A.D.M. COLLEGE FOR WOMEN

(AUTONOMOUS)

Nationally Accredited with "A" Grade by NAAC - 3rd Cycle

(Affiliated to Bharathidasan University, Thiruchirappalli)

No.1, College Road, Velippalayam,

Nagapattinam – 611 001, Tamil Nadu, India

STATISTICS

SYLLABUS

(2021-2024 Batch onwards)

A.D.M COLLEGE FOR WOMEN (AUTONOMOUS),

Nagapattinam

UG Programme – Statistics Department

(For the candidates admitted from 2021 – 2022 onwards)

Bloom's Taxonomy Based Assessment Pattern

Knowledge Level

K1 – Recalling	**K2** – Understanding	**K3** – Applying	**K4** – Analyzing	**K5** – Evaluating	**K6** – Creating

1. Part I, II and III

Theory (External + Internal = 75 + 25 = 100 marks)

External/Internal					
Knowledge Level	**Section**	**Marks**	**Hrs**	**Total**	**Passing Mark**
K1-K3	A (Answer all)	10 ×2 = 20	3	75	30
K3-K6	B (Either or pattern)	5 × 5 = 25			
K3-K6	C (Answer 3 out of 5)	3 × 10 = 30			

DEPARTMENT OF STATISTICS

COURSE STRUCTURE &SCHEME UNDER CBCS

2021- 2024 onwards

Sem	Part	Course Code	Course	Inst. Hrs	Credit	Exam Hrs	Marks		Total Marks
							CIA	SE	
I	III	EUA1	AC-I Statistics for Economics-I	5	3	3	25	75	100
	III	**CUB**	CC-II Statistical Methods for Business	6	5	3	25	75	100
II	III	**EUA2**	AC-II Statistics for Economics-II	5	3	3	25	75	100
	III	**AUA2**	AC-II Business Statistics for Managers	4	3	3	25	75	100
	III	**PGEH**	CC-VIII Statistical Methods for Economic Analysis	6	5	3	25	75	100
	III	**PGCG**	CC-VII Business Statistics	6	5	3	25	75	100
III	III	**EUA3**	AC-III Statistics for Economics-III	5	3	3	25	75	100
	III	**SUA1**	AC-IV Mathematical Statistics-I	4	4	3	25	75	100
	III		AC-V Statistics Practical	3	-	-	-	-	-
IV	III	**SUA2Y**	AC-V Statistics Practical	3	3	3	40	60	100
	III	**SUA3**	AC-VI Mathematical Statistics-II	3	2	3	25	75	100

Mark Allocation for Theory Papers

CIA	-	25 Marks
External	-	75 Marks
Total	-	**100 Marks**

CIA Component

Test	-	10 Marks
Assignment	-	2 Marks
Seminar	-	3 Marks
Quiz/ Group Discussion	-	5 Marks
Attendance	-	5 Marks
Total	-	**25 Marks**

Pattern of Question Papers (Theory)

Section A	-	10 x 2 = 20 Marks (No Choice)
Section B	-	5 x 5 = 25 Marks (Either or)
Section	-	3 x 10 = 30 Marks (Any three out of 5)
Total	-	**75 Marks**

Mark Allocation for Practical

CIA	-	40 Marks
Practical	-	60 Marks
Total	-	**100 Marks**

Practical CIA Component

Mid Semester Practical	-	10 Marks
Model Practical	-	10 Marks
Practical Skill	-	10 Marks
Record Submission	-	5 Marks
Attendance	-	5 Marks
Total	-	**40 Marks**

Pattern of Question Paper (Practical)

Answer any Five out of Six (5 x 10)	-	50 Marks
Record	-	10 Marks
Total	-	**60 Marks**

