

# Chaudhary Bansi Lal University, Prem Nagar

(A State University established under Haryana Act No. 25 of 2014)



## **Scheme of Examination and Syllabus for Bachelor of Science (Actuarial Science) (Scheme- D)**

**Undergraduate Programme (Interdisciplinary) as per NEP 2020  
Curriculum and Credit Framework for Undergraduate Programmes (Multiple Entry-Exit, Internships and Choice Based  
Credit System LOCF) With effect from the session 2024-25 (in phased manner)**

**Faculty of Physical Sciences**

**Chaudhary Bansi Lal University, Premnagar-127031 Bhiwani, HARYANA,  
INDIA**

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**CHAUDHARY BANSI LAL UNIVERSITY, BHIWANI**  
**Scheme of Examination for Undergraduate Programme (Interdisciplinary)**  
**Bachelor of Science (Actuarial Science) (Scheme- D)**  
**as per NEP-2020 Curriculum Framework**

**(Multiple Entry-Exit, Internships and Choice Based Credit System LOCF) w.e.f. the session 2024-2025 (in phased manner)**

| Semester          | Course Type | Course Code                                                                    | Nomenclature of Course                | Credits |            |              | Contact Hours<br>L: Lecture<br>P: Practical<br>T: Tutorial |   |       | Internal Assessment Marks |   | End Term Examinations Marks |     | Total Marks | Examination Hours |     |
|-------------------|-------------|--------------------------------------------------------------------------------|---------------------------------------|---------|------------|--------------|------------------------------------------------------------|---|-------|---------------------------|---|-----------------------------|-----|-------------|-------------------|-----|
|                   |             |                                                                                |                                       | Total   | Theory (T) | Tutorial (T) | L                                                          | T | Total | T                         | P | T                           | T/P |             | T                 | T/P |
| FIRST YEAR SCHEME |             |                                                                                |                                       |         |            |              |                                                            |   |       |                           |   |                             |     |             |                   |     |
| I                 | CC-1        | 24UN-ASC-101                                                                   | Algebra                               | 4       | 3          | 1            | 3                                                          | 1 | 4     | 30                        | - | 70                          | -   | 100         | 3                 | -   |
|                   | CC-2        | 24UN-ASC-102                                                                   | General Accounting Principles         | 4       | 3          | 1            | 3                                                          | 1 | 4     | 30                        | - | 70                          | -   | 100         | 3                 | -   |
|                   | CC-3        | 24UN-ASC-103                                                                   | Principles and Practices in Insurance | 4       | 3          | 1            | 3                                                          | 1 | 4     | 30                        | - | 70                          | -   | 100         | 3                 | -   |
|                   | CC-M1       | 24UN-ASC-104                                                                   | Basic Statistics                      | 2       | 2          | 0            | 2                                                          | 0 | 2     | 15                        | - | 35                          | -   | 50          | 3                 | -   |
|                   | MDC 1       | Select one course from the pool of Multidisciplinary Courses (MDC) 3 Credits   |                                       |         |            |              |                                                            |   |       |                           |   |                             |     |             |                   |     |
|                   | AEC-1       | Select one course from the pool of Ability Enhancement Courses (AEC) 2 Credits |                                       |         |            |              |                                                            |   |       |                           |   |                             |     |             |                   |     |
|                   | SEC-1       | Select one course from the pool of Skill Enhancement Courses (SEC) 3 Credits   |                                       |         |            |              |                                                            |   |       |                           |   |                             |     |             |                   |     |
|                   | VAC-1       | Select one course from the pool of Value Added Courses (VAC) 2 Credits         |                                       |         |            |              |                                                            |   |       |                           |   |                             |     |             |                   |     |
|                   | Total       | Credits: 24                                                                    |                                       |         |            |              |                                                            |   |       |                           |   |                             |     |             |                   |     |

|    |       |                                                                                       |                         |   |   |   |   |   |   |    |   |    |   |     |   |   |
|----|-------|---------------------------------------------------------------------------------------|-------------------------|---|---|---|---|---|---|----|---|----|---|-----|---|---|
| II | CC-4  | 24UN-ASC-201                                                                          | Calculus                | 4 | 3 | 1 | 3 | 1 | 4 | 30 | - | 70 | - | 100 | 3 | - |
|    | CC-5  | 24UN-ASC-202                                                                          | Basics of Contingencies | 4 | 3 | 1 | 3 | 1 | 4 | 30 | - | 70 | - | 100 | 3 | - |
|    | CC-6  | 24UN-ASC-203                                                                          | Advanced Statistics     | 4 | 3 | 1 | 3 | 1 | 4 | 30 | - | 70 | - | 100 | 3 | - |
|    | CC-M2 | 24UN-ASC-204                                                                          | General Economics       | 2 | 2 | 0 | 2 | 0 | 2 | 15 | - | 35 | - | 50  | 3 | - |
|    | MDC 1 | Select one course from the pool of Multidisciplinary Courses (MDC) <b>3 Credits</b>   |                         |   |   |   |   |   |   |    |   |    |   |     |   |   |
|    | AEC-2 | Select one course from the pool of Ability Enhancement Courses (AEC) <b>2 Credits</b> |                         |   |   |   |   |   |   |    |   |    |   |     |   |   |
|    | SEC-2 | Select one course from the pool of Skill Enhancement Courses (SEC) <b>3 Credits</b>   |                         |   |   |   |   |   |   |    |   |    |   |     |   |   |
|    | VAC-2 | Select one course from the pool of Value Added Courses (VAC) <b>2 Credits</b>         |                         |   |   |   |   |   |   |    |   |    |   |     |   |   |
|    | Total | <b>Credits: 24</b>                                                                    |                         |   |   |   |   |   |   |    |   |    |   |     |   |   |

