B.Sc. Actuarial Science (Semester Wise) 2020-21

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
Semester I	Paper-I	Basics of Business Economics	6	5	50	50	100
Semester II	Paper-II	Basics of Financial Mathematics	6	5	50	50	100
SECOND YEAR							
Semester III	Paper-III	Basics of Financial Accountancy	6	5	50	50	100
Semester IV	Paper-IV	Survival Models	6	5	50	50	100
THIRD YEAR							
Semester V	Paper-V	Basics of Life Contingency	5	5	40	60	100
	Paper-VI	Business Communication	5	5	40	60	100
Semester VI*	Paper-VII	ELECTIVE-1:Mortality and other Actuarial statistics	5	5	40	60	100
		ELECTIVE-2:Actuarial Statistics	5	5	40	60	100
		ELECTIVE-3:Advanced Business Communication	5	5	40	60	100
Semester VI*	Cluster-1	Life contingency-1	5	5	40	60	100
		LifeContingency-2	5	5	40	60	100
		Project	5	5	40	60	100
	Cluster-2	Principles of Insurance	5	5	40	60	100
		Practice of Insurance	5	5	40	60	100
		Project	5	5	40	60	100
	Cluster-3	Statistical Techniques for Research methods	5	5	40	60	100
		Survival Analysis and Bio-statistics	5	5	40	60	100
		Project	5	5	40	60	100

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CBCS SYLLABUS (Semester Wise) 2020-21
I B.Sc. Statistics/Semester-II (With Mathematics Combination)
Actuarial science
Paper – II-Basics of Financial Mathematics

Total hrs.Per week: 04   **Total credits: 03**

Unit-I
Simple and Compound interest, Compound interest tables, Present Value, Normal and Effective rates of interest, Effective rate corresponding to a nominal rate and Vice-Versa, , Varying rates of interest, Equation of Value, Equated time of payment.
Additional Inputs: About Institute of Actuaries of India

Unit-II
Repayment of loan by uniform installments when the frequency of installments is the same as that with which interest is convertible, Repayment of loan by uniform installments consisting of both interest and principle repayment, Redemption of Loans by a sinking fund, Lender's sinking fund, Capital redemption policies, Office premiums, Surrender Value.

Unit-III
Discount and Discounted value , Nominal and Effective rates of Discount, Average interest yield on the life fund, Money weighted rate of return, Time Weighted rate of return and linked internal rate of return,.

Unit-IV
Column l_x , Column d_x , Column q_x , Column p_x , The probabilities of survival and death, Stationary population, L_x , T_x , Curate expectation of life, Complete expectation of life, Central death rate M_x , Selection and select rates, Ultimate table, Aggregate table. Construction of Mortality tables, Stages involved in construction of mortality table, The data to be used, Period of investigation, Unit of investigation, The method of investigation, Census method, application of census method to life office data, Determination of exposed to risk and deaths.

Unit-V
Life Assurance premiums-General Considerations, Assurance benefits-Pure Endowment assurance, Endowment assurance, Temporary Assurance or Team assurance, Whole life Assurance, Double Endowment assurance , Increasing Temporary Assurance, Increasing Whole life Assurance, Commutation functions D_x , C_x , M_x , and R_x , Expressions for present values of assurance benefits in terms of Commutation functions, Fixed term (Marriage) Endowment, Educational annuity plan.

Suggested Readings:
1) An Introduction to Mathematics of finance by J.J.McCUTCHEON and W.F.SCOTT
2) Actuarial Mathematics by Bowers Gerber Hickman J. Nesbit

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CBCS SYLLABUS (Semester Wise) 2020-21
I B.Sc. Statistics/Semester-II - Actuarial science
Paper – II-Basics of Financial Mathematics
(MODEL QUESTION PAPER)

Time: 2 1/2hrs   Max Marks: 50

SECTION-A

Answer any <u>SIX</u> questions from the following: 6x3 = 18M

1. Explain Types of Interests?
2. Write about Discount and Discounted value.
3. Explain Capital Redemption Policies.
4. Define life Assurance premiums and its benefits?
5. Explain about the average Interest yield on the life fund.
6. Explain Construction of Life table.
7. Write a short note on mortality table?

