



**BISHOP HEBER COLLEGE (AUTONOMOUS)**  
**TIRUCHIRAPPALLI – 620017**  
**TAMILNADU, INDIA**

# **COURSE OUTCOMES**

**DEPARTMENT  
OF  
ACTUARIAL  
SCIENCE**



**BISHOP HEBER COLLEGE (AUTONOMOUS)**  
**TIRUCHIRAPPALLI – 620017**  
**TAMILNADU, INDIA**

**STRUCTURE OF THE SYLLABUS**

<b>Program Name</b>	<b>Course</b>	<b>Course Code</b>	<b>Course Name</b>
B.Sc. Actuarial Mathematical Science	Major Core I	U20AS101	Introduction to Actuarial Mathematics
B.Sc. Actuarial Mathematical Science	Major Core II	U20AS102	Differential and Integral Calculus
B.Sc. Actuarial Mathematical Science	Allied I	U19AS1Y1	Descriptive Statistics
B.Sc. Actuarial Mathematical Science	Major Core III	U20AS203	Mathematics of Finance - I
B.Sc. Actuarial Mathematical Science	Major Core IV	U20AS204	Principles of Insurance
B.Sc. Actuarial Mathematical Science	Allied II	U20AS2Y2	Probability Theory and Discrete Distribution
B.Sc. Actuarial Mathematical Science	Major Core V	U20AS305	Mathematics of Finance - II
B.Sc. Actuarial Mathematical Science	Elective I	U20AS3:1	Business Economics
B.Sc. Actuarial Mathematical Science	Allied III	U19AS3Y3	Continuous Distributions and Estimation Theory
B.Sc. Actuarial Mathematical Science	Allied IV	U20ASPY4	Programming using R
B.Sc. Actuarial Mathematical Science	NMEC I	DT	Introduction to Insurance
B.Sc. Actuarial Mathematical Science	Major Core VI	U20AS406	Life and Health Contingencies - I
B.Sc. Actuarial Mathematical Science	Allied V	U20AS4Y5	Sampling theory and its application
B.Sc. Actuarial Mathematical Science	Allied VI	U20AS4Y6	Insurance Underwriting
B.Sc. Actuarial Mathematical Science	SBEC I	U20ASPS1	Stat Lab - Statistical Software ( Topic Revised )
B.Sc. Actuarial Mathematical Science	NMEC II	DT	Financial Markets in India



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<b>Program Name</b>	<b>Course</b>	<b>Course Code</b>	<b>Course Name</b>
B.Sc. Actuarial Mathematical Science	Major Core VII	U20AS507	Stochastic Process
B.Sc. Actuarial Mathematical Science	Major Core VIII	U19AS508	Mathematical Modelling
B.Sc. Actuarial Mathematical Science	Major Core IX	U20AS509	Life and Health Contengencies - II
B.Sc. Actuarial Mathematical Science	Elective II	U19AS5:P	Data Analysis Using MS-Excel
B.Sc. Actuarial Mathematical Science	Elective III	U20AS5:3	Basic Accounting Concepts
B.Sc. Actuarial Mathematical Science	SBEC II	U20AS5S2	Actuarial Profession
B.Sc. Actuarial Mathematical Science	Major Core X	U19AS610	Operations Research
B.Sc. Actuarial Mathematical Science	Major Core XI	U20AS611	Numerical Methods
B.Sc. Actuarial Mathematical Science	Major Core XII	U20AS612	Group Insurance & Retirement Benefit
B.Sc. Actuarial Mathematical Science	Major Core XIII	U20AS613	Reinsurance Management
B.Sc. Actuarial Mathematical Science	Major Core XIV	U20AS614	Introduction to Time Series
B.Sc. Actuarial Mathematical Science	SBEC III	U19AS6S3	Mathematics for Competative Examinations



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**CORE I: INTRODUCTION TO ACTUARIAL MATHEMATICS**

**SEMESTER: I**  
**CREDITS:4**

**CODE: U20AS101**  
**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Relate basic mathematical notations with actuarial theory	K1	I
CO2	Extend different forms of algebraic expansions	K2	II
CO3	Apply the progression models in the field of financial problems	K3	III
CO4	Apply the exponential series in the field of financial problems	K3	IV
CO5	Analyze the logarithmic series in the field of financial problems	K4	IV
CO6	Determine the real problems related to matrices	K5	V