**Exit Option:** Any student opting for exit option after first year will get **Undergraduate Certificate in Actuarial Science** provided he/she completes 52 Credits comprising 48 Credits of first two semesters and additional 4 credits of internship (100 Marks) based 4-6 weeks internship after 2nd semester. The internship report would be evaluated by a panel of one internal and one external expert to be nominated by Principal/Director of the institute/Chairperson of the Department from the panel of examiners approved by UGBOS of department.

Furthermore, the credits of internship will be included/mention in the **Undergraduate Certificate in Actuarial Science** as follow:

| Course Type | Course Code  | Nomenclature | Internal Marks | External Marks | Total Marks | Credit |
|-------------|--------------|--------------|----------------|----------------|-------------|--------|
| Internship  | 24UN-ASC-505 | Internship   | -              | 100            | 100         | 4      |

## CC 1

| Session:2024-25                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part A– Introduction                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Semester                             | I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Name of the Course                   | Algebra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Course Code                          | 24UN-ASC-101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Course Type:                         | CC 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Pre-requisite for the course(if any) | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Course Learning Outcomes(CLOs):      | <p><b>After completing this course, the learner will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Gain knowledge of Binomial theorem and will attain the ability to expand a binomial of any <math>n</math>th power. Manipulate and evaluate expressions and equations involving binomials and combinations.</li> <li>2. Understand the concept of Symmetric, skew-symmetric, Hermitian and skew-Hermitian matrix. Ability to apply the elementary operations on matrices and evaluate rank of matrices. Attain knowledge to find eigenvalues and eigenvectors which find multidisciplinary applications within the chosen field of learning.</li> <li>3. Solve and check the consistency of system of linear equations using matrices. Able to understand Unitary and orthogonal matrices and Quadratic forms.</li> <li>4. Gain knowledge to obtain the relations between roots and coefficients of general polynomial equations and evaluate common roots and multiple roots and identify the nature of the roots. Attain skills to evaluate the cubic equations using Cardon's method.</li> </ol> |



| Credits                                                                                                                                                                                                                                                                                                                                                                                     | Theory                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tutorial      | Total |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|
|                                                                                                                                                                                                                                                                                                                                                                                             | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1             | 4     |
| Contact Hours                                                                                                                                                                                                                                                                                                                                                                               | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1             | 4     |
| Internal Assessment Marks                                                                                                                                                                                                                                                                                                                                                                   | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --            | 30    |
| End Term Examination Marks                                                                                                                                                                                                                                                                                                                                                                  | 70                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --            | 70    |
| Examination Time                                                                                                                                                                                                                                                                                                                                                                            | 3 Hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3 Hours       |       |
| Max.Marks:100                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |       |
| <b>Part B-Contents of the Course</b>                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |       |
| <b><u>Instructions for Paper- Setter</u></b>                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |       |
| <b>Note:</b> The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |       |
| Unit                                                                                                                                                                                                                                                                                                                                                                                        | Topics                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Contact Hours |       |
| I                                                                                                                                                                                                                                                                                                                                                                                           | Binomial theorem for a positive integral index –Binomial theorem for a rational index – (statement and applications only) Summation of Binomial series. Exponential series – Exponential series for all real Values of x – Standard results for the Exponential series – Logarithmic series – Problems.                                                                                                                                                                  | 12            |       |
| II                                                                                                                                                                                                                                                                                                                                                                                          | Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices, Elementary Operations on matrices, Rank of a matrices. Inverse of a matrix, Linear dependence and independence of rows and columns of matrices, Row rank and column rank of a matrix, Eigenvalues, eigenvectors and the characteristic equation of a matrix, Minimal polynomial of a matrix, Cayley Hamilton theorem (statement and applications only) and its use in finding the inverse of a matrix. | 12            |       |
| III                                                                                                                                                                                                                                                                                                                                                                                         | Applications of matrices to a system of linear (both homogeneous and non-homogeneous) equations, Theorems on consistency of a system of linear equations, (statement and applications only) Unitary and Orthogonal Matrices, Bilinear and Quadratic forms.                                                                                                                                                                                                               | 12            |       |

|    |                                                                                                                                                                                                                                                                                                           |    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| IV | Relations between the roots and coefficients of general polynomial equation in one variable. Solutions of polynomial equations having conditions on roots. Common roots and multiple roots. Nature of the roots of an equation, Descarte's rule of signs. Solutions of cubic equations (Cardon's method). | 12 |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|



|                                     |
|-------------------------------------|
| <b>Suggested Evaluation Methods</b> |
|-------------------------------------|

