KANNUR UNIVERSITY

(Abstract)

B.Sc Statistics -Scheme & syllabus for Core, Complementary and Open Courses with Pattern of Question Papers under Choice Based Credit Semester System for Under Graduate Programme-Implemented with effect from 2009 admission-Orders Issued.

ACADEMIC BRANCH

U.O.No.Acad/C2/3269/2007 Dated, K.U.Campus. P.O 10- 07-2009.

Read: 1.Minutes of the meeting of the Board of Studies in Statistics (UG) held on 23-05-2009.

2. Minutes of the meeting of the Faculty of Science held on 16-06-2009.

3. U.O No.Acad/C2/3838/2008 (i) dated 07-07-2009.

4. Letter dated 30-06-2009 from the Chairman in Charge, BOS in Statistics (UG).

ORDER

1.The Board of Studies in Statistics (UG) vide paper read(1) above has prepared, finalised and recommended the Scheme and Syllabus of Statistics Core,Complementary and Open Courses along with Pattern of Question Papers under Choice Based Credit Semester System for implementation from 2009 admission.

2. The recommendations of the Board in restructuring the syllabus is considered by the Faculty of Science vide paper read (2) and recommended for the approval of the Academic Council.

3. The Regulations for Choice based Credit Semester System is implemented in this University vide paper read (3).

4. The Chairman in Charge, BOS in Statistics (UG) has forwarded the restructured scheme and syllabus of Core/Complementary/Open Courses under Statistics Programme with Pattern of Question Papers prepared in line with Choice Based Credit Semester System,by the Board of Studies in Statistics (UG) for implementation with effect from 2009 admission.

5. The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction ***to implement the scheme and syllabus of StatisticsCore/ Complementary/Open Courses with Pattern of Question Papers under Statistics Programme restructured in line with Choice Based Credit Semester System, with effect from 2009 admission,*** subject to ratification by the Academic Council.

6. The Scheme and Syllabus of Complementary Courses offered for this Programme will be available along with the syllabus of Core Courses of the Complementary subject.

7. The affiliated Colleges are not permitted to offer Complementary Courses in violation to the provisional/permanent affiliation granted by the University. Changes in Complementary Courses are permitted with prior sanction /revision in the affiliation order already issued in this regard.

8. If there is any inconsistency between the Regulations for CCSS and its application to the Scheme & Syllabus prepared, the former shall prevail.

9. The restructured scheme and syllabus of Core/Complementary/Open Courses under Statistics Programme with Pattern of Question Papers implemented with effect from 2009 admission under Choice Based Credit Semester System, is appended.

7. Orders are issued accordingly.

Sd/-

To: REGISTRAR

The Principals of Colleges offering Statistics Programme.

Copy To:

1. The Examination Branch (through PA to CE)
2. The Chairman in Charge, BOS Statistics (UG)
3. PS to VC/PA to PVC/PA to Regr
4. DR/AR I Academic
5.The Central Library 6. SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

Appendix to U.O No.Acad/C2/3269/2007 dated 10-07-2009.

KANNUR UNIVERSITY

SCHEME & SYLLABUS
FOR
UNDERGRADUATE PROGRAMME

IN

S T A T I S T I C S

(CORE, COMPLEMENTARY AND OPEN COURSES)

CHOICE BASED CREDIT SEMESTER SYSTEM

(2009 ADMISSION ONWARDS)

PREFACE

The proposed revised syllabus is prepared in conformity with the National Educational Policy of **University Grants Commission** and the mission of Restructuring Undergraduate Education taken up by **The Kerala State Higher Education Council**.

The Board of Studies, Statistics (UG) of Kannur University conducted a five day workshop sponsored by The Kerala State Higher Education Council in two spells- the first spell on 26-02-2009 & 27-02-2009 and the second spell on 01-04-2009, 02-04-2009 & 03-04-2009.

The restructured syllabus gives primacy to a transformation of rigid to flexible, from a set pattern to choice based structure, from sole summative evaluation to continuous assessment, from talk-and-chalk to activity based imparting of knowledge. The new syllabus is sure to play a great role in equipping the students to meet the challenges of the present time through the development of their knowledge in Statistics.

Sd/-
B.Anitha,
For Chairman, Board of Studies, Statistics (UG)

BSc (STATISTICS) PROGRAMME
WORK AND CREDIT DISTRIBUTION STATEMENT

Semester	Course Title	Credits	Hours per week	Total Credits	Total Hours
I	Common Course I (English)	4	5	20	25
	Common Course II (English)	3	4		
	Common Course VII (Adnl.Language)	4	4		
	Core Course I	3	4		
	First Complementary I	3	4		
	Second Complementary I	3 *	4 *		
II	Common Course III (English)	4	5	20	25
	Common Course IV (English)	3	4		
	Common CourseVIII (Adnl.Language)	4	4		
	Core Course II	3	4		
	First Complementary II	3	4		
	Second Complementary II	3 *	4 *		
III	Common Course V (English)	4	5	17	25
	Common CourseIX (Adnl.Language)	4	5		
	Core Course III	3	5		
	First Complementary III	3	5		
	Second Complementary III	3 *	5 *		
IV	Common Course VI (English)	4	5	17	25
	Common Course X (Adnl.Language)	4	5		
	Core Course IV	3	5		
	First Complementary IV	3	5		
	Second Complementary IV	3 *	5 *		
V	Core Course V	4	4	22	25
	Core Course VI	4	5		
	Core Course VII	4	4		
	Core Course VIII	4	4		
	Core Course IX	4	4		
	Open Course I	2	2		
	Project **	-	2		
VI	Core Course X	4	4	24	25
	Core Course XI	4	4		
	Core Course XII	4	4		
	Core Course XIII	4	5		
	Core Course XIV	4	4		
	Open Course II	2	2		
	Project**	2	2		
Total				**120**	**150**

First Complementary- Mathematics

Second Complementary- Computer Science

* Allotment of Credits and Hours for Practical and theory will be decided by the Board of Studies of Computer Science.

** The project will start in Semester V and the report is to be submitted at the end of Semester VI .For more details, see *'Guidelines for the Project work'* .

Scheme- Complementary (Statistics) For BSc. Mathematics/Computer Science

No.	Semester	Course code	Title of the course	Contact hour/ week	Credits
1	I	1C01STA	Basic Statistics	4	3
2	II	2C02STA	Probability Theory and Random Variables	4	3
3	III	3C03STA	Standard Distributions	5	3
4	IV	4C04STA	Statistical Inference	5	3

Scheme- Complementary (Statistics) For BSc. Geography/Psychology

No.	Semester	Course code	Title of the course	Contact hour/ week	Credits
1	I	1C01 STA(G&P)	Fundamentals of Statistics	4	3
2	II	2C02STA(G&P)	Bivariate Data Analysis and Applied Statistics	4	3
3	III	3C03 STA(G&P)	Probability Theory and Practice	5	3
4	IV	4C04STA(G&P)	Distribution Theory and Applications	5	3

Scheme-Open courses

No.	Semester	Course code	Title of the course	Contact hour/ week	Credits
1	V or VI	* D01 STA	Computer Oriented Data Analysis	2	2
2	V or VI	* D02 STA	Operations Research	2	2
3	V or VI	* D03 STA	Design of Experiments	2	2
4	V or VI	* D04 STA	Biostatistics	2	2
5	V or VI	* D05 STA	Sampling Techniques	2	2
6	V or VI	* D06 STA	Econometrics	2	2

* *Fill up the position with the semester in which the course is offered.*

STATISTICS CORE COURSES

WORK AND CREDIT DISTRIBUTION

(2009 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HOURS
1 B 01 STA	METHODOLOGY AND PERSPECTIVES OF STATISTICS	I	4	3	3
2 B 02 STA	DESCRIPTIVE STATISTICS	II	4	3	3
3 B 03 STA	PROBABILITY THEORY	III	5	3	3
4 B 04 STA	PROBABILTY DISTRIBUTIONS	IV	5	3	3
5 B 05 STA	MATHEMATICAL ANALYSIS- I	V	4	4	3
5 B 06 STA	STATISTICAL INFERENCE-I	V	5	4	3
5 B 07 STA	STATISTICS USING R	V	4	4	3
5 B 08 STA	SAMPLING TECHNIQUES	V	4	4	3
5 B 09 STA	STATISTICAL QUALITY CONTROL AND OPERATIONS RESEARCH	V	4	4	3
6 B 10 STA	MATHEMATICAL ANALYSIS - II	VI	4	4	3
6 B 11 STA	STATISTICAL INFERENCE- II	VI	4	4	3
6 B 12 STA	ACTUARIAL STATISTICS	VI	4	4	3
6 B 13 STA	DESIGN OF EXPERIMENTS	VI	5	4	3
6 B 14 STA	PRACTICALS USING R	VI	4	4	3
6 B 15 STA	*PROJECT*	V & VI	2 HRS EACH IN SEM. V & VI	0 CREDIT IN SEM. V & 2 CREDITS IN SEM. VI	-