**CORE II: DIFFERENTIAL AND INTEGRAL CALCULUS**

**SEMESTER: I**  
**CREDITS:4**

**CODE: U20AS102**  
**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Define the value of the derivative at a point algebraically using the (limit) function	K1	I
CO2	Demonstrate exponential, logarithmic, trigonometric and inverse trigonometric functions.	K2	II
CO3	Distinguish the various forms of integrals.	K4	III
CO4	Apply various properties to solve different forms of integrals.	K3	IV
CO5	Choose the techniques to solve various integral problems.	K5	IV
CO6	Solve the different forms of multiple integrals	K6	V



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**ALLIED I: DESCRIPTIVE STATISTICS**

**SEMESTER: I**  
**CREDITS: 4**

**CODE: U19AS1Y1**  
**HOURS/WEEK: 4**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Classify different types of data set and its collection methods	K2	I
CO2	Construct data representation in different forms	K3	II
CO3	Analyze the measures of central tendencies and its dispersion	K4	III
CO4	Evaluate correlation analysis, in order to estimate the nature and the strength of the linear relationship that may exist between two variables	K5	IV
CO5	Build regression model to predict the value of one variable based on the value of the other variable	K6	V
CO6	Apply a comprehensive set of statistical tools in making practical decisions	K3	III

**CORE III-MATHEMATICS OF FINANCE - I**

**SEMESTER: II**  
**CREDITS:5**

**CODE: U20AS203**  
**HOURS/WEEK: 6**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Classify the financial terms of bonds and shares	K2	I
CO2	Identify the cash-flow process in financial transactions.	K3	II
CO3	Identify the different types of interest rates	K3	III
CO4	Analyze the real and money rate of interest and its applications	K4	IV
CO5	Evaluate the present value of cash flow using interest rates	K5	V
CO6	Solve the accumulated value of cash flow using interest rates.	K6	V



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**CORE IV: PRINCIPLES OF INSURANCE**

**SEMESTER: II**  
**CREDITS: 5**

**CODE:U20AS204**  
**HOURS/WEEK:6**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Classify the various types of risks faced by the insurance industry and solving them using appropriate risk management tools	K2	I
<b>CO2</b>	Understand the basic knowledge of insurance and its different types	K2	II
<b>CO3</b>	Identify the functions of insurance company, role of regulatory body for the insurance industry, role of insurance in economic development	K3	II
<b>CO4</b>	Estimation of future exposure in insurance industry, calibration of general insurance and analyze how the insurance market function in current scenario.	K5	III
<b>CO5</b>	Categorize the different risk arises in general insurance products and covering the financial losses	K4	IV
<b>CO6</b>	Discuss the different products offered by life insurers	K6	V

**ALLIED II - PROBABILITY THEORY AND DISCRETE DISTRIBUTION**

**SEMESTER: II**  
**CREDITS: 4**

**CODE: U20AS2Y2**  
**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Understand the basic terminology of probability and its applications	K2 & K3	I
<b>CO2</b>	Analyse the random variable and its distribution functions	K4	II
<b>CO3</b>	Evaluate expectations of random variable	K5	III
<b>CO4</b>	Application of discrete distributions	K3	IV
<b>CO5</b>	Application of discrete distributions	K3	V
<b>CO6</b>	Solve the properties of discrete distribution in different situation	K6	V



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**CORE V: MATHEMATICS OF FINANCE – II**

**SEMESTER: III**  
**CREDITS: 5**

**CODE: U20AS305**  
**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

CO. No.	Course Outcomes	Level	Unit Covered
CO1	Understand the different types of annuity contracts	K2	I
CO2	Solve the varying cash flow model by increasing and decreasing	K3	II
CO3	Examine the unknown parameters by using equations of value method	K4	III
CO4	Evaluate the loan outstanding by using different methods	K5	IV
CO5	Construct the loan schedule	K6	IV
CO6	Evaluation of interest rates	K5	V

**ELECTIVE I: BUSINESS ECONOMICS**

**SEMESTER: III**  
**CREDITS: 4**

**CODE: U20AS3:1**  
**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

CO. No.	Course Outcomes	Level	Unit Covered
CO1	Demonstrate the core economic concepts	K2	I
CO2	Application of economic concepts in business	K3	II
CO3	Distinguish between demand and supply	K4	III
CO4	Discuss the types of cost and revenue	K6	IV
CO5	Evaluate the different types of market structure	K5	IV
CO6	Importance of Macro economics	K5	V



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**ALLIED III: CONTINUOUS DISTRIBUTIONS AND ESTIMATION THEORY**

**SEMESTER: III**

**CREDITS: 4**

**CODE: U19AS3Y3**

**HOURS/WEEK: 4**

**At the end of this course, the students will be able to**

CO.No.	Course Outcomes	Level	Unit Covered
CO1	Application of continuous distribution	K3	I
CO2	Analyze the types of continuous distribution	K4	II
CO3	Analyze the moment generating functions for continuous distribution	K4	III
CO4	Explain the Central limit theorem and its applications	K4	III
CO5	Estimate the parameters using different methods	K5	IV
CO6	Estimate the confidence interval	K6	V