**Internal Assessment:**➤ **Theory30**

- ClassParticipation:5
- Seminar/presentation/assignment/quiz/classstestetc.:10
- Mid-TermExam:15

**End Term Examination:**

- ☐ **Theory70**  
Written Examination

|                                  |
|----------------------------------|
| <b>Part C-Learning Resources</b> |
|----------------------------------|

1. H.S. Hall and S.R. Knight: Higher Algebra, H.M. Publications 1994.
2. Shanti Narayan : A Text Books of Matrices.
3. Chandrika Prasad : Text Book on Algebra and Theory of Equations.  
Pothishala Private  
Ltd., Allahabad.
4. Ayers,F., 1962. Schaum's Theory and Problems of Matrices, McGraw Hill  
Book Company
5. Grewal, B.S.2015. Higher Engineering Mathematics, Khanna Publications,  
India.



## CC 2

| Session:2024-25                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part A– Introduction                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Semester                             | I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Name of the Course                   | General Accounting Principles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Course Code                          | 24UN-ASC-102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Course Type:                         | CC 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Pre-requisite for the course(if any) | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Course Learning Outcomes(CLOs):      | <p><b>After completing this course, the learner will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Gain insights about the types, advantages, and limitations of accounting as well as its concepts and analogies.</li> <li>2. Gain proficiency in trial balance preparation, accounting equation use, and recordkeeping</li> <li>3. Learn how to keep different cashbooks and subsidiary books up-to-date for precise financial record-keeping.</li> <li>4. Apply depreciation techniques, generate bank reconciliation statements, and fix accounting mistakes.</li> </ol> |



|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                 |               |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|
| Credits                                                                                                                                                                                                                                                                                                                                                                                                                              | Theory                                                                                                                                                                                          | Tutorial      | Total |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3                                                                                                                                                                                               | 1             | 4     |
| Contact Hours                                                                                                                                                                                                                                                                                                                                                                                                                        | 3                                                                                                                                                                                               | 1             | 4     |
| Internal Assessment Marks                                                                                                                                                                                                                                                                                                                                                                                                            | 30                                                                                                                                                                                              | --            | 30    |
| End Term Examination Marks                                                                                                                                                                                                                                                                                                                                                                                                           | 70                                                                                                                                                                                              | --            | 70    |
| Examination Time                                                                                                                                                                                                                                                                                                                                                                                                                     | 3 Hours                                                                                                                                                                                         | 3 Hours       |       |
| Max.Marks:100                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                 |               |       |
| Part B-Contents of the Course                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                 |               |       |
| <u>Instructions for Paper- Setter</u><br><b>Note:</b> The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. |                                                                                                                                                                                                 |               |       |
| Unit                                                                                                                                                                                                                                                                                                                                                                                                                                 | Topics                                                                                                                                                                                          | Contact Hours |       |
| I                                                                                                                                                                                                                                                                                                                                                                                                                                    | <u>Accounting:</u> Concepts, Types of accounts, Comparisons: Financial, Management and Cost accounting, advantages and limitations of financial management and cost accounting.                 | 12            |       |
| II                                                                                                                                                                                                                                                                                                                                                                                                                                   | <u>Accounting records and systems:</u> Accounting equation, Accounting mechanics: Journals Ledger posting and trial balance.                                                                    | 12            |       |
| III                                                                                                                                                                                                                                                                                                                                                                                                                                  | <u>Cashbook and Subsidiary books:</u> Single column cashbook, Double column cashbook, Three column cashbook, Petty cashbook, Purchase book, Sales book, Purchase Return book, Sales Return book | 12            |       |
| IV                                                                                                                                                                                                                                                                                                                                                                                                                                   | <u>Bank reconciliation statement:</u> Rectification of errors, Depreciation accounting, Straight line method, Written down value method.                                                        | 12            |       |
| Suggested Evaluation Methods                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                 |               |       |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Internal Assessment:</b><br>➤ <b>Theory30</b> <ul style="list-style-type: none"> <li>● ClassParticipation:5</li> <li>● Seminar/presentation/assignment/quiz/classtestetc.:10</li> <li>● Mid-TermExam:15</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>End Term Examination:</b><br><input type="checkbox"/> <b>Theory70</b><br>Written Examination |
| <b>Part C-Learning Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                 |
| <ol style="list-style-type: none"> <li>1. S. N. Maheshwari et al , Financial Accounting, Vikas Publication, New Delhi.,2018.</li> <li>2. T.S, Grewal and S.C. Gupta, Introduction to Accounting, S. Chand and Co., New Delhi,2024</li> <li>3. P.C. Tulsian, Financial Accounting, Pearson Education, New Delhi,2002.</li> <li>4. Dalston L.Cecil and JenitraL Merwin by “Principles of Accountancy”<br/>Trichy; Learntech; 2007</li> <li>5. Jawahar Lal and Seema Srivastava, Financial Accounting, Himalaya Publishing House.,2017</li> <li>6. Monga, J.R., Financial Accounting: Concepts and Applications, Mayoor Paper Backs, New Delhi.2017.</li> <li>7. Shukla, M.C., T.S. Grewal and S.C. Gupta. Advanced Accounts. Vol.-I. S. Chand &amp; Co., New Delhi,2007.</li> </ol> |                                                                                                 |