Semester-I / I B.A. Eco Allied Course-I	**Statistics for Economics - I**	Course Code:**EUA1**
Instruction Hours: 5	Credits: 3	Exam Hours: 3
Internal Marks: 25	External Marks:75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To impart the knowledge about collection of data. • To condense the mass of data. • To present the data in diagrams and graphs. • To enable the students to compute various measures of central tendency. • To enable the students to compute various measures of dispersion.	
UNIT	**CONTENT**	**HOURS**
Unit I	**Introduction** Statistics- Definition- Scope - Functions and Limitations of Statistics. Sources of data-Primary and Secondary – Methods of collecting Primary data. – Secondary Data-Sources of collecting Secondary	**15Hours**
Unit II	**Classification and Tabulation** Classification of data- Objectives - Types of classification. Formation of frequency distribution (one-way classification) – problems only. Tabulation– Definition – Parts of table – rules for tabulation –Kinds of tables.	**15Hours**
Unit III	**Diagrams and Graphs** Diagrams – advantages - general rules for constructing diagrams (one dimensional diagram only).Line diagram – Simple bar diagram – Subdivided bar – Multiple bar diagram– Pie diagram – Simple problems. Graphs – Histogram, Frequency Polygon, Frequency curve and Ogives. Difference between diagrams and graphs	**15Hours**

Unit IV	**Measures of Central Tendency** Measures of central tendency- Arithmetic Mean, Median, Mode, Harmonic mean and Geometric mean– Simple problems only.	**15Hours**
Unit V	**Measures of Dispersion** Measures of dispersion – Range, Quartile Deviation, Standard Deviation and their Coefficients – Simple problems only (without Mean Deviation measure).	**15Hours**

Textbook:

R.S.N. Pillai&V. Bagavathi, Statistics –S.Chand& company LTD, Reprint 2014.

Books for Reference:

1. S.P. Gupta, Statistical methods- Sultan Chand and Sons, 45th Edition 2017.
2. Pa. Navaneetham-Business tools for decision making – Jai publishers, Trichy Reprint 2014.

e- Resources:

1. www.analyticsvidhya.com
2. www.makeuseof.com

Course Outcomes:

On completion of the course the learner will be able to

CO 1:	know different types of data and different methods of collection of data.
CO 2:	know different types of classification and different kinds of tables.
CO 3:	draw suitable diagrams and graphs.
CO 4:	understand different types of averages.
CO 5:	understand various measures of dispersion.

Semester-I / I B.Com Core Course-II	**Statistical Methods for Business**	Course Code: **CUB**
Instruction Hours: 6	Credits: 5	Exam Hours: 3
Internal Marks: 25	External Marks:75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To impart the knowledge about collection and condensation of data. • To study various types of averages. • To enable the students to compute various measures of dispersion. • To impart the knowledge about the degree of relationship between variables and estimate unknown variable from known variable. • To impart the knowledge about the basics of Index Numbers	
UNIT	**CONTENT**	**HOURS**
Unit I	**Introduction** Statistics – Definition - Scope - Functions and Limitations of Statistics. Primary and Secondary data – Definition. Methods of collecting Primary data — Sources of Secondary data. Classification of data - Objectives - Types of Classification and Formation of Frequency table (one variable only). Tabulation – Definition – Parts of table – Rules for tabulation – Kinds of tables	**18Hours**
Unit II	**Measures of Central Tendency** Measures of central tendency- Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean– Simple problems.	**18Hours**
Unit III	**Measures of Dispersion, Skewness and Kurtosis** Measures of dispersion - Range, Quartile Deviation, Standard Deviation (without Mean Deviation) and their Coefficients - Simple problems only. Skewness - Types and Methods - Karl Pearson's and Bowley's Coefficient of Skewness-Simple problems. Kurtosis - definition - Types.	**18Hours**

UnitIV	**Correlation and Regression** Definition – Simple Correlation - Types of Correlation – Methods of Correlation : Scatter diagram– Karl Pearson's Coefficient of Corrélation– Spearman's Rank Correlation Coefficient (repeated and not repeated ranks) - Simple problems. Linear Regression – Lines of Regression – Simple problems	**18Hours**
Unit V	**Index Numbers** Index Numbers – Definition – Uses – Construction. Unweighted Index Numbers – Simple Aggregative Method and Simple Average of Relatives Method. Weighted Method – Laspeyre's, Paasche's and Fisher's Index Numbers. Time Reversal and Factor Reversal tests – Simple problems	**18Hours**