**ALLIED IV: PROGRAMMING USING R**

**SEMESTER: III**

**CREDITS: 2**

**CODE: U20ASPY4**

**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Demonstrate to access the R Console & R Studio for Analysis	K2	I
CO2	Demonstrate the different data types in R	K2	II
CO3	Experiment with different types of data structures	K3	III
CO4	Analyze the data using different graphical representation	K4	IV
CO5	Measure the strength of relationship between two variables	K5	V
CO6	Build regression model to predict the value of one variable based on the value of the other variable	K6	V





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**NMEC I: INTRODUCTION TO INSURANCE**

**SEMESTER: III**  
**CREDITS: 2**

**CODE: U19AS3E1**  
**HOURS/WEEK: 2**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Classify the various types of risks faced by the insurance industry and solving them using appropriate risk management tools	K2	I
CO2	Understand the basic knowledge of insurance and its different types	K2	II
CO3	Understand the concepts of reinsurance	K2	III
CO4	Extend the principles of insurance	K2	IV
CO5	Analyze the Life insurance contract	K4	V
CO6	Determine the different products offered by life insurers	K5	V

**CORE VI: LIFE AND HEALTH CONTINGENCIES - I**

**SEMESTER: IV**  
**CREDITS: 4**

**CODE: U20AS406**  
**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

CO. No.	Course Outcomes	Level	Unit Covered
CO1	Illustrate life table functions with real life contingent problems	K2	I
CO2	Outline the concept of life assurance policies and its benefits.	K2	II
CO3	Examine the formulae for the means and variances of the present values of the payments under assurance contracts	K4	III
CO4	Outline the concept of life annuities and its benefits	K2	IV
CO5	Examine the formulae for the means and variances of the present values of the payments under annuities	K4	IV
CO6	Solving Life Assurance & annuity contract problems	K6	V



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**CORE VI: SAMPLING THEORY AND ITS APPLICATION**

**SEMESTER: IV**

**CODE: U19AS406**

**CREDITS: 4**

**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Classify the different types of sampling distribution	K2	I
CO2	Analyze the test of significance of large samples for different attributes.	K4	II
CO3	Inference about the parameters in the statistical analysis	K4	II
CO4	Analyze the categorical data and test the goodness of fit	K4	III
CO5	Estimate and interpret the moments in 't' distribution	K5	IV
CO6	Estimate and interpret the moments in 'F' distribution	K6	V

**ALLIED VI: INSURANCE UNDERWRITING**

**SEMESTER: IV**

**CODE: U20AS4Y6**

**CREDITS: 4**

**HOURS/WEEK: 4**

**At the end of this course, the students will be able to**

CO. No.	Course Outcomes	Level	Unit Covered
CO1	Classify the risks associated with underwriting process	K2	I
CO2	Identify the life related risks and estimate the premium	K3	II
CO3	Categorize the General Insurance Risks and limits of acceptance.	K4	III
CO4	Analyze the health insurance underwriting process and its requirements.	K4	IV
CO5	Determine the need for reinsurance and its types	K5	V
CO6	Choose the appropriate reinsurance products to mitigate the risk	K6	V



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**SBEC I: STAT LAB – STATISTICAL SOFTWARE**

**SEMESTER: IV**  
**CREDITS: 2**

**CODE: U20ASPS1**  
**HOURS/WEEK: 2**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Define a wide range of data management tasks in application	K1	1
CO2	Demonstrate the basic workings of Statistical software and perform basic statistical analyses.	K2	2
CO3	Apply database management tasks, descriptive statistics and graphics, and basic inferential statistics for comparisons and correlations.	K3	3
CO4	Apply data checking and create simple tables and charts	K3	4
CO5	Examine advanced analysis in Statistical software	K4	5
CO6	Examine the integrate information and build models.	K6	5

**NMEC II - FINANCIAL MARKETS IN INDIA**

**SEMESTER: IV**  
**CREDITS: 2**

**CODE: U19AS4E2**  
**HOURS/WEEK: 2**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Illustrate the functions of financial system	K2	I
CO2	Identify the different financial markets.	K3	II
CO3	Identify the types of financial assets in the stock market.	K3	III
CO4	Demonstrate the functions of commercial banks.	K2	IV
CO5	Demonstrate the money market intermediates.	K2	IV
CO6	Analyze the various kinds of money market instrument.	K4	V