## CC 3

| Session:2024-25                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part A– Introduction                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Semester                             | I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Name of the Course                   | Principles and Practices in Insurance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Course Code                          | 24UN-ASC-103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Course Type:                         | CC 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Pre-requisite for the course(if any) | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Course Learning Outcomes(CLOs):      | <p><b>After completing this course, the learner will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Gain a deep understanding of life insurance principles, policy elements, the economic value of insurance, and investment strategies for life insurance funds.</li> <li>2. Develop expertise in risk selection, classification, and understanding various types of general insurance, including fire, marine, and health insurance.</li> <li>3. Acquire skills in managing policy conditions, calculating values, bonuses, and effectively handling claim settlements for life insurance policies.</li> <li>4. Understand the basic insurance concepts, the effects of insurance privatization in India, and the IRDAI's regulatory function in the sector.</li> </ol> |



| Credits                    | Theory  | Tutorial | Total |
|----------------------------|---------|----------|-------|
|                            | 3       | 1        | 4     |
| Contact Hours              | 3       | 1        | 4     |
| Internal Assessment Marks  | 30      | –        | 30    |
| End Term Examination Marks | 70      | –        | 70    |
| Examination Time           | 3 Hours | 3 Hours  |       |

Max.Marks:100

**PartB-Contents of the Course****Instructions for Paper- Setter**

**Note:** The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

| Unit | Topics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Contact Hours |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| I    | Principles of Life Insurance: Nature of Insurance , Classification of Insurance Economic value of Earning Head of the Household, Basic Insurance Protection, Business use of Life Insurance, Basic elements of life insurance contracts, Insurable interest, Need for utmost good faith, disclosure of Material Facts, Warrant, Tax advantages of Certain Assurance, Wealth Tax.<br>Investment of life fund: Investment of LIC, Investment of life Insurance Fund, basic principles, statutory requirements of investments, people's money for peoples welfare valuation, purpose and types. | 12            |
| II   | Selection and classification Risks, Objectives for selection and classification of risks, factors relating to Physical Hazard, Factors relating to occupational Hazards and Moral Hazard, Source of Information, Insurance of female lives, rating of female lives.<br>General Insurance: Need for general insurance, Types of general insurance, Fire Insurance, Marine Insurance, Motor Insurance, Liability Insurance, Aviation Insurance, Engineering Insurance, Burglary Insurance, Mediclaim and project Insurance, Loss of profit Insurance.                                          | 12            |



|                                     |                                                                                                                                                                                                                                                                                                                                                  |    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| III                                 | Policy conditions and Privileges, calculation of paid up values, Surrender values, Loans, Foreclosure Alterations, Distribution of loans, Calculations of Vested bonus, Interim bonus, Final bonus, settlement of Claims, calculation of benefit payable on, Maturity claims, Death claims and adjustment for loans unpaid premium and interest. | 12 |
| IV                                  | Principles of general Insurance, Privatization of Insurance in India, IRDAI and role of IRDAI.                                                                                                                                                                                                                                                   | 12 |
| <b>Suggested Evaluation Methods</b> |                                                                                                                                                                                                                                                                                                                                                  |    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Internal Assessment:</b><br><b>➤ Theory30</b> <ul style="list-style-type: none"> <li>● ClassParticipation:5</li> <li>● Seminar/presentation/assignment/quiz/classtestetc.:10</li> <li>● Mid-TermExam:15</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>End Term Examination:</b><br><input type="checkbox"/> <b>Theory70</b><br>Written Examination |
| <b>Part C-Learning Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                 |
| 1. Kenneth Black Jr. and Harold D.S kipper , Life and Health Insurance.(13 <sup>th</sup> Ed.)1999.<br>2. Principles and Practice of Life Insurance-Insurance Institute of India,<br><a href="https://www.insuranceinstituteofindia.com">https://www.insuranceinstituteofindia.com</a><br>3. Principles and General Insurance-Insurance Institute of India,<br><a href="https://www.insuranceinstituteofindia.com">https://www.insuranceinstituteofindia.com</a><br>4. Narang, Uma, Insurance Industry in India: Features, Reforms and Outlook, New Century Publications.2013<br>5. Periasamy P, Principles and Practice of Insurance, Himalaya Publishing House.2014. |                                                                                                 |