Textbook:

S.P.Gupta, Statistical methods- Sultan Chand and Sons ,45th edition , 2017

Books for Reference:

1 R.S.N.Pillai&V.Bagavathi, Statistics –S.Chand& company LTD, Reprint 2014.

2 Pa.Navaneetham-Business tools for decision making – Jai publishers ,Trichy Reprint 2014.

3 V.K.Kapoor, Modern Approach to Fundamentals of Statistics for Business and Economics - Sultan Chand and Sons, New Delhi, Reprint 2014.

e- Resources:

1. www.analyticsvidhya.com
2. www.makeuseof.com

Course Outcomes:

On completion of the course the learner will have the knowledge about

CO 1:	the methods of data collection, classification and tabulation.
CO 2:	the applications of averages.
CO 3:	the problems related to measure of dispersion.
CO 4:	the applications of correlation and regression.
CO 5:	the uses and applications of the index numbers.

Semester-II / I B.A. Eco Allied Course-II	**Statistics for Economics-II**	Course Code: **EUA2**
Instruction Hours: 5	Credits: 3	Exam Hours: 3
Internal Marks: 25	External Marks: 75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To know the distribution of data. • To know the types of relationship between the variables. • To understand cause and effect relationship between the variable. • To study the relation between qualitative data. • To study the basic concept of probability.	
UNIT	**CONTENT**	**HOURS**
Unit I	**Skewnessand Kurtosis** Skewness - Types and Methods - Karl Pearson's and Bowley's Coefficient of Skewness - simple problems. Kurtosis - Definition –Types (only)	**15Hours**
Unit II	**Correlation Analysis** Definition – Simple Correlation - Types of Correlation – Scatter diagram – Measurement of Correlation – Karl Pearson's Coefficient of Correlation – Spearman's Rank Correlation Coefficient - Simple problems.	**15Hours**
Unit III	**Regression Analysis** Linear Regression – Regression lines – X on Y and Y on X - Simple problems. Properties of Regression Coefficients (without proof) – Difference between Correlation and Regression.	**15Hours**
Unit IV	**Association of Attributes** Association of attributes (two attributes only) – Positive and Negative classes- Ultimate class frequencies- Contingency table- Consistency of data-Types of Association –Methods of determining Association – Comparison of Observed and Expected frequency method –Yule's Coefficient of Association method –Simple problems.	**15Hours**

Unit V	**Theory of Probability** Probability- Random Experiments- Sample Space-Types of Events – Exhaustive Events- Equally likely events- Mutually Exclusive Events- Independent Events – Mathematical and Statistical Probability. Addition and Multiplication theorems (two events only) – Simple problems.	**15Hours**

Text Book:

R.S.N. Pillai & V. Bagavathi, Statistics –S. Chand& company LTD, Reprint 2014.

Books for Reference:

1. S.P. Gupta, Statistical methods- Sultan Chand and Sons, 45th Edition 2017.
2. Pa. Navaneetham-Business tools for decision making – Jai publishers, Trichy Reprint 2014.
3. V.K. Kapoor, Modern Approach Fundamentals of Statistics for Business and Economics - Sultan Chand and Sons, New Delhi, Reprint 2014.

e- Resources:

1. www.analyticsvidhya.com
2. www.makeuseof.com

Course Outcomes:

On completion of the course the learner will have the knowledge about

CO 1:	the types of skewness and kurtosis
CO 2:	the applications of correlation analysis
CO 3:	the unknown variable and known variable.
CO 4:	the various methods of studying relation between attributes.
CO 5:	the different types of events on uncertain situations.