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**CORE-VII: STOCHASTIC PROCESSES**

**SEMESTER: V**  
**CREDITS: 5**

**CODE: U20AS507**  
**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

<b>CO. No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Explain the concept of stochastic process.	K2	I
<b>CO2</b>	Apply the concept of Markov chain.	K3	II
<b>CO3</b>	Apply the concept of Basic limit theorem.	K3	III
<b>CO4</b>	Determine the Stationary distribution of a Markov chain.	K5	IV
<b>CO5</b>	Explain the pure birth process and its marginal distribution	K5	V
<b>CO6</b>	Discuss the concept of Continuous time Markov chains.	K6	V

**CORE VIII: MATHEMATICAL MODELLING**

**SEMESTER: V**  
**CREDITS:5**

**CODE: U19AS508**  
**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

<b>CO. No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Applying ODE to construct the model for lifetime applications.	K3	I
<b>CO2</b>	Identify the relationships between mathematics and life science and to develop a model.	K3	II-III
<b>CO3</b>	Inspect the real-world systems from science and technology in a mathematical framework.	K4	III
<b>CO4</b>	Choose the best investment projects	K5	IV
<b>CO5</b>	Create linear predictor model	K6	V
<b>CO6</b>	Develop Models for short term insurance contracts	K6	V



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**CORE IX: LIFE AND HEALTH CONTINGENCIES – II**

**SEMESTER: V**

**CODE: U20AS509**

**CREDITS: 5**

**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

<b>CO. No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Explain the various benefits pertaining to different types of contracts.	K2	I
<b>CO2</b>	Solve the Gross premium calculations using the basic assumptions.	K3	II
<b>CO3</b>	Classification of Reserves	K4	III
<b>CO4</b>	Evaluate the Reserves for conventional without profit contracts.	K5	III
<b>CO5</b>	Evaluate the Mortality profit of the single policy or portfolio of policies	K5	IV
<b>CO6</b>	Estimation of benefit payments in life insurance contracts	K6	V

**ELECTIVE II: DATA ANALYSIS USING MS – EXCEL**

**SEMESTER: V**

**CODE: U21AS5:P**

**CREDITS: 4**

**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Make use of the basic formatting and editing options	K3	I
<b>CO2</b>	Interpret the data using different Conditional formatting options in Excel	K3	II
<b>CO3</b>	Organize the data using pivot tables & pivot charts in MS-Excel	K3	III
<b>CO4</b>	Examine the values using functions library for sorting data	K4	IV
<b>CO5</b>	To understand the purpose of using macros function in the workbook.	K2	V
<b>CO6</b>	Formulate the basic macros to enhance the effective usage of excel functions in the workbook.	K6	V



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**ELECTIVE: III- BASIC ACCOUNTING CONCEPTS**

**SEMESTER: V**

**CODE: U20AS5:3**

**CREDITS: 4**

**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Identify the different types of accounting statements.	K3	I
<b>CO2</b>	Utilize the accounting concepts to frame out the journals and ledger.	K4	II
<b>CO3</b>	Formulating the final accounts.	K6	III
<b>CO4</b>	Evaluate the company's financial performance through cash book and subsidiary books	K3	IV
<b>CO5</b>	Distinguish between different types of depreciation accounting.	K5	V
<b>CO6</b>	Predicting the errors in the Bank Reconciliation statements.	K6	V

**SBEC-III: ACTUARIAL PROFESSION**

**SEMESTER: V**

**CODE: U20AS5S2**

**CREDITS: 4**

**HOURS/WEEK: 2**

**At the end of this course, the students will be able to**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Summarize the concept of Actuarial Profession and its characteristics	K2	I
<b>CO2</b>	Utilize the regulatory measure in the profession	K3	II
<b>CO3</b>	Identify the role of Actuary	K3	III
<b>CO4</b>	Functions of Actuaries in the general insurance	K4	IV
<b>CO5</b>	Importance of the role of Actuaries in Health Insurance	K5	V
<b>CO6</b>	Discuss the duties and responsibilities of an actuary in other areas	K6	V



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**CORE X: OPERATIONS RESEARCH**

**SEMESTER: VI**  
**CREDITS: 5**

**CODE: U19AS610**  
**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

<b>CO. No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Demonstrate the meaning of Operations Research and how to use in real-life decision-making problems.	K2	I
<b>CO2</b>	Build linear program in the event of minimum cost or maximum profit	K3	I
<b>CO3</b>	Solve linear programming problem using Graphical Method, Simplex Method, Big- M-Method and Two-Phase Simplex Method	K3	II
<b>CO4</b>	Assess dual simplex method in LPP	K5	III
<b>CO5</b>	Compare the different types of decision-making environments and the appropriate decision-making approaches and tools to be used in each type	K5	IV
<b>CO6</b>	Discuss the concept of PERT and CPM methods	K6	V