8. Explain about Education Annuity plan?
9. What are Equated Time of Payments?

SECTION-B

Answer any <u>FOUR</u> questions from the following: 4x8 = 32M

9. Explain about Normal and Effective rates of Interest.

10. Explain about Varying Rates of Interest.

11. Explain about Repayment of loan by Uniform installments

12. Define Annuity? And Explain concepts of Annuity?

13. Explain Nominal and Effective rates of Discount

14. Explain about Census method and how do you apply census method to life office

    Data

15. Give the expressions for present values of assurance benefits in terms of

    Commutation functions.

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CBCS SYLLABUS (Semester Wise) 2020-21
II B.Sc. Statistics/Semester-IV-Actuarial science
Paper – IV-SURVIVAL MODELS

Total hrs.Per week: 04   Total credits:03

Unit-I

Principles of modeling: Need, benefits and limitations of models, stochastic and deterministic models, discrete and continuous state spaces and time sets, suitability of model, short term and long term properties of a model,analysiing the output of a model.

Unit-II

Concepts of Survival Models: The distribution and density functions of the random future lifetime, the survival function, the force of mortality or hazard rate and derive relationships between them, Laws of mortality like Gompertz and Makeham, the distribution and density functions of the curate future lifetime random variable.

Unit-III

Truncation, Censoring mechanisms: Right censoring, Left or interval censoring, random censoring, informative and non-informative censoring, Type one and two censoring, Likelihood construction for censored and truncated data, Kaplan-Meier model, Nelson Aalen model, Cox proportional hazard model, Breslow's approximations to the partial likelihood estimator.

Unit-IV

Maximum likelihood estimator of transitions intensities in Binomial and Poisson model and their mean-variances, advantages and disadvantages of multiple state models and the binomial models, including consistency, efficiency, simplicity of the actuarial estimators and their distributions, application to practical observations and generality.

Unit-V
Initial and central exposed to risks, graduation, purpose and methods of graduation, testing goodness of fit and testing smoothness of a set of graduated estimates, statistical test for comparing a set of crude estimates and a standard table or a set of crude estimates and a set of graduated estimates, effect of duplicate policies on estimates.

References:

U K Institute of Actuaries core reading for subject CT4-Models.
Klein J.P. and Moeschberger, M.L.(2003) Survival Analysis: Techniques for Censored and Truncated Data 2nd Edition, Springer Verlag, New York, Klugman, S.A.(June 2003), "Estimation, Evaluation, and Selection of Actuarial Models".
Dick London (2197), Survival Models and their Estimation, second edition, ACTEX publications.
Cox, D.R. and Oakes, D.(2184) Analysis of Survival Data, Chapman and Hall, NewYork.

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CBCS SYLLABUS (Semester Wise) -2020-21
II B.Sc. Statistics/Semester-IV- Actuarial Science
Paper – IV-Survival Models
(MODEL QUESTION PAPER)

Time: 2 1/2hrs   Max Marks: 50

SECTION-A

Answer any <u>SIX</u> questions from the following: 6 x3 = 18M

1. Explain the discrete and continuous state spaces and time sets.
2. Explain the distribution and density functions of the random future life time.
3. Describe a test for smoothness of a set of graduated estimates?

4. Write the advantages and disadvantages of multiple state models.
5. Explain the need for graduation.

6. Define Poisson distribution and its model
7. Explain about duplicate policies on estimates
8.   Define complete and curate expectation of life. Derive the relation between them.
9. Explain methods of graduation

SECTION-B

Answer any <u>FOUR</u> questions from the following: 4x8= 32M

10. Explain the Need, benefits and limitations of models
11. Explain short term and long term properties of a model, and analyzing the output

   Of a model
11.   State Gompertz and Make ham laws of Mortality.