Semester-II / I B.B.A Allied Course-II	**Business Statistics for Managers**	Course Code: **AUA2**
Instruction Hours: 4	Credits: 3	Exam Hours: 3
Internal Marks: 25	External Marks: 75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To impart the knowledge about collection and condensation of data. • To study various types of averages and SPSS -packages. • To enable the students to compute various measures of dispersion. • To impart the knowledge about the degree of relationship between variables. • To understand cause and effect relationship between the variable	
UNIT	**CONTENT**	**HOURS**
Unit I	**Introduction** Definition of statistics - Characteristics - uses of statistics in commerce and business. Primary and secondary data – definition. Methods of collecting primary data – characteristics of questionnaire – sources of secondary data. Classification of data: objectives – types of classification – formation of frequency distribution (one-way classification) problems only.	**12Hours**
Unit II	**Measures of Central Tendency** Measures of central tendency – characteristics of a good average – arithmetic mean, median, mode, geometric mean harmonic mean – Simple problems. SPSS – packages, operations and uses .	**12Hours**
Unit III	**Measures of Dispersion, Skewness and Kurtosis** Measures of dispersion – Range, Quartile deviation, Standard deviation and their coefficients – Simple problems only. Skewness – types and methods – Karl person's and Bowley's Coefficient of Skewness. Kurtosis – definition – types.	**12Hours**
Unit IV	**Correlation Analysis** Definition – Simple correlation - types of correlation – methods of correlation: Scatter diagram, Karl Pearson's coefficient of correlation and Spearman's rank correlation coefficient (repeated and not repeated ranks) – Properties of correlation coefficient (without proof) – Simple Problems.	**12Hours**

Unit V	**Regression Analysis** Linear regression – definition – Lines of Regression– properties of regression coefficients (without proof) – Simple Problems. [Question paper consists of 30% theory and70% problems]	**12Hours**

Text Books:

S.P. Gupta, Statistical methods – Sultan Chand and Sons.

Reference Books:

1. R.S.N. Pillai & V. Bagavathi, Statistics – S. Chand & Company LTD.
2. Beresons M.L and Levine D.M. – Business Statistics, 12th Edition,1996.

Web-Resources:

1. htts://www.businessstaticsformanagers.com
2. htts://www. textbooks.com

Course Outcomes:

On completion of the course, the learner will be able to

CO 1:	know the methods of data collection and classification.
CO 2:	compute various measures of averages.
CO 3:	understand various measures of dispersion and skewness.
CO 4:	discuss the applications of correlation analysis.
CO 5:	estimate the unknown values from the known values of the variables.

Semester-II/I M.A Eco Core Course-VIII	Statistical Methods for Economic Analysis	Course Code: **PGEH**
Instruction Hours: 6	Credits: 5	Exam Hours: 3
Internal Marks: 25	External Marks: 75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To study the important measures of central tendency and dispersion • To impart the knowledge about the degree of relationship between variables • To understand cause and effect relationship between the variable • To create an overview about sampling and its various methods • To study the diffèrent types of testing of hypothèses.	
UNIT	**CONTENT**	**HOURS**
Unit I	**Measures of Averages and Dispersions** Measures of Averages, Definition, Characteristics of a good Measure of Average - Mean, Median and Mode - Definition, Merits and Demerits (Simple Problems).Measures of Dispersions - Definition, Characteristics of a good measure of dispersion - Standard Deviation - Definition, Merits and Demerits, Coefficient of Variation, (Simple Problems).	**18Hours**
Unit II	**Correlation Analysis** Correlation Analysis - Definition, Types, Methods of Finding Correlation Co-efficient - Scatter Diagram, Karl Pearson, Spearman's Rank Correlation Co-efficient, Concurrent Deviations Method - Properties of Correlation Co-efficient.(Only statement Withoutproof) - Simple Problems.	**18Hours**
Unit III	**Regression Analysis** Regression Analysis –Definition, Types, Lines of Regression - Properties of Regression Co- Efficient- (Without proof) - Difference Between Correlation and Regression Analysis. (Simple Problems).	**18Hours**
Unit IV	**Sampling Methods** Sampling- Definition, Uses of sampling. Random Sampling- Simple Random Sampling Stratified Random Sampling, Systematic Random Sampling - Definition, Merits and Demerits, Non-random sampling - Purposive, Quota and Judgement sampling. (Only Theory).	**18Hours**

Unit V	**Testing of Hypothesis** Sampling distribution of Mean, Standard Error- Uses of Standard Error - Testing of Hypothesis - Test Procedure - Type I error, Types II error - One Tailed & Two Tailed Tests, - t - test- Test of Significance for Single Mean and Difference between Two Means, Chi square test-Testing the Independence of Two Attributes, (Simple Problems).	**18Hours**

Text Books:

1. Gupta S. P - Statistical methods, Sultan Chand and Son's New Delhi, 2014,
2. Gupta S.C - Fundamentals of Applied Statistics, Sultan Chand and son's New Delhi, 2005.