**CORE XI: NUMERICAL METHODS**

**SEMESTER: VI**  
**CREDITS: 5**

**CODE: U20AS611**  
**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

<b>CO. NO.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Make use of different algebraic and numerical techniques	K3	I
<b>CO2</b>	Solve problems using linear system of equations	K3	II
<b>CO3</b>	Make use of the techniques to find the interpolated values.	K3	III
<b>CO4</b>	Examine the suitable techniques to find the interpolated values for unequal intervals.	K4	III
<b>CO5</b>	Analyze the derivatives and deduct the values using Newton's formulae.	K5	IV
<b>CO6</b>	Solve ordinary differential equations using different methods	K6	V



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**CORE-XII: GROUP INSURANCE AND RETIREMENT BENEFITS**

**SEMESTER: VI**

**CODE: U20AS612**

**CREDITS: 5**

**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

<b>CO. NO.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Summarize the different types of retirement benefits	K2	I
<b>CO2</b>	Outline the different types of group insurance schemes	K2	II
<b>CO3</b>	Analyze the different ways of arranging schemes	K4	III
<b>CO4</b>	Assess past service benefits and future service benefits	K5	IV
<b>CO5</b>	Elaborate the treatment of retirement provisions	K6	V
<b>CO6</b>	Elaborate documentation of trust deeds and rules	K6	V

**CORE XIII: REINSURANCE MANAGEMENT**

**SEMESTER: VI**

**CODE: U20AS613**

**CREDITS: 5**

**HOURS/WEEK: 6**

**At the end of this course, the students will be able to**

<b>CO. NO.</b>	<b>COURSE OUTCOMES</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Demonstrate the concept of Reinsurance and its importance.	K2	I
<b>CO2</b>	Identify the factors influencing reinsurance business.	K3	II
<b>CO3</b>	Analyze the usage of reinsurance in various types of industry.	K4	III
<b>CO4</b>	Functions of regulatory bodies in reinsurance business	K4	IV
<b>CO5</b>	Prioritize the importance of proportional and non-proportional reinsurance arrangements in the insurance industry.	K5	V
<b>CO6</b>	Adapt the suitable alternative risk transfer in insurance contract	K6	V





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**CORE XIV: INTRODUCTION TO TIME SERIES**

**SEMESTER: VI**  
**CREDITS: 4**

**CODE: U20AS614**  
**HOURS/WEEK: 5**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Develop to handle the different kinds of price index numbers.	K3	I
CO2	Develop to handle the different kinds of quantity index numbers	K3	II
CO3	Make use of index numbers to create time series for predicting future values	K3	III
CO4	Categorize the trend analysis techniques for different time periods.	K4	III
CO5	Evaluate the average in different seasonal variations	K5	IV
CO6	Adapt the suitable techniques to find the interpolated and extrapolated values.	K6	V

**SBEC III - MATHEMATICS FOR COMPETITIVE EXAMINATIONS**

**SEMESTER: VI**  
**CREDITS: 2**

**CODE: U19AS6S3**  
**HOURS/WEEK: 2**

**At the end of this course, the students will be able to**

CO. NO.	Course Outcomes	Level	Unit Covered
CO1	Build themselves involved to attend civil service examinations	K3	I
CO2	Assess themselves to the current demand in the job market	K5	II
CO3	Analyze the techniques to solve logical math efficiently	K4	III
CO4	Solving the Reasoning questions with full confident	K3	IV
CO5	Plan to take up the exams on time with no fear	K3	IV
CO6	Construct the Aptitude level of thinking	K6	V



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**STRUCTURE OF THE SYLLABUS**