12. Explain Type one and two censoring, Likelihood construction for censored and truncated
    data, Kaplan-Meier model, Nelson Aalen model,

13.Write a brief note on censoring.

14. Derive the maximum likelihood estimator for the rate of mortality in the binomial

    model and its mean and variance. ?

15. Write statistical properties of maximum likelihood estimates and extending the
    models

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial Science
Paper-VII- MORTALITY AND OTHER ACTUARIAL SCIENCE (Elective-1)

Total hrs.Per week: 04   **Total credits:03**

Unit-I
Rates and Ratio's in Mortality- Exposed to Risk Aggregate Rates- Life Year and other rate Intervals

Unit-II
Select Rates – Multiple Decrement Tables – Its role in Actuarial Statistics

Unit-III
Principles and Purposes of Graduation – The Graphic Method - Graduation by reference to a Standard table.

Unit-IV
Compression of Rates of Selection – Social and Economic factors in Mortality – Population Structures and Projections – Age Sex Pyramid

Unit-V
U.K. Assured lives and Annuitants Mortality.- The English life Tables – Individual Policy Sickness Experience – Indian Assured Lives Mortality.

Recommended Books:
1. Benjamin, B and Pollard: Analysis of Mortality and other Actuarial Sciences Published by Heinemann: Chapters 1,10,11,12,15,21.
2. Special Note: Exposed to Risk using the Direct and Census methods including mortablity rates by age and Multiple Decrements.
3. Special Note: Population Structures and Projections -2190 Edition
4. English Life Tables No. 14-2180/82 HMSC

TIME: 3 Hrs   Max. Marks: 60

SECTION-A

Answer any <u>FIVE</u> questions from the following   5X4=20M
1. Write brief note on rates and ratio of mortality.
2. Write a brief note on multiple and discriminent roles.?
3. Write compression rates of selection?
4. Write population structures.
5. Define annuitants mortality?
6. Write short note on Indian assured lives?
7. Write graphic method of graduation
8. Write short note Graduation

SECTION-B

Answer any <u>FOUR</u> questions from the following   4x10=40M
9. Write brief notes on exposed to risk aggregate rates
10. Write brief notes on life year and other rates of intervals
11. Write brief notes on multiple & discriminate tables
12. Write role on multiple & discriminate tables in actuarial statistics.
13. write graduation by reference to a standard table.
14. Write about population structures and projections.
15. Explain the English life table, individual policy sickness.

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
Paper-VII - ACTUARIAL STATISTICS (Elective-II)

Total hrs.Per week: 04   **Total credits:03**

Unit-I

Warning's Result- Compound Distribution – Branching Process – Poissonian Process – Linear Population Process

Unit-II

Linear Combination of Random Variables – Chebyshev Inequality Central Limit Theorem – Special Distributions.

Unit-III

Descriptive Statistics – Inferential Statistics – Estimation of Method of Moments – Properties of Estimation.

Unit-IV

Confidence Intervals – Single Sample Problems – Two sample Problems – Paired problems.

Unit-V

Testing of Hypothesis – Single sample Problems – Two Sample problems – Chi square Tests - Bayesian Methods

References:
1. Gray, J.R: Probability (Chapters 1,2,3,4,5, and 8)
2. Larson, H.J.: Introduction to Probability Theory and Statistical Inference. Published by Wiley.

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
Paper-VII- ACTUARIAL STATISTICS (Elective-II)

Max. Marks: 60

TIME: 3 Hrs

SECTION-A
Answer any <u>FIVE</u> questions from the following   **5X4=20M**
1. Write brief note on linear population process.
2. State and prove Central Limit Theorem.
3. Write about inferential statistics?
4. Write the properties of a good estimator.
5. Write brief notes on double sample problem?
6. Write single sample problem for testing of hypotheses.
7. Write Short note ON Actuarial Statistics
8. Explain f –test for equaliy of two variances
.