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	3
INTERNAL	1

INTERNAL ASSESSMENT

CATEGORY	WEIGHTAGE	REMARKS
TEST PAPERS	2	3-5 CLASS TESTS ARE TO BE CONDUCTED. CONSIDER GRADES OF BEST TWO TEST PAPERS.
ASSIGNMENT	1	CONSIDER GRADES OF BEST TWO ASSIGNMENTS.
SEMINAR / VIVA VOCE	1	ONE SEMINAR PAPER IS TO BE PRESENTED BY EACH STUDENT.
ATTENDANCE	1	MORE THAN 90% : A 85%- 90% : B 80%- 85% : C 75%- 80% : D BELOW 75% : E

CORE COURSE I : METHODOLOGY AND PERSPECTIVES OF STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
I	1 B 01 STA	4	3	3

Unit I :Science and Science studies- Types of knowledge, Practical, Theoretical, Scientific knowledge, Information, What is Science, What is not Science, Laws of Science, Basis of scientific laws and factual truths, Science as a human activity, Scientific temper, empiricism, vocabulary of Science, Science of disciplines, Revolutions in Science and Technology (Elementary concepts only) **(15 Hr)**

Unit II :Methods and Tools of Science-Hypothesis, Theories and laws in Science, Axioms and Lemma, Observations, Evidences and Proofs, Review collections , Posting a question, formulation of hypothesis, Significance of verification (proving), corroboration and falsification (disproving), Hypothesis formulation, Revision of scientific theories and laws, Importance of models,simulations and virtual testing, Mathematical methods vs Scientific methods(concepts only) **(20 Hr)**

Unit III: Meaning and Scope of Statistics- History and development of Statistics, Definitions of Statistics-Statistics as Statistical data, Statistics as Statistical methods, Importance and Scope of Statistics in various streams of Science and other streams, Limitations of Statistics, Distrust of Statistics, Developments of Statistics, Brief introduction to various Statistical fields- Descriptive Statistics, Probability theory, Distribution theory, Statistical Inference, Sampling, Design of Experiments, Statistical Quality Control, Operations Research, Vital Statistics, Time Series, Stochastic Process , Actuarial Statistics etc.(just to create an understanding about what is Statistics, as a subject) **(15 Hr)**

Unit IV:Data Collection and Data Handling in Statistics –Information and data,Population, Census, Parameter, Sample, Sample Survey, Statistic, Different types of data-Quantitative, Qualitative, Geographical and Chronological; Interval, Nominal and Ordinal data; Continuous and discrete data; Primary and Secondary data, Accuracy of data in each, Scrutiny, Classification and Tabulation of data, Different numerical presentations of data; Different types of diagrammatic Presentation of data.**(22 Hr)**

References:

1. Cultural Boundaries of Science- T.F.Gieryn (University Chicago Press, 1999)
2. The Gole: What Everyone Should Know About Science- H.Collins and T. Pinch (Cambridge University Press, 1993)
3. Conceptual Integrated Science**,** Hewitt Paul G, Suzanne Lyons, John A Suchocki & Jennifer Yeh (Addison – Wesley, 2007)
4. The Truth of Science**,** Newton R.G
5. Methods for Teaching Science as Inquiry**,** Arthur A Carin, Joel E Bass and Terry A Contant (Allyn&Bacon, 2009)
6. Fundamentals of Mathematical Statistics - S.C.Gupta & V.K.Kapoor (Sulthan Chand & Sons)
7. Statistical Methods- S.P.Gupta (Sulthan Chand & Sons)

Weightage including choice:

Unit I - 9 ; Unit II - 15 ;
Unit III - 15 ; Unit IV - 6
Total -45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions****(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE II: DESCRIPTIVE STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2 B 02 STA	4	3	3

Unit I: **Measures of central tendency** – Mean, Median, Mode, Geometric mean, Harmonic mean with simple applications, Partition values (definition only)

Absolute and relative measures of dispersion – Range, Quartile deviation, Mean deviation, Standard deviation (definition and properties), Coefficient of variation (with out proof), Lorenz Curve.

Moments –Raw and central moments, their inter relationship.**Skewness and Kurtosis** – Measures of skewness and kurtosis, Beta and Gamma coefficient. **(12 Hrs)**

Unit II:**Curve fitting** –Principles of least squares, Fitting of linear,quadratic,exponentialand power curve.

Correlation – Definition and types of correlation, Scatter diagram,graphical method, Karl Pearson's correlation coefficient – definition and properties, Rank Correlation coefficient.

Regression–Linear and non linear, line of regression and regression coefficients, their properties, Plane of regression, Yule's notation, Partial and multiple correlation (three variables) **(25 Hrs)**

Unit III: **Time series** –Definition, components of time series, Additive and multiplicative models, Measurement of trend –semi average, free hand curve, moving average, least square method, Measurement of seasonal variation –Ratio to trend, Ratio to moving average methods. **(18 Hrs)**

Unit IV:**Index numbers** –Definition, Construction of index numbers, Laspeyer's, Paasche's, Fisher's index numbers,Time reversal and factorreversal tests,construction of cost of living index numbers.

(17 Hr)

References:

1. Fundamentals of Mathematical Statistics - S.C.Gupta & V.K.Kapoor (Sulthan Chand & Sons)
2. Fundamentals of Applied Statistics - S.C. Gupta &V.K.Kapoor (Sulthan Chand & Sons)
3. Fundamentals of Statistics (Vol I) - Goon, Guptha & Das Gupta (The World Press)
4. Statistics - R.S.N Pillai and A.V. Bagarathi (Sulthan Chand & Sons)
5. Modern Elementary Statisticsn - Miller & Freund (Prentice Hall of India Pvt. Ltd)
6. Introductory Statistics - Neil Wein (Pearson)

Weightage including Choice: Unit I - 8 Unit II - 15
Unit III - 12 Unit IV - 10
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE III: PROBABILITY THEORY

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3 B 03 STA	5	3	3

Unit I: Probability – Random experiment, Sample point, Sample space, Events,Algebra of events, Statistical regularity, Frequency and Classical definitions, Axiomatic approach to probability , Probability Space and probability measure, Addition theorem, Conditional probability, Multiplication theorem, Independence of events, Bayes' theorem and applications. **(25Hr)**

Unit II: Random variables – Discrete and continuous random variables, Functions of random variables, Probability distribution of a random variable, Distribution function – definitions and properties, Bivariate distribution, Joint density,Marginal and conditional distributions, independence of random variables, Transformation of variables. **(30Hr)**

Unit III: Mathematical expectation – (Univariate and Bivariate) definition, Properties, Moments, Relation between raw and central moments, Conditional mean and variance, Correlation coefficient. **(20Hr)**

Unit IV: **Generating functions** – Moment generating function, Cumulant generating function and characteristic function – definition and property, Probability generating function and simple examples. **(15 Hr)**

References:

1. Fundamentals of Mathematical Statistics - S. C.Gupta &V.K.Kapoor(Sulthan Chand & Sons)
2. A First Course in Probability - Sheldon.M.Ross (Mc Millian publishing Co.)
3. Fundamentals of Statistics (Vol .I) - Goon, Gupta & Das Gupta (TheWorld Press)
4. Statistics - R.S.N Pillai and A.V. Bagavathi (Sulthan Chand Company Ltd.)
5. Probability Essentials - Jean Jacod and Philip Protter (Springer)

Weightage including choice: Unit I - 12 Unit II - 15
Unit III - 11 Unit IV - 7
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE IV: PROBABILITY DISTRIBUTIONS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4 B 04 STA	5	3	3

Unit I: Discrete Distributions – One point, two point distributions, Uniform, Point binomial, Poisson, Geometric, Hyper geometric and Negative binomial distributions, Fitting of binomial, Poisson, geometric distributions. **(30 Hrs)**

Unit II: Continuous Distributions – Rectangular, Normal, Exponential, Beta, Gamma, log normal, Laplace,Cauchy and bivariate normal distributions,Fitting of Normal and exponential distribution. **(30 Hrs)**

Unit III: Inequalities and Convergence of random variables – Tchebychev's, Jenson's and Cauchy – Shewart's inequalities and applications, Mode of convergence –Convergence in probability and convergence in distribution, weak law of large numbers, Bernoulli's weak law of large numbers with simple examples,Central limit theorem (iid case only) and its applications.**(23 Hrs)**