<b>Program Name</b>	<b>Course</b>	<b>Course code</b>	<b>Course name</b>
M.Sc. Actuarial Science	CORE I	P19AS101	Actuarial statistics-I
M.Sc. Actuarial Science	CORE II	P19AS102	Actuarial mathematics - I
M.Sc. Actuarial Science	CORE III	P19AS103	Actuarial mathematics - II
M.Sc. Actuarial Science	CORE IV	P19AS104	Survival analysis - I
M.Sc. Actuarial Science	ELECTIVE I	P19AS1:1	Principles of insurance
M.Sc. Actuarial Science	CORE V	P19AS205	Actuarial statistics-II
M.Sc. Actuarial Science	CORE VI	P19AS206	Actuarial mathematics-III
M.Sc. Actuarial Science	CORE VII	P19AS207	Actuarial mathematics - IV
M.Sc. Actuarial Science	CORE VIII	P19AS208	Survival analysis - II
M.Sc. Actuarial Science	CORE IX	P19AS209	Risk modelling
M.Sc. Actuarial Science	ELECTIVE II	P19AS2:P	Programming using R
M.Sc. Actuarial Science	CORE X	P19AS310	Business economics - I
M.Sc. Actuarial Science	CORE XI	P19AS311	Business finance - I
M.Sc. Actuarial Science	CORE XII	P19AS312	Financial engineering - I
M.Sc. Actuarial Science	ELECTIVE III	P20AS3:3	Actuarial practice
M.Sc. Actuarial Science	ELECTIVE IV	P19AS3:P	Advanced MS Excel
M.Sc. Actuarial Science	CORE XIII	P19AS413	Business economics - II
M.Sc. Actuarial Science	CORE XIV	P19AS414	Business finance - II
M.Sc. Actuarial Science	CORE XV	P19AS415	Financial engineering - II
M.Sc. Actuarial Science	ELECTIVE V	P19AS4:P	Python programming language



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**CORE I: ACTUARIAL STATISTICS – I**

**Semester: I**  
**Credits: 5**

**Code: P19AS101**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Demonstrate problem-solving techniques needed to accurately calculate probabilities.	K2	I
<b>CO2</b>	Identify then different types of distribution to fitting model	K3	II
<b>CO3</b>	Apply problem-solving techniques to solving in Actuarial Field	K3	II, III
<b>CO4</b>	Examine the analysis of derived statistics in Actuarial field	K4	IV
<b>CO5</b>	Choose problem solving techniques in testing of Hypothesis	K5	V
<b>CO6</b>	Test simulated data from the given distributions and compare with normal distribution	K6	V

**CORE II: ACTUARIAL MATHEMATICS – I**

**Semester: I**  
**Credits: 5**

**Code: P19AS102**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Understand the different types of cash flow models	K2	I
<b>CO2</b>	Build the model to handle different situations of compound interest problems in banking and financial sectors	K3	II
<b>CO3</b>	Apply the different types of interest rates	K3	III
<b>CO4</b>	Categorize various models related to interest Rates	K4	IV
<b>CO5</b>	Assess to identify and classify the varying annuities on the basis of cash flows.	K5	IV
<b>CO6</b>	Develop to analyze different types of annuities and to know, how to handle that.	K6	V



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**CORE III: ACTUARIAL MATHEMATICS - II**

**Semester: I**  
**Credits: 4**

**Code: P19AS103**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Outline and illustrate the life table functions for the concept of life assurance policies and its benefits.	K2	I
CO2	Outline and illustrate the life table functions for the concept of life annuities and its benefits.	K2	II
CO3	Apply the concept of equation of value to find variable benefits for with-profit policies.	K3	III
CO4	Evaluate gross premiums under different payment periods	K5	IV
CO5	Estimate gross future loss random variables	K5	IV
CO6	Formulate gross premium prospective and retrospective reserves using recursive relation	K6	V

**CORE IV: SURVIVAL ANALYSIS -I**

**Semester: I**  
**Credits: 4**

**Code: P19AS104**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Illustrate the real time application of stochastic process.	K2	I
CO2	Identify the methods of stochastic process.	K3	I
CO3	Identify the different kinds of Markov Chains.	K3	II
CO4	Examine the two-state Markov model and the Poisson model.	K4	III
CO5	Determine the Time-homogeneous Markov Jump processes.	K5	IV
CO6	Estimate the Time-inhomogeneous Markov jump processes.	K6	V



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**ELECTIVE I: PRINCIPLES OF INSURANCE**

**Semester: I**  
**Credits: 4**

**Code: P19AS1:1**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Units Covered
CO1	Recall the historical development of insurance.	K1	I
CO2	Classify the components of general insurance and its salient features	K2	II
CO3	Make use of IRDAI 's regulations and its functions to enhance the insurance business	K3	III
CO4	Strengthening the relationship between insured and insurers	K4	IV
CO5	Analyze the stages involved in claim settlement process both in life and general insurance	K4	IV
CO6	Adapt the different tax systems that come under insurance business	K6	V