## CCM1

| Session:2024-25                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |       |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------|
| Part A– Introduction                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |       |
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |       |
| Semester                             | I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |       |
| Name of the Course                   | Basic Statistics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |       |
| Course Code                          | 24UN-ASC-104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |       |
| Course Type:                         | CC M1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |       |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |       |
| Pre-requisite for the course(if any) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |       |
| Course Learning Outcomes(CLOs):      | <p><b>After completing this course, the learner will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Organize, manage and present data. • Analyze statistical data graphically using frequency distributions and cumulative frequency distributions.</li> <li>2. Ability to analyze the data using Simple Bar Diagram, Multiple Bar Diagram, Clustered Bar Diagram, Line Diagram, Pie Chart.</li> <li>3. Analyze statistical data using measures of central tendency, dispersion and location.</li> <li>4. Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events. Solve real-world problems using probability models.</li> </ol> |          |       |
| Credits                              | Theory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tutorial | Total |
|                                      | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -        | 2     |
| Contact Hours                        | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -        | 2     |
| Internal Assessment Marks            | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -        | 15    |
| End Term Examination Marks           | 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -        | 35    |



| Examination Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3 Hours                                                                                                                                                                                                                                                                                                               | -             |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--|
| Max.Marks:50                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                       |               |  |
| <b>Part B-Contents of the Course</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                       |               |  |
| <p style="text-align: center;"><b><u>Instructions for Paper- Setter</u></b></p> <p><b>Note:</b> The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.</p> |                                                                                                                                                                                                                                                                                                                       |               |  |
| Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Topics                                                                                                                                                                                                                                                                                                                | Contact Hours |  |
| I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Introduction: Meaning, Importance, Function, Limitation, Collection of Data, Objectives, Rules and types, Frequency distribution (discrete and continuous) Frequency (class, two-way, cumulative) Classification and Tabulation.                                                                                      | 7             |  |
| II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Diagrammatic and Graphical Representation: Advantages, construction, rules, Diagram, Simple Bar Diagram, Multiple Bar Diagram, Clustered Bar Diagram, Line Diagram, Pie Chart, Graph histogram Frequency (polygon, curve, ogive), ( time series, z curve, horizontal line, false base lines, component or band graph) | 7             |  |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Measure of Central Tendency (Averages):Introduction, Meaning, Definition, Functions, Characteristics, Arithmetic mean, Median, Mode, Geometric Mean, Harmonic Mean.<br>Measure of Dispersion and Skewness, Kurtosis, Moments: Introduction, Meaning, Range, Mean Deviation, Quartile Deviation Standard Deviation, Skewness, Kurtosis                                                                                                      | 9                                                                                               |
| IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Probability: Introduction, History, Meaning, Mathematical properties, Permutation, Combination, Trial, Event, Sample space, Mutually exclusive cases.<br>Exhaustive events, Dependent and independent events, Simple and compound events Measurement, Classical Relative frequency theory Limitations Personalist view of probability and axiomatic approach of probability, Addition and multiplication theorem, odds, practical problems | 9                                                                                               |
| <b>Internal Assessment:</b><br><b>➤ Theory15</b> <ul style="list-style-type: none"> <li>● ClassParticipation:4</li> <li>● Seminar/presentation/assignment/quiz/classtestetc.:4</li> <li>● Mid-TermExam:7</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>End Term Examination:</b><br><input type="checkbox"/> <b>Theory35</b><br>Written Examination |
| <b>Part C-Learning Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                 |
| <b>Recommended Books:</b> <ol style="list-style-type: none"> <li>1. Dr P. Mariappan, Statistics for Scientific Solutions, New Century Book House[P]Ltd.,2008.</li> <li>2. A.M. Gun, M.K. Gupta, B. Dasgupta, An outline of Statistical Theory Vol 1 &amp;vol 2, World Press,2016</li> <li>3. A.M. Gun, M.K. Gupta, B. Dasgupta Fundamental of statistics vol 1&amp;2, World Press, 2013</li> <li>4. M. Spiegel, Probability and Statistics, Schaum's Outline Series,2009</li> <li>5. J.E. Freund, Mathematical Statistics, Prentice Hall of India,1992.</li> <li>6. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons Publishers, 2014.</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                 |

## CC 4

| Session:2024-25                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part A– Introduction                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Semester                             | II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Name of the Course                   | Calculus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Course Code                          | 24UN-ASC-201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Course Type:                         | CC 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Pre-requisite for the course(if any) | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Course Learning Outcomes(CLOs):      | <p><b>After completing this course, the learner will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Gain knowledge of the concepts and theory of limit, continuity and differentiability of functions. Attain skills of calculating the limit of functions and examining the continuity and differentiability of different types of functions, and perform successive differentiation of functions. To apply the procedural knowledge to obtain the series expansions of functions which find multidisciplinary applications.</li> <li>2. Understand concepts of integration and attain skills to evaluate the integrations to have procedural knowledge to solve related problems.</li> <li>3. Calculate double and triple integrals over the regions. Determine areas and volumes in Cartesian and polar coordinate systems using double and triple integrals. Calculate Multiple integrals using change of variable.</li> <li>4. Understand the concept of Beta and Gamma functions, their properties and relation between these two. Attain ability to evaluate multiple integrals using Beta and Gamma functions.</li> </ol> |