Unit IV: Simulation –Concepts and inverse transform method of simulation of discrete and continuous random variables, simulation of exponential and geometric random variables **(7 Hrs**)

References:

1. Fundamentals of Mathematical Statistics - S. C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. An Introduction to Probability and Mathematical Statistics - V.KRohatgi (Wiley Eastern limited)
3. Introduction to the Theory of Statistic - A.M.Mood,F.A.Graybill and D.C. Boes (Mc Graw Hill)
4. Introduction to Probability and Statistics for Engineers and Scientists- S.M. Ross (Elsever)

Weightage including choice: Unit I - 15 Unit II - 15
Unit III - 12 Unit IV - 3
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COUSE V : MATHEMATICAL ANALYSIS -I

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 B 05 STA	4	4	3

Unit I: **Sequence** –Real sequences, limit of a sequence, Bolzano- Weirstrass theorem, limit inferior and superior, convergence and divergence, Cauchy's Principle of convergence, algebra of sequences, some important theorem, monotonic sequence. **(24Hrs)**

Unit II:**Infinite Series**- Definition, positive term series, comparison test, Cauchy's root test, D'Alembert's ratio test, Raabe's test, Logarithmic test, alternative series, Lebnitz test, absolute convergence and conditional convergence. **(20Hrs)**

Unit III:**Functions of single variable**-Limits of a function, continuous function, continuity at a point, continuity in closed interval, types of continuity, function continuous on closed intervals, uniform continuity, the derivatives, Darboux's theorem, Rolle's theorem, mean value theorem, Taylor's theorem **(28Hrs)**

References :

1.Mathematical Analysis - S.C.Malik (Wiley Eastern Ltd)
2.A course of Mathematical Analysis - Shanti Narayanan (Sulthan Chand & Sons)
3.Elements of Real Analysis - Shanti Narayanan
4.Principle of Mathematical Analysis - Rudin W (Mc Graw Hill)
5.Complex variables. - Kasana. H.S

Weightage including choice:

Unit I	-	15
Unit II	-	12
Unit III	-	18
Total	-	45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE VI: STATISTICAL INFERENCE -I

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 B 06 STA	5	4	3

Unit I: Sampling Distributions – Definition, Standard error, Distribution of sample mean and sample variance, Chi square, t and F distributions and their interrelations. **(20 Hrs)**

Unit II:Point Estimation –Properties of estimators, Fisher's criteria–unbiasedness, consistency, efficiency and sufficiency, Unbiasedness and minimum variance unbiased estimator (MVUE), Consistency of estimators and sufficient conditions for consistency, Efficiency and relative efficiency of an estimator, Cramer- Rao lower bound of variance, MVB estimators, Amount of information, sufficient statistic, Complete sufficient statistic. Rao-Blackwell Theorm (without Proof) **(30 Hrs)**

Unit III: Methods of Estimation – Method of moments, Method of Maximum Likelihood, Properties (without proof), Method of minimum variance, Method of least squares. **(20 Hrs)**

Unit IV:Interval Estimation–Concept of confidence interval and confidence coefficient, Confidence intervals for the parameters of univariate normal, two independent normal, confidence interval for proportion and difference of proportions, confidence interval for one parameter exponential distribution and Poisson distribution.

Bayesian Estimation–Prior and posterior distributions, loss function, Bayes' Risk, Bayes' estimator. **(20 Hrs)**

References:

1. Fundamentals of Mathematical Statistics - S. C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. An Introduction to Probability and Mathematical Statistics - V.KRohatgi (Wiley Eastern limited, New Delhi)
3. Introduction to the Theory of Statistics -A.M. Mood, F.A.Graybill and D.C. Boes (Mc Graw Hill)
4. Mathematical Statis - J.E. Freund (Prentice-Hall India.)
5. Bayesian Inference - B.K.Bansal
6. Introduction to the Theory of Statistic-A.M.MooD, F.A.Graybill and B.C.Boes(Mc GrawHill)

Weightage including choice: Unit I - 10 Unit II - 14
Unit III - 10 Unit IV - 11
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE VII: STATISTICS USING R

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 B 07 STA	4	4	3

Unit I: **Introduction to R** - R as a Statistical Software and language, R preliminaries, Method of data input, Data accessing or indexing, Data frames and lists, Functions, Graphics with R, Saving, Storing and retrieving work, work space and files, using scripts, using packages.

Descriptive Statistics Using R – Diagrammatic representation of data, Graphical representation of data, Measures of central tendency, Measures of dispersion, Measures of skewness and Kurtosis, Selection of representative samples. **(28 Hrs)**

Unit II: **Probability and Probability distributions using R** – Probability; definition and properties, probability distributions, some special discrete distributions(Binomial,Poisson), Continuous probability distribution, some special continuous distributions (Normal, exponential)

Methods for generating random variables – Introduction, Random generation of common probability distribution in R,the inverse method, the acceptance rejection methods, transformation methods, sums and mixture, Poisson distribution. **(16Hrs)**

Unit III: **Correlation and Regression Analysis** – Correlation,Inference procedures for correlation coefficient, Linear Regression, Inference Procedures for simple linear model, validation of linear regression model. **(8Hrs)**

Unit IV: **Monte Carlo methods in estimation and Testing** – Monte Carlo estimation and standard error, estimation of MSE, estimating a confidence interval, Monte Carlo methods for hypothesis test, Empirical type I error rate, Power of a test, Comparison of powers of two tests.

Statistical Inference – Sampling distribution of the sample mean, Estimation of parameters, plots to check normality, Hypothesis testing, Goodness of fit, one way ANOVA **(20Hrs)**

References:

1. Statistics Using R - Sudha .G. Purohit et al. (2008)(Narosa Publishing House)
2. Statistical Computing with R - Maria.L. Rizzo (2007) (Chapman& Hall/CRC)

Weightage including choice: Unit I - 18 Unit II - 10
Unit III - 5 Unit IV - 12
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C- **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COUSE VIII: SAMPLING TECHNIQUES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 B 08 STA	4	4	3

Unit I: **Census and Sampling** – Principal steps in sample survey, Probability sampling, Judgment sampling, Mixed sampling, Sampling and non-sampling errors. **(12 Hrs)**

Unit II: **Simple random sampling** – SRSWR and SRSWOR, method of collecting samples, unbiased estimates of mean and population total – their variance and estimates of the variances, Estimation of sample size in SRS, SRS for attributes.

Stratified random sampling – Estimation of the population mean and population total, proportional and optimum allocation, comparison with SRS **(28 Hrs)**

Unit III:**Systematic sampling**- Linear and circular Systematic sampling, estimation of mean and variance of the estimator, comparison with SRS and stratified random sampling.

Cluster sampling – Estimation of population mean and variance for equal size clusters, PPS Method of sampling – cumulative method and Lahari method. **(24 Hrs)**

Unit IV: **Official Statistics** – Indian Census Operations, Origin and functions, Role of Indian Census operation in planning and development processes, Origin and functions of -National Sample Survey Organisation (NSSO), Central Statistical Organisation (CSO), Indian Statistical Institute (ISI), Indian Council for Medical Researches (ICMR) etc., Role of these institutions in the planning and development processes. **(8 Hrs)**

References:

1. Fundamentals of applied Statistics- S.C.Gupta and V.K. Kapoor(Sulthan Chand & Sons)
2. Sampling Theory and Methods - Murthy.M.N(Statistical Probability Society , Calcutta)
3. Sampling Techniques -Cochran.W.G (Wiley Eastern Ltd)
4. Sampling Theory - Desraj (Tata Mc Graw Hill)
5. Theory and Analysis of Sample survey - D.Singh and F.S.Chaudhary (John Wiley and Sons)
6. Sampling Theory - P.V.Sukhatme
7. Fundamentals of Statistics (Vol II) - Goon, Gupta & Das Gupta (Sulthan Chand & Sons)

Weightage including choice: Unit I - 7 Unit II - 18

Unit III - 15 Unit IV - 5

Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE IX
STATISTICAL QUALITY CONTROL AND OPERATIONS RESEARCH

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 B 09 STA	4	4	3

Unit I :**General theory of control charts**- Causes of Variations in quality, Control limits, group control chart, construction of control charts, charts of attributes, np- chart , P- chart, C- chart, charts of variables, X bar chart, R chart and sigma-chart, Revised control charts, Applications and advantages **(24Hrs)**

Unit II : **Acceptance sampling** – Problems and lot acceptance, Stipulation of good and bad lots – producer's and consumer's risks, single and double sampling plans, their OC functions, concepts of AQL, LTPD, AOQL, Average amount of inspection and ASN function . **(16 Hrs)**