**CORE V: ACTUARIAL STATISTICS – II**

**Semester: II**  
**Credit: 4**

**Code: P19AS205**  
**Hours/Week: 5**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Develop the ability to find the relationship between variables and predicting using model	K3	I
CO2	Build the regression model	K3	II
CO3	Apply Bayesian Statistics to estimate the posterior distribution	K4	III
CO4	Evaluate the risk premium for insurance company	K5	IV
CO5	Evaluate the premium rate to the insurance company	K5	IV
CO6	Estimate the risk premium of general insurance company	K6	V



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**CORE VI - ACTUARIAL MATHEMATICS - III**

**Semester: II**  
**Credits: 4**

**Code: P19AS206**  
**Hours/Week: 5**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Apply the concepts relating to functions and Annuities	K3	I
<b>CO2</b>	Analyze the theoretical concept and find the solution for unknown quantity	K4	II
<b>CO3</b>	Categorize the skills, how to apply the equations of value in loan repayment Process	K4	III
<b>CO4</b>	Evaluate the skill related to APR	K5	IV
<b>CO5</b>	Evaluate the different situations of financial projects	K5	IV
<b>CO6</b>	Build the different types of term structure of interest rates.	K6	V

**CORE VII - ACTUARIAL MATHEMATICS - IV**

**Semester: II**  
**Credits: 4**

**Code: P19AS207**  
**Hours/Week: 5**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Make use of different situations of policies.	K3	I
<b>CO2</b>	Construct the premium & reserve table.	K4	II
<b>CO3</b>	Measures the relations between assurance and annuity factors using equation of value, and their select and continuous equivalents	K4	II
<b>CO4</b>	Explain the relations between annuities payable in advance and in arrears, and between temporary, deferred and whole life annuities	K5	III
<b>CO5</b>	Solve the gross premiums and reserves of assurance and annuity contracts	K5	IV
<b>CO6</b>	Develop various types of reserves	K6	V



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**CORE VIII: SURVIVAL ANALYSIS -II**

**Semester: II**  
**Credits: 4**

**Code: P19AS208**  
**Hours/Week: 5**

**At the end of this course, the students will be able to**

CO. No.	Course Outcomes	Level	Unit Covered
CO1	Apply the real time application of Survival models.	K3	I
CO2	Examine the methods of Survival models.	K4	I
CO3	Evaluate the different kinds of lifetime distribution functions	K5	II
CO4	Analyze the Proportional hazard models.	K4	III
CO5	Classify the Graduation and Methods.	K4	IV
CO6	Estimate the Graduation and statistical tests	K6	V

**CORE IX: RISK MODELLING**

**Semester: II**  
**Credits: 4**

**Code: P19AS209**  
**Hours/Week: 5**

**At the end of this course, the students will be able to**

CO. No.	Course Outcomes	Level	Unit Covered
CO1	Make use of the properties of Times series in actuarial calculation	K3	I & II
CO2	Application of loss distribution in Insurance sector.	K3	II
CO3	Testing the extreme value theory in General Insurance	K4	III
CO4	Assess the importance of reinsurance contract.	K5	IV
CO5	Estimate the value of general insurance contract by using statistical techniques	K5	V
CO6	Estimate the aggregate claims using risk models	K6	V



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**ELECTIVE II – PROGRAMMING USING R**

**Semester: II**  
**Credits: 2**

**Code: P19AS2:P**  
**Hours/Week: 3**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Understand the concept of R studio	K2	I
CO2	Make use of R expressions that involve variables, variable assignment, operators and functions	K3	II
CO3	Organize the data using R data types (character, double, integer and logical) diagrammatically	K3	II
CO4	Analyze the basic R data structures relevant to modern data analysis (atomic vectors and data frames)	K4	III
CO5	Determine the basic verbs of data transformation of actuarial data	K5	IV
CO6	Build statistical graphics with gg plot using R environment	K6	V

**CORE X: BUSINESS ECONOMICS – I**

**Semester: III**  
**Credits: 4**

**Code: P19AS310**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

CO. No	Course Outcomes	Level	Unit Covered
CO1	Classify the economic system and its strands.	K2	I
CO2	Categorize the impact of changes in demand and supply	K4	II
CO3	Determine the risk and uncertainty about future market movements.	K5	III
CO4	Prioritize the different market structures and its applications	K5	IV
CO5	Determine the pricing strategies and product lifecycle.	K5	IV
CO6	Elaborate the objectives of Macro economy and estimation of National Income and Output	K6	V





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**CORE XI: BUSINESS FINANCE - I**