SECTION-B
Answer any <u>FOUR</u> questions from the following   **4x10=40M**
9. Write properties of poisson process.
10. Write brief notes on branching process.
11. State and prove chebychev's inequality.
12. Write estimation of method of moments also write its properties.
13. Explain t-test for single mean and paired t-test.
14. Explain the procedure of chi-square test for goodness of fit
15. Write procedure of chi-square test for independence of attributes.

PRINCIPLES OF INSURANCE (Cluster-2, Paper-1)
Paper-VIII-B1

Total hrs.Per week: 04   **Total credits:03**

Unit-I
Risk Management: Meaning of risk and distinguish between different types of risks, Risk analysis and risk management techniques, Concept of risk retention for individuals.

Unit-II
Insurance Market: Indian insurance market, role of intermediaries: agents, brokers; role of specialists: surveyors, medical examiners, third party administrators(TPA); role of regulator and other bodies.

Unit-III
Insurance Customers: Concept of Insured customer, different types of customers, concept of customer mindset and customer satisfaction, importance of ethical behavior.

Unit-IV
Insurance Contract: Notion of insurance contract, significance of principle of insurable interest, principles of indemnity, principles of subrogation and contribution, principles of utmost good faith, concept of proximate cause.

Unit-V
Insurance Terminology: Concept of life and non-life insurance, terms specific to life insurance, terms specific to non-life insurance.

References:
1. Principles of Insurance, IC-01, Insurance institute of India.
2. Principles of Insurance and Banking, Dr. S.S. Kundu, Dr. B.S. Bodla

Time: 3hrs   Max Marks: 60

SECTION-A

Answer any FIVE questions from the following   **5X4=20M**

1. Write Distinguish between different types of risks?
2. Explain the role of intermediaries?
3. Explain the different types of customers ?
4. Explain of significances of principal of Insurance interest?
5. Explain the concept of risk of retention for individuals?
6. Explain the concept of customer satisfaction?
7. Explain the role of specialists?
8. Explain the concept of Risk Management

SECTION-B

Answer any FOUR questions from the following   **4X10=40M**

9. Explain the risk analysis and risk management techniques?
10. Explain the importance of ethical behavior?
11. Explain the role of third party administrators?
12. Explain the principals of subrogation and contribution?
13. Explain the principals of utmost good faith and proximate cost?
14. Explain terms specific to life insurance and specific to non-life insurance?
15. Explain the insurance terminology and the concept of life and non-life insurance ?

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
PRACTICE OF INSURANCE (Cluster-2,Paper-2)
Paper-IX-B2

Total hrs.Per week: 04   **Total credits:03**

Unit-I
Practice of Life Insurance: Introduction, Over view of Indian insurance market, growth of insurance business in india, liberalization of Indian insurance sector, organizational structure of LIC.

Unit-II
Premiums and bonuses: Concept of premium, different types of premiums, factors involved in the calculation of premium, concept of bonus.

Unit-III
Plans of Life Insurance: various life insurance plans, importance of ULIPs, importance of riders, industrial life insurance, benefits of MWP, importance of key-man insurance, importance of health insurance.

Unit-IV
Annuities: Concept of annuity, analysis of different types of annuity plans, advantages and disadvantages of annuity.

Unit-V
Group Insurance: Importance of group insurance, different group insurance schemes, group insurance classifications, features of group insurance schemes, group superannuation schemes, group leave encashment scheme, group insurance scheme in view of EDLI, social security scheme.

Reference:
1. Practice of Life Insurance IC-02, Insurance institute of india.
2. Theory and Practice of Insurance, J. François Outreville.