Unit III:**Linear Programming**- Mathematical formulation of LPP, Graphical and simplex method of solving LPP- duality in linear programming. **(16Hrs)**

Unit IV:**Transportation and Assignment problems**- North –west corner rule, row,column and least cost method-Vogel's approximation method,Assignment problem, Hungarian algorithm of solution **(16Hrs)**

References:

1. Linear Programming -Gupta & Manmohan (sulthan chand & sons)
2. Linear Programming -Hadley G (Addison-Wesley)
3. Operations Research -Taha (Mc Millan)
4. Operations Research -V.K. Kapoor (Sulthan Chand & Sons)
5. Fundamentals of Applied Statistics - S.C. Gupta & V.K.Kapoor (Sultan Chand & Sons)
6. Statistical Quality Control-Grant E.L (Mc Graw Hill)
7. Quality Control and Industrial Statistics- Duncer. A.J (Taraporewala & Sons)
8. Introduction to Statistical Quality Control - Montgomery D.C (John Wiley & Sons)

Weightage including choice:

Unit I	-15	Unit II	-11
Unit III	-10	Unit IV	- 9
		Total	-45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

Maximum weightage of the course- 30

CORE COUSE X : MATHEMATICAL ANALYSIS- II

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 B 10 STA	4	4	3

Unit I: **The Riemann Integral** - Definition and existence of the integral, Refinement of portions, conditions of integrability, properties of Riemann integral, integral as a limit of sums, Integrability of continuous and monotonic functions, Integration and differentiation (the primitive),Fundamental theorem of integral calculus, first mean value theorem. **(24Hrs)**

Unit II: **Uniform Convergence and Vector Space**-Point wise convergence, convergence in an interval ,linear vector space, Algebra of vector, linear independence & dependence **(16 Hrs)**

Unit III:**Function of several Variables**: Explicit and implicit functions, limit point, limit of a function, continuity, partial derivatives, differentiability, partial derivatives of higher orders.

Extreme Values: Maxima and minima, derivative of implicit function, Lagrange's method of multipliers. **(20Hrs)**

Unit IV: **Improper Integrals**- Introduction, integration of unbounded function withfinite limits of integration , comparison tests, Beta and gamma integrals. **(12 Hrs)**

References:

1. Mathematical Analysis - S.C .Malik (Wiley Eastern Ltd)
2. A course of Mathematical Analysis -Shanti Narayan (Sulthan Chand & Sons)
3. Matrix Algebra - Biswas
4. Mathematical Analysis - Apostol (Adison Wesley Publication Company Inc.)

Weightage including choice:

Unit I	- 15	Unit II	- 11
Unit III	- 12	Unit IV	- 7
		Total	-45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE XI: STATISTICAL INFERENCE- II

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 B 11 STA	4	4	3

Unit I: **Testing of hypothesis** – Statistical Hypothesis – Simple and Composite Hypothesis, Null and alternative hypothesis, Critical Region, Errors of type I and Type II, size and power of a test, Power function, definition of most powerful and uniformly most powerful tests, p-value, Neymann -Pearson Lemma and its applications in testing of Hypothesis regarding Binomial, Poisson, Normal and Exponential distributions. **(28 Hrs)**

Unit II: **Likelihood Ratio Tests** – Concept, derivation of test for mean of a normal population, Large sample test and small sample test-Tests for mean, proportion, Standard deviation and correlation coefficient,Test for equality of means and proportions, Paired t-test, Test based on F-distribution- testing equality of two variances, Test based on Chi-square distribution- testing the significance of variance of a normal distribution, testing goodness of fit, testing independence and association of attributes. **(28 Hrs)**

Unit III: **Non parametric test** – Need for non- parametric test, Run test, test for randomness, sign test for location of univariate and bivariate population,Mann-Whiteney 'U' Statistic, Empirical distribution function, Test for Specified distribution function, Test for equality of distribution functions. **(16 Hrs)**

References:

1. Fundamentals of Mathematical Statistics - S. C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. An Introduction to Probability and Mathematical Statistics - V.K.Rohatgi (Wiley Eastern limited, New Delhi)
3. Linear Statistical Inference and its applications - C.R. Rao (Wiley Eastern)
4. An Out line of Statistical Theory (Vol.II -A.M.Goon, M.K.Gupta and B.Dasgupta (The World Press Publishers Ltd.)
5. Non Parametric Statistical Inference - J.D.Gibbons (Mc.Graw Hill)
6. Mathematical Statistics - J.E. Freund (Prentice-Hall of India)
7. 100 Statistical Tests - Gopal.K.Kanji (SAGE Publishers)

Weightage including choice:

Unit I - 18
Unit II - 17
Unit III - 10
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE XII: ACTUARIAL STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 B 12 STA	4	4	3

Unit I Vital Statistics- Sources of vital statistics in India, functions of vital Statistics, rates and ratios, Mortality rates- Crude, Age Specific and Standard Death rates, Fertility and reproduction rates, Crude birth rates- general and specific fertility rates, gross and net reproductive rates. **(16 Hrs)**

Unit II Probability Models and Life Table-Utility theory, insurance and utility theory, models for individual claims and their sums, survival function, curtate future lifetime, force of mortality. Life table and its relation with survival function, examples, assumptions for fractional ages, some analytical laws of mortality, select and ultimate tables. Multiple life functions, joint life and last survivor status, insurance and annuity benefits through multiple life functions, evaluation for special mortality laws Multiple decrement models, deterministic and random survivorship groups, associated single decrement tables, central rates of multiple decrement, net single premiums and their numerical evaluations. **(28Hrs)**

Unit III Insurance and Annuities- Distribution of aggregate claims, compound Poisson distribution and its applications. Principles of compound interest, Nominal and effective rates of interest and discount, force of interest and discount, compound interest accumulation factor, continuous compounding.Life insurance: Insurance payable at the moment of death and at the end of the year of death-level benefit insurance, endowment insurance, deferred insurance and varying benefit insurance, recursions, commutation functions Life annuities-Single payment, continuous life annuities, discrete life annuities, life annuities with monthly payments, commutation functions, varying annuities, recursions, complete annuities- immediate and apportionable annuities-due. **(28 Hrs)**

References:

1. N.L. Bowers, H.U.Gerber, H.C. Hickman, D.A. Jones and C.J. Nesbitt, (1986).
2. Actuarial Mathematics, Society of Actuaries, Ithaca, Illinois, U.S.A. Second Edition (1997)/ Unit II Chapters: 1,2,3,8,9,11 Unit III- Chapters: 4, 5,6,7,13,14
3. Life Contingencies, Spurgeon E.T (1972), Cambridge University Press.
4. Life Contingencies, Neill, A. (1977), Heineman..

Weightage including choice: Unit I -10 Unit II - 18
Unit III- 17
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COUSE XIII: DESIGN OF EXPERIMENTS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 B 13 STA	5	4	3

Unit I: **Linear Estimation-** Linear parametric function, estimability and BLUE, linear hypothesis, Gauss Markov theorem. **(20 Hrs)**

Unit II: **Analysis of variance**- One way and two way classification (with a single observation per cell), critical difference, Levene's test, Analysis of covariance with a single unit per cell. **(25 Hrs)**

Unit III: **Experimental Design**: Principles of design-Randomization, Replication, Local control, Completely Randomized Design, Randomized Block design, Latin Square design. Greeco Lation square, orthogonal Latin square (definition only), Missing plot technique- comparison of efficiency**. (30 Hrs)**

Unit IV: **Basic concepts of Factional experiments**- 2^2 Factional experiments (analysis), concept of confounding. **(15 Hrs)**

References:

1. Fundamentals of Applied statistics - S.C. Gupta & V.K. Kapoor(Sulthan Chand & Sons)
2. Design of experiments - M.N. Das & N. Giri (Wiley Eastern Ltd)
3. Linear Estimation and Design of experiments - D.D. Joshy (Wiley Eastern Ltd)
4. Experimental Design - Federer (Oxford & JBH Publications)
5.Design of Experiments - Kempthorne

Weightage including choice:

Unit I	- 11
Unit II	- 12
Unit III	- 15
Unit IV	- 7
Total	-45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

CORE COURSE XIV(COMPUTER PRACTICAL) : PRACTICALS USING R

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 B 14 STA	4	3	3

Unit I Data Exploration-Box plot, PP Plot, qq Plot, test for normality

Measures of central tendency and Dispersion-Mean, Median, Mode, Partition values, variance, Skewness and Kurtosis **(12 Hrs)**

Unit II Point Estimation, **Confidence Interval**, **Test based on one and two sample**

Non- Parametric test **(24Hrs)**

Unit III Sampling Techniques-Estimation of population characteristic and standard error

Design of Experiments – ANOVA (one way) **Control Chart** (**18Hrs)**

Unit IV Time series-Fitting and plotting **Index Numbers**

Correlation and regression **(18Hrs)**

* Both internal and external examinations will be conducted.