**Semester: III**  
**Credits: 5**

**Code: P19AS311**  
**Hours/Week: 6**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	understand the position of each stakeholder	K2	I
CO2	Examine the knowledge in capital market and analyze about the investments	K4	II
CO3	Estimate the different types of Business entity	K5	III
CO4	Determine to understand different types of issue of shares and shareholders	K5	IV
CO5	Evaluate the project with different stages by using probability trees	K5	IV
CO6	Estimate the position of debt and capital structure	K6	V

**CORE XII: FINANCIAL ENGINEERING - I**

**Semester: III**  
**Credits: 5**

**Code: P19AS312**  
**Hours/Week: 6**

At the end of this course, the students will be able to

CO No.	Course Outcomes	Level	Unit Covered
CO1	Apply utility function in insurance contract.	K3	I
CO2	Modelling of investment returns.	K3	II
CO3	Determine the operation of insurance and other financial systems.	K5	III
CO4	Analysis the best portfolio-based risk and return.	K4	IV
CO5	Evaluate the risk of the insurance company.	K5	V
CO6	Estimate the expected return from the investment portfolio.	K6	V



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**ELECTIVE III: ACTUARIAL PRACTICE**

**Semester: III**  
**Credits: 5**

**Code: P20AS3:3**  
**Hours/Week: 6**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Demonstrate the concept and implement the regulations of Actuarial Clients	K2	I
CO2	Application of Actuarial regulations	K3	II
CO3	Analyze the various investments choices available in the market	K4	III
CO4	Categorize the investment portfolio of general insurance business	K4	IV
CO5	Asses the investment return from different money market and bond market instruments.	K5	IV
CO6	Discuss the outcomes from property market and overseas investments	K6	V

**ELECTIVE IV: ADVANCED MS-EXCEL**

**Semester: III**  
**Credits: 4**

**Code: P19AS3:P**  
**Hours/Week: 6**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Evaluate the statistical terms and its measures	K5	I
CO2	Measure to recognize the applications of Statistical measure	K5	II
CO3	Compare using descriptive measures (Statistical Software and MS-Excel).	K5	III
CO4	Analysis the data relationship using correlation	K4	IV
CO5	Predict the variation using regression	K6	IV
CO6	Determine the procedure to compute statistical measure using statistical software tool	K5	V



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**CORE XIII: BUSINESS ECONOMICS – II**

**Semester: IV**  
**Credits: 4**

**Code: P19AS413**  
**Hours/Week: 6**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Classify the international trade system and payments	K2	I
CO2	Apply the Keynesian classical theory in Philip's curve	K3	II
CO3	Analyze the effects of demand and supply side policies	K4	III
CO4	Determine the exchange rate and its implication	K5	IV
CO5	Influence of globalization and monetary systems in economy.	K5	V
CO6	Discuss the emerging financial crisis and the new consensus	K6	V

**CORE XIV: BUSINESS FINANCE - II**

**Semester: IV**  
**Credits: 4**

**Code: P19AS414**  
**Hours/Week: 6**

At the end of this course, the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Analyze to understand the reason for preparing accounting statements	K4	I
CO2	Explain the accounting concepts, which followed by the company for preparing the accounting statements	K5	II
CO3	Assume the purpose for preparing and maintaining the statements.	K4	III
CO4	Analyze to handle the depreciation, which is treated in company accounts	K4	IV
CO5	Explain the basic construction of accounts of different types and the role and principal features of the accounts of a company	K5	IV
CO6	Estimate the policies for working capital management, including its individual elements	K6	V



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**CORE XV: FINANCIAL ENGINEERING – II**

**Semester: IV**  
**Credits: 4**

**Code: P19AS415**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Utilizing the CAPM in insurance business	K3	I
<b>CO2</b>	Application of arbitrage concept and its development	K4	II
<b>CO3</b>	Estimate the credit risk using statistical tool	K5	III
<b>CO4</b>	Importance of surplus process	K5	IV
<b>CO5</b>	Estimate the insolvent position of general insurance company	K5	IV
<b>CO6</b>	Estimate the reserve in general insurance business	K6	V

**ELECTIVE V: PYTHON PROGRAMMING LANGUAGE**

**Semester: IV**  
**Credits: 4**

**Code: P19AS4:P**  
**Hours/Week: 6**

**At the end of this course, the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
<b>CO1</b>	Analyze to build and package Python modules for reusability.	K4	I
<b>CO2</b>	Explain the read and write files in Python.	K5	II
<b>CO3</b>	Classify the object-oriented programs with Python classes.	K4	III
<b>CO4</b>	Importance of the Python applications for error handling.	K5	IV
<b>CO5</b>	Justify the indexing and slicing to access data in Python programs.	K5	IV
<b>CO6</b>	Formulate the Lists, tuples, and dictionaries in Python programs.	K6	V