Reference Books

1. Nagar AL and Das RK - Basic statistics Oxford University Press New Delhi
2. Salvatore Dominick - Statistics and Econometrics Mc.Graw Hill Co., New Delhi
3. Morris Carl. N and John E Rolph - Introduction to Data Analysis and Statistical Inference Prentice, Hall Inc. Engle wood Cliffs, New Jersey 07632.
4. Speigal MR - Theory and problems of Statistics, McGrahill Book Company
5. Crozton Cowden and Klein - Applied General Statistics, Prentice hall of India, New Delhi.
6. Chou Y - Statistics Analysis Holy Reinhart and Winston, New Delhi.

e - Resources:

1. http://www. Freeeconomics books.com
2. http:// www.delnet.in

Course Outcomes:

On completion of the course, the learner will have the knowledge about

CO 1:	the problems related to mean, median, mode and standard deviation.
CO 2:	the applications of correlation analysis.
CO 3:	the unknown values and the known values of the variables.
CO 4:	the application of sampling techniques.
CO 5:	the application of t-test and chi square test.

Semester-II / I M.Com Core Course- VII	**Business Statistics**	Course Code: **PGCG**
Instruction Hours: 6	Credits: 5	Exam Hours: 3
Internal Marks: 25	External Marks: 75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To create an overview about sampling and its various methods. • To impart the knowledge about the degree of relationship between variables and estimate unknown variable from known variable. • To study the various components of Time series. • To impart the basic concept of probability and itsprobability distributions. • To study the different types of test of hypotheses.	
UNIT	**CONTENT**	**HOURS**
Unit I	**Statistical Surveyand Sampling Methods** Statistical Survey – Planning and Execution of the Survey. Methods of Sampling – Probability Sampling – Simple Random Sampling- Stratified Sampling- Systematic Sampling- Cluster Sampling. Non- Probability Sampling – Judgement Sampling, Quota Sampling, Convenience Sampling. Sampling and Non-Sampling Errors.	**18Hours**
Unit II	**Correlation and Regression Analysis** Simple Correlation: Definition – Types of Correlation – Methods of Correlation - Karl Pearson's Coefficient of Correlation – Properties of Correlation Coefficient (no proof) – Spearman's Rank Correlation Coefficient (repeated and not repeated ranks) - Simple problems. Linear Regression – Lines of Regression – Properties of Regression Coefficients (without proof) – Simple problems	**18Hours**
Unit III	**Time Series Analysis** Time Series – Definition – Uses – Components – Measurement of trend – Moving Average Method – Least Square Method (linear model only) – Measurement of Seasonal variation – Simple Average Method -Simple problems.	**18Hours**
Unit IV	**Probability and Distributions** Probability – Mathematical and Statistical Probability –Types of Events -	**18Hours**

	Addition and Multiplication Theorems – Simple Problems. Random Variable – Definition of Discrete and Continuous Random Variable. Binomial, Poisson and Normal Distributions – Definition – Properties (Without Proof) - Simple Problems. (No Derivations and Fitting of Distributions).	
Unit V	**Testing of Hypothesis** Concept of Sampling Distribution and Standard Error- Uses of Standard Error. Test of Hypothesis – Null and Alternative Hypothesis – Type I and Type II Errors – One Tailed and Two Tailed Tests – Level of Significance – Procedure of Testing Hypothesis -- Tests of Significance – Large Sample Test: Test for Single Proportion, Difference of Proportions, Single Mean, Difference of Means – Simple problems.Small Sample Tests - Student's t – Applications of t – t-test for Single Mean, Difference of Means –Paired t- test.–and Chi Square Test for Independence of Attributes. F-Test for Equality of Variances -Analysis variance-Simple problems.	**18Hours**