* Computer lab facilities should be provided by the college.

Weightage including choice:

Unit I	- 7
Unit II	- 15
Unit III	- 11
Unit IV	- 12
Total	- 45

About the Pattern of Questions :

- *Maximum weightage for the course-* ***30***

Unit	No. of questions with weightage 5 each	No. of questions to be answered
I	2	1
II	4	2
III	4	2
IV	2	1
Total	**12**	**6**

Internal Evaluation:

Category	Weightage	Remarks
Practical Test Papers	2	3-5 class tests are to be conducted. Consider grades of best two test papers.
Assignments	1	Consider grades of best two assignments.
Record Book	1	Practical record is to be maintained for computer programs and result. It will be internally evaluated by the Supervising teacher concerned and Head of the Department.
Attendance	1	More than 90% : A 85%- 90% : B 80%- 85% : C 75%- 80% : D Below 75% : E

CORE COURSE XV: PROJECT

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V & VI	6 B 15 STA	2	0 CREDIT IN SEM. V & 2 IN SEM. VI	-

GUIDELINES FOR THE PROJECT WORK:

1. The project will start in Semester V and will end at the end of Semester VI.

2. A project may be undertaken by a group of students. However, the project report shall be submitted by each student.

3. There shall be a teacher from the department to supervise the project and the synopsis of the project should be approved by that teacher. The head of the department shall arrange teachers for supervision of the project work.

4. As far as possible, topics for the project may be selected from the applied branches of Statistics so that there is enough scope for applying and demonstrating statistical skills learnt in the degree programme.

5. The Project will be evaluated internally.

Category	Weightage
Data Collection	2
Analysis and Project Report	2
Viva Voce	1

The following books may be used to get an idea about projects and project report writing.

1. Introduction to Research Methodology- C.R. Kothari (New age International Publications)
2. Methodology and Techniques in Social Research- P.L.Bhandarkar and

   T.S.Wilkinson (Himalaya Publishing House)

Sd/-
B.Anitha,
For Chairman,BOS Statistics (UG)

STATISTICS COMPLEMENTARY COURSES

(FOR BSC MATHEMATICS/ COMPUTER SCIENCE PROGRAMMES)

WORK AND CREDIT DISTRIBUTION

(2009 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HOURS
1 C 01 STA	BASIC STATISTICS	I	4	3	3
2 C 02 STA	PROBABILITY THEORY AND RANDOM VARIABLES	II	4	3	3
3 C03 STA	STANDARD DISTRIBUTIONS	III	5	3	3
4 C 04 STA	STATISTICAL INFERENCE	IV	5	3	3

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	3
INTERNAL	1

INTERNAL ASSESSMENT

CETEGORY	WEIGHTAGE	REMARKS
TEST PAPERS	2	3-5 CLASS TESTS ARE TO BE CONDUCTED. CONSIDER GRADES OF BEST TWO TEST PAPERS.
ASSIGNMENT	1	CONSIDER GRADES OF BEST TWO ASSIGNMENTS.
SEMINAR / VIVA VOCE	1	ONE SEMINAR PAPER IS TO BE PRESENTED BY EACH STUDENT.
ATTENDANCE	1	MORE THAN 90% : A 85%- 90% : B 80%- 85% : C 75%- 80% : D BELOW 75% : E

COMPLEMENTARY COURSE
FOR
BSC MATHEMATICS/ COMPUTER SCIENCE

I: BASIC STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
I	1 C 01 STA	4	3	3

Unit I: **Statistical Methods**: Census and sample survey, collection of data,primary and secondary data, sampling and non-sampling errors, types of sampling- judgment, random and mixed sampling, different methods of sampling-SRS, stratified and systematic sampling (concepts only) **(10 hrs)**

Unit II: **Different measures of Central tendency** –concepts, properties and simple problems, weighted average, partition values.

Measures of dispersion – Absolute and relative measures of dispersion- various measures of dispersion, Lorenz curve.

Moments – Raw moments, central moments, relation between moments, **Skewness and Kurtosis**- definition and various measures. **(27 hrs)**

Unit III: **Curve fitting** – Principle of least squares, fitting of linear, quadratic and exponential curves

Correlation - Types of correlation (definition only),Correlation coefficient, Rank correlation coefficient, scatter diagram

Regression – Linear regression, regression coefficients and their properties, partial and multiple correlation (definition only) **(20 hrs)**

Unit IV: Time series – Components, models for time series (additive and multiplicative). Estimation of trend by least square method.

Index numbers – Meaning and uses, weighted and unweighted index numbers, Laspeyer's, Paasche's, Fisher's index number, Time Reversal test and Factor Reversal test. **(15hrs)**

References:

1. Fundamentals of Mathematical Statistics - S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. Fundamentals of Applied Statistics - S.C. Gupta &V.K.Kapoor (Sulthan Chand & Sons)

Weightage including choice:

Unit I - 6
Unit II - 17
Unit III - 13
Unit IV - 9
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

COMPLEMENTARY COURSE
FOR
BSC MATHEMATICS/ COMPUTER SCIENCE
II: PROBABILITY THEORY AND RANDOM VARIABLES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2 C 02 STA	4	3	3

Unit I: Probability – Random Experiments, sample space, events classical definition and frequency approach to probability, Class of sets, sigma field, axiomatic definition of probability, probability space, addition theorem. **(20 hrs)**

Unit II:Conditional probability and Bayes' theorem -Conditional probability, multiplication theorem, independence of events, Bayes' theorem and its applications. **(15 hrs)**

Unit III: Random variables- Discrete and continuous type, probability distribution of a random variable, distribution function-definition and properties, transformation of random variables-discrete and continuous type. **(20 hrs)**

Unit IV: Bivariate random variables- Definitions, joint probability distributions,marginal and conditional distributions, independence of Random variables. **(17 hrs)**

Reference Books:

1. Fundamentals of Mathematical Statistics - S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. Mathematical Statistics - J.N.Kapoor & H.C. Saxena (Sulthan Chand & Sons)
3. A First course in Probability - Sheldon .M .Ross (McMillion Publishing co.)
4. A First course in Probability - T.K. Chandra & D.Chatterjee (Narosa Publishing House)
5. Mathematical Statistics (VI Edition) - John E. Freund (Pearson Education, India)

Weightage including choice: Unit I - 14 Unit II - 9
Unit III - 12 Unit IV - 10

Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)
- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)
- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)
- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45
- ***Maximum weightage of the course- 30***

COMPLEMENTARY COURSE
FOR
BSC MATHEMATICS/ COMPUTER SCIENCE
III: STANDARD DISTRIBUTIONS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3 C 03 STA	5	3	3

Unit I: Mathematical Expectation –Definition and properties of mathematical expectation. **Moments** –Relation between raw and central moments, conditional mean and variance, correlation coefficient.

Generating functions - MGF, definition and properties, cumulants , characteristic function. **(30 hrs)**

Unit II: Standard distributions(Discrete distribution) -one point and two point distribution, Bernoulli, Binomial, Poisson, Uniform (discrete),Geometric. **(20 hrs)**

Unit III: Standard distributions (Continuous distributions)- Rectangular, Normal, Exponential, Gamma, Beta distributions. **(20 hrs)**

Unit IV: Tchebycheff's inequality and Law of large numbers – Tchebycheff's inequality and its applications, mode of convergence-convergence in distribution, convergence in probability, Weak law of large numbers, Bernoulli's law of large numbers, central limit theorem for iid random variables (Statement and examples only) **(20 hrs)**

References:

1. Fundamentals of Mathematical Statistics - S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. Introduction to probability theory and mathematical Statistics-V.K.Rohatgi(Wiley Eastern)
3. Introductory Statistics - Sheldon.M.Ross (Elsevier Academic Press)

Weightage including choice:

Unit I	- 15	Unit II	- 11
Unit III	- 9	Unit IV	- 10
		Total	- 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***
-

COMPLEMENTARY COURSE
FOR
BSC MATHEMATICS/ COMPUTER SCIENCE
IV: STATISTICAL INFERENCE

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4 C 04 STA	5	3	3

Unit I: **Sampling distributions**- Definition , standard error, sampling distribution of mean, variance, chi-square, Student's-t, F distribution and their inter relations. **(18 hrs)**

Unit II: Theory of estimation-Point estimation, desirable properties of good estimator, CRLB (without Proof), MVB, MVUE (definition), method of estimation- method of MLE, method of moments. **Interval estimation**-Confidence interval for mean, proportion, difference of means, difference of proportions, variances. **(30 hrs)**