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CBCS SYLLABUS (Semester Wise) -2020-21
III B.Sc. Statistics/Semester-VI- Actuarial Science
PRACTICE OF INSURANCE(Cluster-2,Paper-2) Paper –IX-B2
(MODEL QUESTION PAPER)

Time: 3hrs   Max Marks: 60

SECTION-A

Answer any <u>FIVE</u> questions from the following   5X4=20M

1. Explain the growth of insurance business in India?
2. Explain organizational structure of LIC
3. Write the different types of premiums
4. Write the various life insurance plans
5. Write the benefits of MWP
6. Write the advantages and disadvantages of annuity
7. Write the group insurance classification
8. Write short note on Annuities

SECTION-B

Answer any <u>FOUR</u> questions from the following   4X10=40M

9. Explain briefly about Indian insurance market?

10. Write factors involved in the calculation of premiums and the concept of bonus

11. Write the importance of key-man insurance and health insurance

12. Explain the concept of premiums and write different types of premiums with explanation

13. Write the analysis of different types of annuity plans
14. Write the importance of riders and industrial life insurances
15. Write the group insurance schemes in view of EDLI.

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
LIFE CONTIGENCIES-I (Cluster-1,Paper-1)
Paper-VIII-A1

Total hrs.Per week: 04   **Total credits:03**

UNIT-I
Net premiums or Benefit premiums
The random future loss under an assurance or annuity contract, state the principle of equivalence, Notations and formulae of net premium for common life insurance contracts, Fully Discrete Premiums, True m-thly payment premium, Commutation functions, increasing and decreasing Benefit premiums, Profits contract, Types of bonus, Calculating net premiums for with-profit contracts.

UNIT-II
Benefit Reserves
Prospective and Retrospective Reserves , Net future random loss for reserves, Conditions for equality of prospective and retrospective Reserves, Fully Continuous Benefit Reserves, other formulas for fully Continuous Benefit Reserves, Fully Discrete Benefit Reserves, Benefit Reserves on a Semi-continuous basis, Benefit Reserves based on True m-thly Benefit premiums, Net Premium Reserves, Thiele's Differential Equation, Death strain at risk(DSAR), Expected death strain(EDS), Actual death strain (ADS), Mortality profit, Mortality profit on a portfolio of policies, Calculating net Reserves for with-profit contracts.

UNIT-III
Analysis of Benefit Reserves
Benefit Reserves for General Insurances, Recursion Relations for Fully Discrete Benefit Reserves, Benefit Reserves at Fractional Durations.

UNIT-IV
Insurance Models Including Expenses
List the type of expenses incurred in writing a life insurance contract, Describe the influence of inflation on the expenses, Define the gross future loss random variable for the benefits and annuities using equivalence principle.

UNIT-V
Multiple Life Functions
Joint distribution of Future Lifetimes, The Joint-Life Status, The Last-Survivor Status, More Probabilities and Expectations, Dependent Lifetime Models: Common Shock, Insurance and Annuity Benefits: Survival Status, Special Two-Life Annuities, Reversionary Annuities, Simple Contingent Functions.

Text Books

1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(2186),
Actuarial Mathematics, The society of actuaries.

References

1. UK Institute of Actuaries core reading for subject CT5-Contingences.
2. Robin Cunningham, Thomas N. Herzog, Richard L. Models for Quantifying Risk,
4th Edition, ACTEX Publications, 2011.
3. Dickson, David C. M., Hardy, Mary R. and Waters, Howard R., Actuarial
Mathematics for life contingent risks, International series on actuarial science,
Cambridge 2009.4. Deshmukh S. R., An Introduction to Actuarial Statistics, University Press,
2009

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CBCS SYLLABUS (Semester Wise) -2020-21
III B.Sc. Statistics/Semester-VI- Actuarial Science
LIFE CONTINGENCIES-I (Cluster-1,Paper-1)
Paper-VIII—A1
(MODEL QUESTION PAPER)

Time: 3hrs   **Max Marks: 60**

SECTION-A

Answer any FIVE questions   **5X4=20 M**

1. State the principle of equivalence ?

2. Explain the notations and formulae of net premium for common life insurance contracts ?

3. Explain Fully Continuous Benefit Reserves?

4. Explain Recursion Relations for Fully Discrete Benefit Reserves?

5. Describe the influence of inflation on the expenses?

6. Describe Joint distribution of Future Lifetimes?

7. Write short note on Insurance Models

8. Write Short note on benefit Reserves ?

SECTION-B

Answer any FOUR questions from the following   **4X10=40M**

9. Write a brief note on discrete premiums.?

10. For Insurance contract and assumptions of an aggregate mortality law

    (i) Exhibit the formulas for the d.f and p.d.f of conditional distribution for t^L, given T(x)>t