|                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                           |               |       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|
| Credits                                                                                                                                                                                                                                                                                                                                                                                     | Theory                                                                                                                                                                                                                                                                    | Tutorial      | Total |
|                                                                                                                                                                                                                                                                                                                                                                                             | 3                                                                                                                                                                                                                                                                         | 1             | 4     |
| Contact Hours                                                                                                                                                                                                                                                                                                                                                                               | 3                                                                                                                                                                                                                                                                         | 1             | 4     |
| Internal Assessment Marks                                                                                                                                                                                                                                                                                                                                                                   | 30                                                                                                                                                                                                                                                                        | --            | 30    |
| End Term Examination Marks                                                                                                                                                                                                                                                                                                                                                                  | 70                                                                                                                                                                                                                                                                        | --            | 70    |
| Examination Time                                                                                                                                                                                                                                                                                                                                                                            | 3 Hours                                                                                                                                                                                                                                                                   | 3 Hours       |       |
| Max.Marks:100                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                           |               |       |
| Part B-Contents of the Course                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                           |               |       |
| <u>Instructions for Paper- Setter</u>                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                           |               |       |
| <b>Note:</b> The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. |                                                                                                                                                                                                                                                                           |               |       |
| Unit                                                                                                                                                                                                                                                                                                                                                                                        | Topics                                                                                                                                                                                                                                                                    | Contact Hours |       |
| I                                                                                                                                                                                                                                                                                                                                                                                           | Definition of the limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities, Differentiability, Successive differentiation, Leibnitz theorem. Maclaurin and Taylor series expansions (statement and applications only). | 12            |       |
| II                                                                                                                                                                                                                                                                                                                                                                                          | Integration of $f'(x)/f(x)$ , $f'(x)\sqrt{f(x)}$ , $(px+q)/\sqrt{(ax^2+bx+c)}$ , $\sqrt{(x-a)/(b-x)}$ , $\sqrt{(x-a)(b-x)}$ , $1/\sqrt{(x-a)(b-x)}$ , $1/(a\cos x+b\sin x+c)$ , $1/(a\cos 2x+b\sin 2x+c)$ , Integration by parts, Reduction Formulae.                     | 12            |       |
| III                                                                                                                                                                                                                                                                                                                                                                                         | Evaluation of Double and Triple integrals, Dirichlets integrals, change of order of integration in double integrals, applications to calculation so far as and volumes, are as in polar coordinates also, Change of order of integration in double integral.              | 12            |       |
| IV                                                                                                                                                                                                                                                                                                                                                                                          | Beta and Gamma integrals, Their properties, relation between them, evaluation of multiple integrals using Beta and Gamma functions.                                                                                                                                       | 12            |       |
| Suggested Evaluation Methods                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                           |               |       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Internal Assessment:</b><br>➤ <b>Theory30</b> <ul style="list-style-type: none"> <li>● ClassParticipation:5</li> <li>● Seminar/presentation/assignment/quiz/classstestetc.:10</li> <li>● Mid-TermExam:15</li> </ul>                                                                                                                                                                                                                                                                                                                                                      | <b>End Term Examination:</b><br><input type="checkbox"/> <b>Theory70</b><br>Written Examination |
| <b>PartC-Learning Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |
| <ol style="list-style-type: none"> <li>1. P. Kandasamy &amp; K. Thilagarathy, Mathematics for BSc, Vol I and .II, S. Chandand Co, 2014.</li> <li>2. Shanthi Narayanan &amp;J.N. Kapoor, A Text book of calculus, S. Chand &amp; Co.,2014.</li> <li>3. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985</li> <li>4. R.R. Goldberg: Real analysis, Oxford &amp; IBH publishing Co., New Delhi, 1970</li> <li>5. D. Somasundaram and B. Choudhary : A First Course in Mathematical, Analysis, Narosa Publishing House, New Delhi, 1997</li> </ol> |                                                                                                 |



## CC 5

| Session:2024-25                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part A– Introduction                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Semester                             | II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Name of the Course                   | Advanced Statistics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Course Code                          | 24UN-ASC-202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Course Type:                         | CC 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Pre-requisite for the course(if any) | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Course Learning Outcomes(CLOs):      | <p><b>After completing this course, the learner will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Derive the probability density function of transformation of random variables. Calculate probabilities, and derive the marginal and conditional distributions of bivariate random variables.</li> <li>2. Use discrete and continuous probability distributions, including requirements, mean and variance, and making decisions.</li> <li>3. Calculate the expectation and moments of random variables Identify the applications of various moment inequalities. Attain the ability to calculate the variance and covariance.</li> <li>4. Use different discrete distributions to solve statistical problems, normal probability distribution including standard normal curve calculations and other distributions to solve simple practical problems.</li> </ol> |



| Credits                    | Theory  | Tutorial | Total |
|----------------------------|---------|----------|-------|
|                            | 3       | 1        | 4     |
| Contact Hours              | 3       | 1        | 4     |
| Internal Assessment Marks  | 30      | –        | 30    |
| End Term Examination Marks | 70      | –        | 70    |
| Examination Time           | 3 Hours | 3 Hours  |       |