Unit III: Testing of hypothesis-Statistical hypothesis, simple and composite hypothesis, Null and alternative hypothesis, types of errors, critical region, size and power of test, most powerful test, UMPT, Neymaan–Pearson Lemma (without proof) Large and small sample tests- test for mean, proportion, equality of means, paired t-test, equality of proportions, test for variance and equality of variance.**(30 hrs)**

Unit IV: Non-parametric Tests-Chi-square test for goodness of fit, test for the goodness of fit of binomial, Poisson distributions, independence of attributes. **(12 hrs)**

References:

1. Introduction to Probability theory and Mathematical Statistics-V.K.Rohatgi(Wiley Eastern Lt)
2. Fundamentals of Mathematical Statistics- S.C.Gupta & V.K.Kapoor (Sulthan Chand & Sons)
3. Introductory Statistics - Sheldon.M.Ross (Elsevier, Academic Press)
4. Statistical Inference - Surendran & Saxena (Sulthan Chand & Sons Company Ltd)

Weightage including choice: Unit I - 9 Unit II - 15 Unit III - 15 Unit IV - 6 Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)
- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)
- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)
- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45
- ***Maximum weightage of the course- 30***

Sd/-
B.Anitha,
For Chairman,BOS Statistics (UG)

STATISTICS OPEN COURSES
WORK AND CREDIT DISTRIBUTION
(2009 ADMISSION ONWARDS)

Students of other Streams can choose **two Open Courses from the following six Courses.** All Statistics Departments (whether it is a Core department or Complementary department can offer the course in semester v or vi)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HOURS
5 D 01 STA	COMPUTER ORIENTED DATA ANALYSIS	**V**	2	2	3
5 D 02 STA	OPERATIONS RESEARCH	**V**	2	2	3
5 D 03 STA	DESIGN OF EXPERIMENTS	**V**	2	2	3
6 D 01 STA	BIOSTATISTICS	**VI**	2	2	3
6 D 02 STA	SAMPLING TECHNIQUES	**VI**	2	2	3
6 D 03 STA	ECONOMETRICS	**VI**	2	2	3

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	3
INTERNAL	1

INTERNAL ASSESSMENT

CETEGORY	WEIGHTAGE	REMARKS
TEST PAPERS	2	3-5 CLASS TESTS ARE TO BE CONDUCTED. CONSIDER GRADES OF BEST TWO TEST PAPERS.
ASSIGNMENT	1	CONSIDER GRADES OF BEST TWO ASSIGNMENTS.
SEMINAR / VIVA VOCE	1	ONE SEMINAR PAPER IS TO BE PRESENTED BY EACH STUDENT.
ATTENDANCE	1	MORE THAN 90% : A 85%- 90% : B 80%- 85% : C 75%- 80% : D BELOW 75% : E

OPEN COURSE I:
COMPUTER ORIENTED DATA ANALYSIS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 D 01 STA	2	2	3

Unit I Statistical Methods- Census and sample survey, primary and secondary data, Random sampling, Simple random sampling, Stratified random sampling, systematic sampling (Concepts only) **(8 Hrs)**

Unit IIData Analysis- Diagrams and Graphs, measures of central tendency with simple applications, Partition values, Absolute and relative measures of dispersion, Lorenz curve.

Moments – Raw moments, central moments and their inter relationships, Measures of Skewness and Kurtosis **Correlation and Regression**- Curve fitting, Karl Pearson's correlation coefficient, (definition and properties), Scatter diagram, Rank correlation coefficient, Linear regression and regression coefficients.**(20Hrs)**

Unit IIIData analysis using SPSS/ Excel- Introduction to SPPS/ Excel, Measures of central tendency, Mesures of dispersion, correlation coefficient,regression equation, regression, fitting- Practice with SPSS/ Excel.**(8 Hrs)**

References:

1.Fundamentals of Mathematical Statistics-S.C. Gupta and V.K. Kapoor (Sulthan Chand & Sons)
2.Fundamentals of statistics (Vol I) - Goon, Gupta, Das Gupta (The world Press)
3.Elementary Statistical Methods – S.P. Gupta (Sulthan Chand & Sons)
4.Modern Elementary statistics- Miller & Fruend (Prentice Hall India)
5.Introductory Statistics- Neil Wein, Pearson Publishers.
6.SPSS for Windows Made Simple: Paul. R. Kimner, A. Colin , D. Gray(Lawerance erlbum associates Publishers, UK&USA)
7. Statistical Methods for Practice and Research- A Guide to Data Analysis Using SPSS-Ajai.S.Gaur & Sanjaya.S.Gaur (Response- Business Books from SAGE Publications)
8.Fundamental of Computers - V.Rajaraman
9.Statistics Made Simple - K.V.S.Sarma (Prentice Hall India)

Weightage including choice: Unit I - 11 Unit II - 23 Unit III - 11 Total -45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

OPEN COURSE II:
OPERATIONS RESEARCH

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 D 02 STA	2	2	3

Unit I Introduction to Operations Research –Linear ProgrammingProblem,Mathematical formulation of LPP, canonical and standard forms of LPP.Graphical method to solve two variable LPP, Slack, Surplus and artificial variables, Simplex method, Duality in LPP, (concept and definition only)**(20Hrs)**

Unit II Transportation and Assignment problem - North- West Corner rule, Raw minimum method, Column minimum method, matrix minimum method, Vogel's approximation method, MODI method for solving transportation problem, Assignment problem- Hungarian algorithm. **(16 Hrs)**

References:

1. Linear Programming - Gupta & Manmohanan (Sulthan Chand & Sons)
2. Operations Research - S.D.Sharma (Sulthan Chand & Sons)
3. Operations Research - S.Kalavathy (Vikas Publishing House Pvt Ltd)

Weightage including choice:

Unit I	- 25
Unit II	- 20
Total	-45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

OPEN COURSE III:
DESIGN OF EXPERIMENTS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5 D 03 STA	2	2	3

Unit I Analysis of Variance- Definition, One way classification, two way classification, Applications of Analysis of Variance.**(16 Hrs)**

Unit II Experimental Design-Principles of Design of Experiments-Randomisation, Replication and Local control, Completely Randomised Design, Randomised Block Design, Latin Square Design, Applications of Design in various fields. **(16 Hrs)**

Unit IIIBasic concepts of Confounding- 2^2 factorial experiments, concept of confounding. **(4 Hrs)**

References:

1. Fundamentals of Applied statistics - S.C. Gupta & V.K. Kapoor
   (Sulthan Chand & Sons)
2. Design of experiments - M.N. Das & N. Giri
   (Wiley Eastern Ltd)
3. Linear Estimation and Design of experiments - D.D. Joshy
   (Wiley Eastern Ltd)
4. Experimental Design - Federer
   (Oxford & JBH Publications)
5. Design of Experiments - Kempthorne

Weightage including choice:

Unit I	- 20
Unit II	- 20
Unit III	- 5
Total	-45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C- **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

OPEN COURSE IV:
BIOSTATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 D 04 STA	2	2	3

Unit I: **Bio assay**: Direct assays, quantitative dose-response relations, estimation of median effective dose, estimation of unknown concentration of potency, profit and logit transformation parallel line assays, principles of planning an assay, slope ratio assay, efficiency of slope ratio assay, quental responses and tolerance distribution, assays based on quental responses, symmetric and asymmetric assays. **(18 Hrs)**

Unit II: **Epidemiology** : Measures of disease frequency, mortality and morbidity rates, incidence rates, prevalence rates, sources of mortality and morbidity Statistics, Hospital records and vital Statistics, measures of accuracy and sensitivity index, specificity index, types of studies, cross sectional perspective, case control and clinical trial - logistic regression. **(18 Hrs)**

References:

1. Statistical Techniques in Bio-assay - Govinda Reyala .Z (Karaga Publication, New York)
2.Statistical Methods in Biological Assay - Finney D.J (Cherles Griffin and company, London)
3.Foundations in Epidemiology - Lilienfeld A.M and Lilienfeld D.E (Oxford University Press)
4.Biotatistical Analysis (IV Edition) -Jerrold.H.Zar (Pearson Education)
5. Fundamentals of Biostatistics -Veer Bala Rastogi (Ane's Students Edition)

Weightage including choice:

Unit I	- 23
Unit II	- 22
Total	- 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)
- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)
- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)
- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45
- ***Maximum weightage of the course- 30***

OPEN COURSE V:
SAMPLING TECHNIQUES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 D 05 STA	2	2	3

Unit I Statistical Methods- Data, Different types of data, Primary and Secondary data, Methods of collecting primary data, Sources of collecting secondary data, Census and Sample survey, Errors in sample survey, Different types of sampling- Judgement, probability and mixed sampling.**(10 Hrs)**