    (ii) Display graphs of these conditional p.d.f's for t=0,20,40,60

11. Define the gross future loss random variable for benefits.?

12. Write short note on joint distribution of future life time?

13. Write notes on true m-thly premiums.?

14. Write a short note on benefit reserves for General Insurance?

15. List the type of expenses incurred in writing a life insurance contract.

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
LIFE CONTIGENCIES-II (Cluster-1,Paper-2)
Paper-IX-A2

Total hrs.Per week: 04   **Total credits:03**

Unit:1
Multiple Decrement Model
Two random variables, Random Survivorship Group, Deterministic Survivorship
Group, Associated single Decrement tables: Basic Relationship, Uniform
Distribution Assumption for multiple decrements, Construction of Multiple
decrement table, Relationship between single and multiple decrement tables.

Unit:2
Application of multiple decrement theory
Actuarial present value and their numerical evaluation, benefit premium and
reserves, competing risks, multiple state modelling, multiple state Markov model,
Kolmogorov forward equations, multiple decrement tables.

Unit:3
Profit testing
Discounted emerging costs, unit-linked contract, Profit test annual premium
contracts, the profit vector, the profit signature, the net present value and the profit
margin, determining premiums using profit test,

Unit:4
Profit criterion, determiningreserves using profit testing,
Zeroising negative cashflows, Equity-linked insurance,
deterministic profit testing for equity linked insurance, Stochastic profit testing,
Stochastic pricing, Stochastic reserving.

Unit:5
Pension funds
Multiple decrement service table for pensions calculations, updating a service table,
the salary scale function, setting the DC contribution, the service table, funding
plans, valuation of benefits: Final salary plans, Career average earnings plans.

Text Books
1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(2186),
  Actuarial Mathematics, The society of actuaries.

References
1.UK Institute of Actuaries core reading for subject CT5-Contingencies.
2.Robin Cunningham, Thomas N. Herzog, Richard L. Models for Quantifying Risk,

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CBCS SYLLABUS (Semester Wise) -2020-21
III B.Sc. Statistics/Semester-VI- Actuarial Science
LIFE CONTINGENCIES-II (Cluster-1,Paper-2)
Paper-IX-A2
(MODEL QUESTION PAPER)

Time: 3hrs　　　　　　　　　　　　　　　　　　　　　　　**Max Marks: 60**

SECTION-A

Answer any <u>FIVE</u> questions from the following:　　　　　**5 x4 = 20M**

1. Write a short note on random survivorship group.?

2. Write a short note on multiple state model.?

3. Write a short note on multiple state markov model.?

4. Describe the types of benefit provided by unit-linked contract.?

5. Define net present value and profit margin.?

6. Explain funding plans.?

7. Explain multiple decrement models.?

8. Define profit test annual premium

<u>SECTION-B</u>
Answer any <u>FOUR</u> questions from the following　　　　　　　**4X10=40M**

9. Explain uniform distribution assumption for multiple decrements.?

10. Explain actuarial present value and their numerical evaluation .?

11. Write a short note on unit linked contract or assurance?

12. Explain the fully continuous and fully discrete premiums?

13. Explain stochastic profit testing?

14. Explain the premium determining using profit test?

15. Explain kolmogorov forward equations

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
STATISTICAL TECHNIQUES FOR RESEARCH METHODS (Cluster-3,Paper-1)
Paper-VIII-C1

Total hrs.Per week: 04   **Total credits:03**

UNIT I
Introduction: Meaning, objection and motivation in research, types of research, research approach, significance of research. Research problems: definition, selection and necessity of research problems.

UNIT II
Survey Methodology and Data Collection, inference and error in surveys, the target populations, sampling frames and coverage error, methods of data collection, non-response, questions and answers in surveys.