Max.Marks:100

**Part B-Contents of the Course****Instructions for Paper- Setter**

**Note:** The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

| Unit | Topics                                                                                                                                                                                                                                                                                                                                                                                                           | Contact Hours |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| I    | Baye's Theorem and its application, Random variable, Distribution function, Properties of Distribution function, Discrete Random Variable Probability Mass Function, Discrete Distribution function, Continuous Random Variable, Probability Density Function, Continuous distribution Function                                                                                                                  | 12            |
| II   | Two dimensional random variable, Joint Probability Law, Joint Probability Mass Function, Joint Probability Distribution Function, Marginal Distribution Function, Joint Density Function, The Conditional Distribution Function, Stochastic Independence                                                                                                                                                         | 12            |
| III  | Mathematical Expectation and Generating function (Basic Concept only): Expectation of a function of random variable, Addition theorem of Expectation, Multiplication theorem of Expectation, Expectation of Linear combination of Random variables, Covariance, Variance of a linear combination of Random Variables, Conditional expectation and conditional variance. Movement generating function: movements. | 12            |
| IV   | Discrete Distribution: Introduction Bernoulli distribution, Binomial Distribution Poisson distribution. Continuous Distribution: Uniform Distribution Normal Distribution, Gamma Distribution.                                                                                                                                                                                                                   | 12            |



|                                     |
|-------------------------------------|
| <b>Suggested Evaluation Methods</b> |
|-------------------------------------|

|                                                                                                                                                                                                                       |                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Internal Assessment:</b><br>➤ <b>Theory30</b> <ul style="list-style-type: none"> <li>● ClassParticipation:5</li> <li>● Seminar/presentation/assignment/quiz/classtestetc.:10</li> <li>● Mid-TermExam:15</li> </ul> | <b>End Term Examination:</b><br><input type="checkbox"/> <b>Theory70</b><br>Written Examination |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|



|                                 |
|---------------------------------|
| <b>PartC-Learning Resources</b> |
|---------------------------------|

1. Dr P. Mariappan, Statistics for Scientific Solutions, New Century Book House[P]Ltd.,2008.
2. A.M. Gun, M.K. Gupta, B. Dasgupta, An outline of Statistical Theory Vol 1 &vol 2, World Press,2016
3. A.M. Gun, M.K. Gupta, B. Dasgupta Fundamental of statistics vol 1&2, World Press, 2013
4. M. Spiegel, Probability and Statistics, Schaum's Outline Series,2009
5. J.E. Freund, Mathematical Statistics, Prentice Hall of India,1992.
6. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons Publishers, 2014.



## CC 6

| Session:2024-25                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part A– Introduction                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Semester                             | II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Name of the Course                   | Basics of Contingencies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Course Code                          | 24UN-ASC-203                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Course Type:                         | CC 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Pre-requisite for the course(if any) | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Course Learning Outcomes(CLOs):      | <p><b>After completing this course, the learner will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Gain knowledge of Guaranteed Payout, Premiums, cash value, policy loans, death benefits, No cash value, Renewal options, survival benefits, No death benefits, dual benefits, saving components and investments. Understand the concepts of higher and lower present value compared to regular and temporary annuity in arrears and to annuity due, Commutation Function for Annuities and sums.</li> <li>2. Attain the knowledge of equity, simplicity basis for pricing, Natural Premiums, level annual premiums, Actuarial Notations. Able to solve assurance problems within the chosen field of learning.</li> <li>3. Gain knowledge to calculate net premiums for different types of annuity plans, using actuarial notations and mathematical expressions.</li> <li>4. Attain the ability to understand and how to calculate office premiums, including adjustments for expenses, bonus loading, and maintaining premium consistency.</li> </ol> |



| Credits                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Theory                                                                                                                                                                                                                                                                                                                                                                  | Tutorial      | Total |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3                                                                                                                                                                                                                                                                                                                                                                       | 1             | 4     |
| Contact Hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3                                                                                                                                                                                                                                                                                                                                                                       | 1             | 4     |
| Internal Assessment Marks                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30                                                                                                                                                                                                                                                                                                                                                                      | –             | 30    |
| End Term Examination Marks                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 70                                                                                                                                                                                                                                                                                                                                                                      | –             | 70    |
| Examination Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3 Hours                                                                                                                                                                                                                                                                                                                                                                 | 3 Hours       |       |
| Max.Marks:100                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                         |               |       |
| <b>Part B-Contents of the Course</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                         |               |       |
| <p style="text-align: center;"><b><u>Instructions for Paper- Setter</u></b></p> <p><b>Note:</b> The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.</p> |                                                                                                                                                                                                                                                                                                                                                                         |               |       |
| Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Topics                                                                                                                                                                                                                                                                                                                                                                  | Contact Hours |       |
| I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Introduction: Whole life assurance, Term Assurance, Pure endowment Assurance, Endowment Assurance, Commutation Functions $D_x$ , $C_x$ , $M_x$ and $R_x$<br>Introduction: Whole life annuity (due and arrear), Temporary annuity (Due and Arrear), deferred whole life annuity, Variable life annuity, Increasing life annuity, Commutation functions $N_x$ and $S_x$ . | 12            |       |
| II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Net Premiums for Assurance Plans, Natural premiums, Level Annual Premiums, Actuarial Notations, Mathematical expressions for level annual premium under various Assurance plans, Net Premiums, Problems on net Premiums.                                                                                                                                                | 12            |       |
| III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Net Premiums for Annuity Plans, Actuarial Notations, Mathematical expressions for level annual premium under various Annuity plans, Net Premiums, Numerical Illustrations on net Premiums.                                                                                                                                                                              | 12            |       |
| IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Office Premiums, Introduction, Loading in premiums rates for expenses, Expression for office premiums, Bonus loading in premium rates, Consistency of premiums, Select premiums, Numerical illustrations on Office Premiums.                                                                                                                                            | 12            |       |
| <b>Suggested Evaluation Methods</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                         |               |       |



