Objectives (for the learners):

1. To help the Learners to understand Future Trends in CRM and e-CRM.
2. To know the framework of evolving CRM.
3. To understand CRM in B2C and B2B Market.

Course Outcome:

After completion of this course, the student will be able to

- 1) Apply the concept of CRM in B2C and B2B.
- 2) Implement how CRM practices and technologies enhance the achievement of marketing, sales and service objectives throughout the customer life-cycle stages of customer acquisition, retention and development whilst simultaneously supporting broader organizational goals.
- 3) Apply principles underlying the requirements of the professional standards and guidance relevant to actuaries practising in Indian health and care operations
- 4) Privacy, Ethics issues of CRM

Modules at a Glance

| Sr.No. | Modules | No. of Lectures |
|--------|------------------------------------------------|-----------------|
| 1 | Overview of CRM in B2C and B2B Market | 20 |
| 2 | Implementation of CRM and Future Trends in CRM | 20 |
| 3 | CRM emerging concepts and perspective – | 20 |
| 4 | Architecture of CRM | 20 |
| | Total | 80 |

| Sr.No. | Modules/Units |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit I | Overview of CRM in B2C and B2B Market |
| | <ul style="list-style-type: none"> i. Service business characteristics and classification, Service recovery, CRM in Banking Industry, Hospitality Industry, Aviation Industry, Telecom and Retail industry. ii. CRM in Consumer durable Industry and its application. - White Goods, common CRM Tools in Practice and improvisation for Quality Service Assurance. iii. Importance of CRM in B2B markets, Key Account Management, Supply channel Management, Internal CRM and Employee relationship management |
| Unit II | Implementation of CRM and Future Trends in CRM |
| | <ul style="list-style-type: none"> i. CRM Implementation Process, Evaluation of CRM process, Challenges in CRM implementation, Customer Care Management through Information Technology Tools – Electronic Point of Sales (ePOS) , Sales Force Automation ii. Emerging trends in CRM, Social CRM, e-CRM, Challenges involved in formulating and implementing e-CRM strategies, iii. Multichannel CRM, Role of Social media in CRM, Six E's of e-CRM,, Mobile CRM, Artificial Intelligence (AI) with CRM System. |
| Unit III | CRM emerging concepts and perspective – |
| | <ul style="list-style-type: none"> i. Introduction : A cost benefit analysis –CRM benefits, CRM Cost-customer value- customer life time value-issues in calculating CLV Customer profitability ii. principles underlying the requirements of the professional standards and guidance relevant to actuaries practising in Indian health and care operations iii. Privacy, Ethics issues of CRM |

| Unit IV | Architecture of CRM |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | i. CRM Technology and Data Platforms, Database and Data Management, and the role of Business Intelligence (BI) in CRM. ii. Customer relationship management practices in Indian service sectors- Relevance of CRM for Hospital Services; Customer Relationship Management in Banking and Financial Services; CRM in Insurance Sector iii. Careers in industry |

References:

- ❑ Customer Relationship Management – Concepts and Technologies by Francis Buttle, 2nd Edition, Butterworth Heinemann, Elsevier
- ❑ Relationship Management – Text and Cases, S. Shajahan, TMGH.
- ❑ J N Sheth, AtulParvatiyar, G. Shainesh, 2001, Customer Relationship Management, Tata McGraw Hill
- ❑ Customer Relationship Management: Concepts and Cases, Second Edition, Alok Kumar Rai PHI learning Pvt Ltd, New Delhi

Suggested Reference Books:-

Handbook of Relationship Marketing by JagdishSheth and AtulParvatiyar, Response Books, Sage Publications.

Zikmund, McLEOD, Gilbert, Customer Relationship Management

Customer Relationship Management- Concepts and Technology, Second Edition, Francis Buttle, Elsevier, Sabre foundation

Brown, Stanley A 2001, Customer Relationship Management, John Wiley& Sons

Anderson, Kristin , 2002, Customer Relationship Management, Tata McGraw-Hill

Suggested URL: 1. https://swayam.gov.in/nd2_imb20_mg09/

Evaluation scheme

I. Continuous Assessment (C.A.)– 40 Marks

1) Assessment 1 (20 Marks)

2) Assessment 2 (20 Marks)

II Semester End Examination (SEE)- 60 Marks

QUESTION PAPER PATTERN OF SEE

Maximum Marks: 60 Marks

Time: 2 Hours

Note:

1) Attempt all Questions

2) All Questions carry equal marks

3) Attempt any 3 sub questions from every question

| Question No | Particulars | Marks |
|------------------|----------------------|----------|
| Q -1 (Unit I) | A) B) C) D) | 15 Marks |
| Q -2 (Unit II) | A) B) C) D) | 15 Marks |
| Q -3 (Unit III) | A) B) C) D) | 15 Marks |
| Q4 (Unit IV) | A) B) C) D) | 15 marks |

Syllabus of courses of T.Y.B.Com in Actuarial Studies Programme

With effect from the Academic Year 2021-2022

Semester VI

Course Code: 30606

3. Project Work I (04 Credits)

Project Work

Aim: To equip students to independently write a 4000-6000 words research paper with an actuarial or insurance or investment or pension. The paper can be either theoretical or application oriented.

The paper should comprise a) An abstract with a title and key words,

b) The definition of the idea or problem,

c) Exposition of the idea or problem,

d) Findings, and

e) Conclusion.

It is expected that the paper is supported by appropriate citations/ references, and figures/ tables.

The learner is required to select **any one topic** from the three elective options given below:

☐ Advanced Financial mathematics

Investment analysis

☐ Life contingencies

A Model Structure of the Project Work will be shared with the learners by the Research Guide.

Project Work (Model Structure of the Project Work)

- Chapter No. 1: Introduction In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner.
- Chapter No. 2: Research Methodology This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, etc can be incorporated by the learner.
- Chapter No. 3: Literature Review This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on the same issue.
- Chapter No. 4: Data Analysis, Interpretation and Presentation This chapter is the core part of the study. The analysis pertaining to collected data will be done by the learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of

- information's, presentation of graphs etc. can be provided with interpretation by the learner.
- Chapter No. 5: Conclusions and Suggestions In this chapter of project work, findings of work will be covered and suggestion will be enlisted to validate the objectives and hypotheses. Note:
If required more chapters of data analysis can be added.
 - Bibliography
 - Appendix

OR

Learners could submit a project on the basis of the internship completed by them during the undergraduate course