UNIT III
Processing, Data Analysis and Interpretation: Review of various techniques for data analysis covered in core statistics papers, techniques of interpretation, precaution in interpretation.

UNIT IV
Develop a questionnaire, collect survey data pertaining to a research problem (such as gender discriminations in private v/s government sector, unemployment rates, removal of subsidy, impact on service class v/s unorganized sectors), interpret the results and draw inferences.

UNIT V

Interpretation and Report Writing-Meaning, Techniques of interpretation, Significance of Report Writing –Different steps in Writing Report ,Types of Reports ,Oral Presentation, Precautions for Writing Research Reports and Conclusion

SUGGESTED READING:

1. Kothari, C.R. (2009): Research Methodology: Methods and Techniques, 2nd Revised Edition reprint, New Age International Publishers.
2. Kumar, R (2011): Research Methodology: A Step - by - Step Guide for Beginners, SAGE publications.

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CBCS SYLLABUS (Semester Wise) -2020-21
III B.Sc. Statistics/Semester-VI- Actuarial Science
STATISTICAL TECHNIQUES FOR RESEARCH METHODS (Cluster-3,Paper-1)
Paper-VIII-C1
(MODEL QUESTION PAPER)

Time: 3hrs   Max Marks: 60

SECTION-A

Answer any FIVE questions from the following: 5 x4 = 20M

1. Explain Meaning and objection of Research

2. Explain origin of Research

3. Describe Survey and its Importance

4. Write the advantages and disadvantages of Questionnaire

5. Explain the need of Report writing

6. Write short note on Data Analysis

7. Explain about writing Research in report

8. Discuss about interpretation

SECTION-B

Answer any FOUR questions from the following: 4x10 = 40M

9. Explain the Need of research and it types

10. Explain Research problems

11. Explain Data Collection.

12. Explain principles steps in survey

13. Explain type of reports

14. Discuss about Research Problems

15. What are Presentation types

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CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
SURVIVAL ANALYSIS AND BIO STATISTICS   (Cluster-3,Paper-2)
Paper-IX-C2

Total hrs.Per week: 04   **Total credits:03**

UNIT I

Introduction: Meaning, of survival analysis ,Survival distributions and their applications-Exponential, Gamma, weilbull, Lognormal and their density functions

UNIT II

Censoring Schemes: type -1 ,types II and Progressive or random censoring with biological examples Estimation mean survival time and variance of the Type -1 and types II Censored data

UNIT III

Competing Risk Theory : Indices for measurement of Probability of death under competition risks and their inter-relations. Estimation of probabilities of death using maximum likelihood principle and modified minimum chi-square methods

UNIT IV

Stochastic epidemic Models : Simple epidemic models, general epidemic model definition and concept duration of an epidemic

UNIT V

Statistical Genetics: Introduction, Concept –Genotype,Phenotype,Dominance Excessiveness ,linkage and recombination ,coupling and repulsion ,Random mating,Gametic array.Distribution of Genotypes under random mating, Clinical trails planning and design of clinical trails ,Phase I,II and III trails .Single Blinding

SUGGESTED READING;
1. Lee E.T and wang J.w(2003) Statistical methods for Survival data Analysis
2. Biswas   Applied stochostics Process
3. Medical biostatisticsby Indrayn A (2008)

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CBCS SYLLABUS (Semester Wise) -2020-21
III B.Sc. Statistics/Semester-VI- Actuarial Science
SURVICAL ANALYSIS AND BIO STATISTICS (Cluster-3,Paper-2)
Paper-IX-C2
(MODEL QUESTION PAPER)