Unit II Random Sampling- Types of random sampling, Simple Random Sampling- SRSWR and SRSWOR, Methods of collecting sample- Lottery method and Random number table method, Stratified random sampling, Systematic sampling- Linear and Circular systematic sampling, Cluster sampling, Multi stage sampling (Elementary concepts only), Directorate of Indian Census Operation, National Sample Survey Organisation, Central Statistical Organisation, Indian Statistical Institute, Indian Council for Medical Research etc - their role in planning and development processes of the nation.**(26 Hrs)**

References:

1. Fundamentals of applied Statistics- S.C.Gupta and V.K. Kapoor (Sulthan Chand & Sons)
2. Sampling Theory and Methods - Murthy.M.(Statistical Probability Society , Calcutta)
3. Sampling Techniques -Cochran.W.G (Wiley Eastern Ltd)
4. Sampling Theory - Desraj (Tata Mc Graw Hill)
5. Theory and Analysis of Sample survey - D.Singh and F.S.Chaudhary (John Wiley and Sons)
6. Sampling Theory - P.V.Sukhatme
7. Fundamentals of Statistics (Vol II)- Goon, Gupta & Das Gupta(Sulthan Chand & Sons)

Weightage including choice:

Unit I - 13

Unit II - 32

Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

OPEN COURSE VI:
ECONOMETRICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 D 06 STA	2	2	3

Unit I : **Nature of Econometrics**-The general linear model (GLM) and its extensions, ordinary least squares (OLS) estimation and prediction, use of dummy variables and seasonal adjustment, generalized least squares (GLS), estimation and predication Heteroscedestic disturbances. **(18 Hrs)**

Unit II:**Multiple Regressions-** Least Square method, properties of estimators, Gauss Markov theorem, analysis of variance and regression, problems of single equation models, auto correlation, multicollinearity,heteroscedesticity, specification problems and bias, their consequences, test procedure to identify them, remedial measures **(18Hrs)**

Reference Books:

1. Basic Econometrics - Damoder Grujarati (Mc Graw Hill)
2. Theory of Econometics-A.Koutsogiannis (Mc Millan Press)
3. Econometric methods- J.Jhonston (Mc Graw Hill)

Weightage including choice:

Unit 1	-	22
Unit 2	-	23
Total	-	45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the*** course**- *30***

Sd/-
B.Anitha,
For Chairman,BOS Statistics (UG)

STATISTICS COMPLEMENTARY COURSES

(FOR BSc GEOGRAPHY / PSYCHOLOGY PROGRAMME)

WORK AND CREDIT DISTRIBUTION

(2009 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HOURS
1 C 01 STA(G & P)	FUNDAMENTALS OF STATISTICS	I	4	3	3
2 C 02 STA(G & P)	BIVARIATE DATA ANALYSIS AND APPLIED STATISTICS	II	4	3	3
3 C 03 STA(G&P)	PROBABILITY THEORY AND PRACTICE	III	5	3	3
4 C 04 STA(G&P)	DISTRIBUTION THEORY AND APPLICATIONS	IV	5	3	3

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	3
INTERNAL	1

INTERNAL ASSESSMENT

CATEGORY	WEIGHTAGE	REMARKS
TEST PAPERS	2	3-5 CLASS TESTS ARE TO BE CONDUCTED. CONSIDER GRADES OF BEST TWO TEST PAPERS.
ASSIGNMENT	1	CONSIDER GRADES OF BEST TWO ASSIGNMENTS.
SEMINAR / VIVA VOCE	1	ONE SEMINAR PAPER IS TO BE PRESENTED BY EACH STUDENT.
ATTENDANCE	1	MORE THAN 90% : A 85%- 90% : B 80%- 85% : C 75%- 80% : D BELOW 75% : E

COMPLEMENTARY COURSE
FOR
BSC GEOGRAPHY/ PSYCHOLOGY- I
FUNDAMENTALS OF STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
I	1 C 01 STA (G&P)	4	3	3

Unit I: **Statistical Methods**: Census and sample survey, collection of data, primary and secondary data, sampling and non-sampling errors, types of sampling- judgment, random and mixed sampling, different methods of sampling-SRS, stratified, systematic, Cluster, multi stage sampling (concepts only) **(22 hrs)**

Unit II:Data Presentation: Numerical Presentation-Raw data, Discrete frequency distribution and Continuous frequency distribution; Diagrammatic Presentation of data- Line diagram, Bar Diagram, Sub divided bar diagram, Multiple bar diagram, Histogram, Frequency polygon, Frequency curve, Pie diagram, Pictogram, Mapogram **(20 Hrs)**

Unit III: **Different measures of Central tendency** : concepts, AM,GM, HM, Median,Mode ,properties and simple problems, weighted average, partition values.

Measures of dispersion – Absolute and relative measures of dispersion, various measures of dispersion, Lorenz curve.

Moments –Raw moments, central moments, relation between moments, **Skewness and Kurtosis**- definition and various measures. **(30 hrs)**

References:

1. Fundamentals of Mathematical Statistics - S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. Fundamentals of Applied Statistics - S.C. Gupta &V.K.Kapoor (Sulthan Chand & Sons)

Weightage including choice: Unit I - 14 Unit II - 13
Unit III - 18
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

COMPLEMENTARY COURSE
FOR
BSC GEOGRAPHY/ PSYCHOLOGY- II

BIVARIATE DATA ANALYSIS AND APPLIED STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2 C 02 STA (G&P)	4	3	3

UNIT I.Bivariate Data Analysis: Fitting of curves of the form linear, $y=ab^x$, $y=ae^{bx}$, correlation analysis,concept of correlation,methods of studying correlation,scatter diagram,Karl Pearson's correlation coefficient,concept of rank correlation and Spearman's rank correlation coefficient, regression analysis, linear regression, regression equations (concepts only). **(30Hrs)**

UNIT II. Index numbers: meaning and use of index numbers, simple and weighted Index numbers . price index numbers , Laspeyer's, Paasche's Marshall – Edgeworth and Fisher's index number ,Test of good index number, chain base and fixed base index number , construction of cost of living index number. **(20Hrs)**

UNIT III. Time series analysis : component of time series , measurement of secular trend semi average, moving average and least square methods (linear function only) concept of seasonal and cyclical variation. **(22 hrs)**

References:

1. Fundamentals of Mathematical Statistics - S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. Fundamentals of Applied Statistics - S.C. Gupta &V.K.Kapoor (Sulthan Chand & Sons)

Weightage including choice: Unit I - 19 Unit II - 13
Unit III - 13
Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)
- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)
- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)
- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45
- ***Maximum weightage of the course- 30***

COMPLEMENTARY COURSE
FOR
BSC GEOGRAPHY / PSYCHOLOGY- III
PROBABILITY THEORY AND PRACTICE

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3 C 03 STA (G&P)	5	3	3

UNIT I: Probability – Random Experiments, sample space, events classical definition and frequency approach to probability, axiomatic definition of probability, probability space, addition theorem, applications **(30 hrs)**

UNIT II:Conditional probability and Bayes' theorem - Conditional probability, multiplication theorem, independence of events, Bayes' theorem and its practical applications. **(20hrs)**

UNIT III: Random variables- Discrete and continuous type, probability distribution of a random variable, distribution function-definition and properties **(25 hrs)**

UNIT IV: Bivariate random variables- Definitions,joint probability distributions,marginal and conditional distributions,independence of Random variables,Practice with real life examples.

(15 hrs)

References:

1. Fundamentals of Mathematical Statistics - S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. Mathematical Statistics - J.N.Kapoor & H.C. Saxena(Sulthan Chand & Sons)
3. A First course in Probability - Sheldon .M .Ross (Mc Million Publishing co.)
4. A First course in Probability - T.K. Chandra & D.Chatterjee (Narosa Publishing House)
5. Mathematical Statistics (VI Edition) - John E. Freund (Pearson Education, India)
6. Probability and Numerical Mathematics- J.P.Singh (Ane's Student Edition)

Weightage including choice: Unit I - 15 Unit II - 10
Unit III - 13 Unit IV - 7

Total - 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - 45

- ***Maximum weightage of the course- 30***

COMPLEMENTARY COURSE
FOR
BSC GEOGRAPHY / PSYCHOLOGY- IV

DISTRIBUTION THEORY AND APPLICATIONS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4 C 04 STA (G&P)	5	3	3

UNIT I: Mathematical Expectation – Definition and properties of mathematical expectation.

Moments – Relation between raw and central moments, conditional mean and variance, correlation coefficient.