|                                                                                                                                                                                                                        |                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Internal Assessment:</b><br>➤ <b>Theory30</b> <ul style="list-style-type: none"> <li>● ClassParticipation:5</li> <li>● Seminar/presentation/assignment/quiz/classstestetc.:10</li> <li>● Mid-TermExam:15</li> </ul> | <b>End Term Examination:</b><br><input type="checkbox"/> <b>Theory7</b><br><b>0 Written Examination</b> |
| <b>Part C- Learning Resources</b>                                                                                                                                                                                      |                                                                                                         |
| 1. “Mathematical Basis of Life assurance”–IC, 81, Insurance Institute of India<br>2. “Actuarial Mathematics for Life Contingent Risks”– Author: David C. M. Dickson, Mary R. Hardy, Howard R. Waters                   |                                                                                                         |



## CCM2

Session:2024-25

## Part A– Introduction

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------|
| Subject/Course                       | Actuarial Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |       |
| Semester                             | II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |       |
| Name of the Course                   | General Economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |       |
| Course Code                          | 24UN-ASC-204                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |       |
| Course Type:                         | CC M2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |       |
| Level of the course                  | 100-199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |       |
| Pre-requisite for the course(if any) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |       |
| Course Learning Outcomes(CLOs):      | <b>After completing this course, the learner will be able to:</b> <ol style="list-style-type: none"> <li>1. Gain an understanding of the principles, applications, and systems of economics with a particular emphasis on the planning, recent policy changes, and economic features of India.</li> <li>2. Get deep insights about GDP measurement, national income accounting, and macroeconomic concerns affecting the Indian economy, such as unemployment, inflation, and growth.</li> <li>3. Learn about the monetary policy, banking system, RBI operations, loan creation by commercial banks, and the structure of the Indian money market.</li> <li>4. Understand the Indian capital market structure, SEBI regulations, and the roles of key development banks and financial institutions.</li> </ol> |          |       |
| Credits                              | Theory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tutorial | Total |
|                                      | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -        | 2     |
| Contact Hours                        | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -        | 2     |
| Internal Assessment Marks            | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -        | 15    |
| End Term Examination Marks           | 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -        | 35    |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                          |                      |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|
| Examination Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3 Hours                                                                                                                                                                                                                                                                                  | -                    |  |
| Max.Marks:50                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                          |                      |  |
| <b>Part B-Contents of the Course</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                          |                      |  |
| <p style="text-align: center;"><b><u>Instructions for Paper- Setter</u></b></p> <p><b>Note:</b> The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes(CLOs)into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.</p> |                                                                                                                                                                                                                                                                                          |                      |  |
| <b>Unit</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Topics</b>                                                                                                                                                                                                                                                                            | <b>Contact Hours</b> |  |
| I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Economics: Nature and Scope, Economic Problems, Economic Organizations and Economic systems.<br>Nature and characteristics of Indian Economy, Economic planning in India, recent trends and policy changes in Indian Economy.                                                            | 8                    |  |
| II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | National Income Accounting: concepts of GDP and National Income, Measurement of National Income and Aggregates, Limitation of GDP concepts, CSO (Central Statistical Office)<br>Macro Economics Issues of Indian Economy: Growth and Development, Inflation, Unemployment, Trade Cycles. | 8                    |  |



|                                                                                                                                                                                                                     |                                                                                                                                                               |                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| III                                                                                                                                                                                                                 | Indian Money Market: Structure and components, Indian Banking System, RBI and its functions, Monetary policy, Commercial Banks: Function and Credit Creation. | 8                                                                                               |
| IV                                                                                                                                                                                                                  | Indian Capital Market: Structure and its Components, SEBI, Development banks and Financial Institutions (LIC, IDBI, IFCI, ICICI, UTI, NABARD, SIDBI).         | 8                                                                                               |
| <b>Internal Assessment:</b><br>➤ <b>Theory15</b> <ul style="list-style-type: none"> <li>● ClassParticipation:4</li> <li>● Seminar/presentation/assignment/quiz/classtestetc.:4</li> <li>● Mid-TermExam:7</li> </ul> |                                                                                                                                                               | <b>End Term Examination:</b><br><input type="checkbox"/> <b>Theory35</b><br>Written Examination |

| Part C- Learning Resources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Books:</b> <ol style="list-style-type: none"> <li>1. Paul A. Samuelson, William D. Nordhaus, Sudip Chaudhuri, Anindya, Economics, Mc Graw Hill ,2020.</li> <li>2. Santhosh Kumar ,Nature and Scope of Economics, Kindle Edition, 2019</li> <li>3. S. K. Agarwala, National Income Accounting, Worldview Publications,2002.</li> <li>4. Krishna Kumar Sharma (Author) - Indian Money Market, Legare Stree Press,2023</li> <li>5. Rajesh Chakrabarti, Capital Markets in India (Response Books),2010.</li> </ol> |