Time: 3hrs   Max Marks: 60

SECTION-A
Answer any **FIVE** questions from the following: 5 x4 = 20M

1. Explain Meaning and objectives of Survival analysis

2. Explain origin of Bio-statistics

3. Describe Survival Distribution and its applications

4. What are type-1 and types-II   errors

5. Explain Competing risk theory

6. Write stochastic epidemic models

7. **Explain** Phase I,II and III trails

8. Discuss about General Models

SECTION-B
Answer any **FOUR** questions from the following: 4x10 = 40M

9. Explain Exponential and gamma Distribution

10. **Explain** weilbull, Lognormal and their density functions

11. **Explain** Progressive or random censoring with biological examples

12. **Explain** Estimation of probabilities of death using maximum likelihood principle and

modified minimum chi-square methods

13. **Explain** Simple epidemic models, general epidemic model definition and concept duration

of an epidemic

14. **Discuss** Genotype,Phenotype,Dominance Excessiveness ,linkage and recombination

15.**What** Random mating,Gametic array.Distribution of Genotypes under random mating,

Government College [A] Rajamahendravaram
CBCS SYLLABUS (Semester Wise) 2020-21
III B.Sc. Statistics/Semester-VI Actuarial science
Paper – VII-ADVANCED BUSINESS COMMUNICATION(Elective-III)

Total hrs.Per week: 04 **Total credits:03**

UNIT I

Introduction: Meaning Definitions of Communications, Basics of Communication, Types of Communication ,Barriers of Communication and Essential of Effective Communication

UNIT II

Negotiation Skills , different types of Negotiations and styles Approaches to Negotiation, Barriers to Negotiation Group discussion- Team Building

UNIT III

Speeches and Presentations: Effective Speech, Preparation of Speech, Role of Body Language in Speech ,factors of Affecting Presentations-group Presentation-Training presentations-PPT – Writing Skills

UNIT IV

Business Letter writing :Definition and Functions of Business letters Enquiries and Replies – Order and Execution-Persuasive ,Sales and Collection Letters Parts ,Collection of Letters- Complaint Letters

UNIT V

MEMO writing –Report writing :Introduction-Memos-advantages and disadvantages of it, Report writing –Meaning-Steps

SUGGESTED READING:

1. Kothari, C.R. (2009): Research Methodology: Methods and Techniques, 2nd Revised Edition reprint, New Age International Publishers.
2. Kumar, R (2011): Research Methodology: A Step - by - Step Guide for Beginners, SAGE publications.

Time: 3hrs   Max Marks: 60

SECTION-A

Answer any <u>FIVE</u> questions from the following: 5 x4 = 20M

1. **Explain Meaning and Definition of Communication**

2. **Explain Basics of Communication**

3. **Describe Barriers of Communication**

4. **Write the advantages and disadvantages of MEMOS**

5. **Explain the need of Report writing**

6. **Write Short note Team Building**

7. **Explain about writing Research in report**

8. **Discuss Group presentation**

SECTION-B

Answer any <u>FOUR</u> questions from the following: 4x10 = 40M

9. **Explain types of communication**

10. **Explain Negotiation skills and types**

11. **Explain Group Discussion and its advantages**

12. **Explain role of body language in speech**

13. **Explain Training Presentation**

14. **Discuss Business Letter writing**

15. **What is memo writing and process?**

PROJECT WORK

Guidelines for the Project Work:

1. A project work shall be normally offered in the third year (sixth semester).
2. A project work shall be assessed for a maximum of 100 marks. The assessment will be based on the project report, presentation and viva–voce ONLY INTERNAL EVALUATION.
3. A project may be undertaken by a group of students and the maximum number of students in a team shall not exceed five.
4. A project work shall be supervised by a faculty member assigned by the Head of the Department.
5. There shall be an internal examiner for the evaluation of the project work.
6. A project work should encourage a student to interact with the end user.
7. A project work should be chosen such that there is enough scope to apply and demonstrate the statistical techniques learnt in the course.
8. The students should submit a report above their project work before the last working day of the concerned semester. Even if a team of students undertake the same project, the project report submitted by each member of the team should be separate.
9. A project work report shall clearly state the problem addressed, the methodology adopted, the assumptions and the hypotheses formulated, any previous references to the study undertaken, statistical analyses performed and the broad conclusion drawn.