Generating functions - MGF , definition and properties, cumulants , characteristic function. **(25hrs)**

UNIT II: Standard distributions(Discrete distribution) -one point and two point distribution, Bernoulli, Binomial, Poisson. **Standard distributions** (Continuous distributions)- Rectangular, Normal, Exponential. **(20 hrs)**

UNIT III: Statistical Inference: Testing of statistical hypotheses, large and small sample tests, basic ideas of sampling distribution, test of mean, proportion, difference of means, difference of proportions, tests of variance and correlation coefficient, chi squares tests. **(25 hrs)**

UNIT IV: Analysis of variance: One way and two way classifications. Null hypotheses, total, between and within sum of squaresANOVATable, Solution of problems using ANOVA tables**. (20 hrs)**

References:

1. Fundamentals of Mathematical Statistics - S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)
2. Introduction to probability theory and mathematical Statistics-V.K.Rohatgi(Wiley Eastern Ltd)
3. Introductory Statistics - Sheldon.M.Ross (Elsevier Academic Press)
4. Fundamentals of Applied Statistics- S.C.Gupta &V.K.Kapoor (Sulthan Chand & Sons)

Weightage including choice:

	Unit I	- 13	Unit II	- 10
	Unit III	- 12	Unit IV	- 10
			Total	- 45

About the Pattern of Questions:

Part A - **Short answer** (11 questions x weightage 1 each=11)

- ***Answer any 10 questions*** *(10 questions x weightage 1 each=10)*

Part B - **Short essay** (9 questions x weightage 2 each =18)

- ***Answer any 6questions*** *(6questions x weightage 2 each=12)*

Part C - **Long essay** (4 questions x weightage 4 each =16)

- ***Answer any 2 questions*** *(2questions x weightage 4 each=8)*

Total weightage including choice - **45**

- ***Maximum weightage of the course-*** ***30***

Internet References:

1. www.statsoft.com
2. www.statistics.com
3. www.davidmlane.com/hyperstat/intro
4. www.transwebtutors.com/statistics
5. www.onlinestatbook.com
6. www.statpages.org

Sd/-
B.Anitha,
For Chairman,BOS Statistics (UG)

KANNUR UNIVERSITY

(Abstract)

B.Sc Statistics Programme –Model Question Papers for Core &Complementary Courses-Implemented with effect from 2009 admission – Orders issued.

ACADEMIC BRANCH

U.O.No.Acad/C2/3269/2007 (2). Dated, K.U.Campus.P.O, 8th October 2009.

Read: 1. U.O.No.Acad/C2/3838(i) dated 07-07-2009.
2. U.O.No.Acad/C2/3269/2007 dated 10-07-2009.
3. Letter dated 23-09-2009 from the Chairperson in charge, Board of Studies Statistics (UG).

O R D E R

1. Choice Based Credit Semester System was implemented for U.G Programmes in this University with effect from 2009 admission vide paper read (1).

2. The Scheme and Syllabus of B.Sc Statistics Core, Complementary and Open Courses were implemented in line with the Choice Based Credit Semester System vide paper read (2).

3. The Chairman (in charge), Board of Studies in Statistics (UG) has forwarded the Model Question Papers for I Semester Core and Complementary Courses for implementation with effect from 2009 admission, vide paper read (3).

4. The Vice-Chancellor, after examining the matter in detail and in exercise of the powers of the Academic Council as per Section 11 (1) of Kannur University Act, 1996 and all other enabling provision read togetherwith has accorded sanction ***to implement the following Model Question Papers for I Semester Core and Complementary Courses under Choice Based Credit Semester System with effect from 2009 admission,*** subject to reporting to the Academic Council.

i) Statistics Core – 1BOI STA Methodology & Perspective of Statistics.
ii) Statistics Complementary – ICOI STA Basic Statistics.
iii) Statistics Complementary – ICOI STA (G&P) – Fundamental of Statistics.

.

5. The U.O read (2) above stands modified to this extent.

6. The implemented Model Question Papers are appended.

7. Orders are issued accordingly.

Sd/-
REGISTRAR

To

The Principals of Colleges offering B.Sc Statistics (Core/Complementary) Programme.

Copy to:

1. The Examination Branch (through PA to CE).
2. The Chairman in charge, Board of Studies Statistics (UG).
3. PS to VC/PA to PVC/PA to Registrar
4. DR/AR-I (Academic).
5. SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

KANNUR UNIVERSITY

(Abstract)

B.Sc Statistics Programme – Model Question Papers for II Semester Examinations of Core & Complementary Courses under CCSS-Implemented with effect from 2009 admission – Orders issued.

ACADEMIC BRANCH

U.O.No.Acad/C2/3269/2007 Dated, K.U.Campus.P.O, 04-03-2010

Read: 1. U.O.No.Acad/C2/3269/2007 dated 10-07-2009.
2. U.O.No.Acad/C2/3269/2007(2) dated 08-10-2009.
3. Letter dated 22-02-2010 from the Chairperson in charge, Board of Studies in Statistics (UG).

O R D E R

1. The Scheme and Syllabus of B.Sc Statistics Programme (Core/Complementary/Open Courses) were implemented in line with the Choice Based Credit Semester System in this University with effect from 2009 admission as per paper read (1) above and the Model Question Papers for I Semester Examinations (Core/Complementary Courses) were implemented as per paper read (2) above.

2. The Chairperson (in charge), Board of Studies in Statistics (UG) has forwarded the Model Question Papers for II Semester Examinations of Core and Complementary Courses under CCSS for implementation with effect from 2009 admission, vide paper read (3) above.

3. The Vice-Chancellor, after examining the matter in detail and in exercise of the powers of the Academic Council as per Section 11 (1) of Kannur University Act 1996 and all other enabling provision read togetherwith has accorded sanction ***to implement the Model Question Papers for II Semester Examinations of B.Sc Statistics (Core and Complementary Courses), Programme under Choice Based Credit Semester System with effect from 2009 admission***, subject to report to the Academic Council.

4. The U.O read (1) above stands modified to this extent.

5. The implemented Model Question Papers are appended.

6. Orders are issued accordingly.

Sd/-
REGISTRAR

To

1.The Principals of Colleges offering B.Sc Statistics Programme.
(Core/Complementary Courses)
2.The Examination Branch (through PA to CE).

Copy to:

1. The Chairperson in charge, Board of Studies in Statistics (UG).
2. PS to VC/PA to PVC/PA to Registrar.
3. DR/AR-I (Academic).
4. SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

KANNUR UNIVERSITY
(Abstract)

B.Sc Statistics Programme – Model Question Papers for III &IV Semester Examinations of Core & Complementary Courses under Choice based Credit Semester System-Implemented with effect from 2009 admission – Orders issued.

ACADEMIC BRANCH

U.O.No.Acad/C2/3269/2007(2) Dated, K.U.Campus.P.O, 29-07-2010

Read: 1. U.O.No.Acad/C2/3269/2007 dated 10-07-2009.
2. U.O.No.Acad/C2/3269/2007(2) dated 08-10-2009.
3. U.O.No.Acad/C2/3269/2007 dated 04-03-2010.
4. Letter dated 29-06-2010 from the Chairperson in charge, Board of Studies in Statistics (UG).

O R D E R

1) The Scheme and Syllabus of B.Sc Statistics Programme (Core/Complementary/Open Courses) were implemented in line with Choice Based Credit Semester System in this University with effect from 2009 admission as per paper read (1) above and the Model Question Papers for I & II Semester Examinations were implemented as per paper read (2) &(3) above.

2) The Chairperson (in charge) of the Board of Studies in Statistics (UG), vide paper read (4) above, has forwarded the Model Question Papers for III &IV Semester Examinations of B.Sc Statistics Programme (Core and Complementary Courses) under CCSS for implementation with effect from 2009 admission.

3) The Vice-Chancellor, after examining the matter in detail and in exercise of the powers of the Academic Council as per Section 11 (1) of Kannur University Act 1996 and all other enabling provisions read together with has accorded sanction ***to implement the Model Question Papers for III& IV Semester Examinations of B.Sc Statistics Programme (Core and Complementary Courses), under Choice based Credit Semester System with effect from 2009 admission***, subject to report to the Academic Council.

4) The U.Os read above stand modified to this extent.

5) Orders are issued accordingly.

6) The implemented Model Question Papers are appended.

Sd/-
REGISTRAR

To

The Principals of Colleges offering B.Sc Statistics Programme.

Copy to:

1. The Examination Branch (through PA to CE).
2. The Chairperson (in charge), Board of Studies in Statistics (UG).
3. PS to VC/PA to PVC/PA to Registrar.
4. DR/AR-I (Academic).
5. SF/DF/FC.

Forwarded/By Order

SECTION OFFICER