Text Book:

S.P. Gupta, Statistical methods- Sultan Chand and Sons ,45th edition,2017

Reference Books:

1. S.C. Gupta., Fundamentals of Statistics – Himalaya Publishing House, 7th Revised Edition & Enlarged,2018
2. R.S.N. Pillai&V. Bagavathi, Statistics -S. Chand& company LTD, Reprint 2014.
3. P.R. Vittal, Mathematical Statistics, Margham Publications, Chennai, Reprint 2013.
4. V.K. Kapoor, Modern approach to Fundamentals of Statistics for Business and Economics - Sultan Chand and Sons, New Delhi, Reprint 2014.

e- Resources:

1. www.scimagojr.com
2. http://pdfs.semanticscholar.org.

Course Outcomes:

On completion of the course, the learner will have the knowledge about

CO 1:	the statistical survey and sampling techniques.
CO 2:	the correlation and regression analysis.
CO 3:	the uses and applications of Time series analysis.
CO 4:	the problems related to probability and basic concept of probability distributions.
CO 5:	the various statistical tools to apply for a research.

Semester-III/ II B.A. Eco. Allied Course-III	**Statistics for Economics-III**	Course Code:**EUA3**
Instruction Hours: 5	Credits: 3	Exam Hours: 3
Internal Marks: 25	External Marks: 75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To impart the knowledge about the theoretical distributions. • To study the different methods of Index numbers. • To understand the various components of Time series. • To create an overview about Sampling and its various methods. • To know the basic concepts of Vital Statistics.	
UNIT	**CONTENT**	**HOURS**
Unit I	**Distributions** Random variables-discrete and continuous -Binomial distribution, Poisson distribution – Simple problems. (no derivations and fitting of distributions) - normal distribution – definition – their properties.	**15Hours**
Unit II	**Index Numbers** Index numbers – definition – uses – construction. Unweighted method – simple aggregative method and simple average of relatives method. Weighted method – Laspeyre's, Paasche's and Fisher's index numbers. Time reversal and Factor reversal tests – Simple problems.	**15Hours**
Unit III	**Time Series** Analysis of time series – definition –uses –components of time series –secular trend – seasonal variations- cyclical variations –irregular variations – measurement of trend – method of moving averages – method of least squares (linear model only) – Simple problems.	**15Hours**

Unit IV	**Sampling Methods** Sampling techniques – definition of Census and Sample methods. Random and Non- Random Sampling. - Probability Sampling - Simple Random Sampling, Stratified Random Sampling and Systematic Random Sampling.	**15Hours**
Unit V	**Vital Statistics** Vital statistics – definition and uses – methods of obtaining Vital Statistics – Registration method, Census method, Analytical method. Crude birth rate specific birth rate and crude death rate, and Standardized death rate.	**15Hours**
[Question paper consists of 30% theory and 70% problems]		
Textbook: R.S.N. Pillai & V. Bagavathi, Statistics –S. Chand & company LTD, Reprint 2014.		
Reference Books: 1. S.P.Gupta, Statistical methods- Sultan Chand and Sons , 45th Edition 2017 2. Pa. Navaneetham-Business tools for decision making – Jai publishers, Trichy Reprint 2014		
e- Resources: 1. www.analyticsvidhya.com 2. www.makeuseof.com		

Course Outcomes:

On completion of the course, the learner will have the knowledge about

CO 1:	the different types of distributions.
CO 2:	the various methods of index numbers.
CO 3:	the uses and applications of Time series.
CO 4:	the application of sampling techniques.
CO 5:	the uses and methods for collecting vital statistics.

Semester-III /II B.Sc Maths Allied Course-IV	**Mathematical Statistics-I**	Course Code : **SUA1**
Instruction Hours: 4	Credits: 4	Exam Hours: 3
Internal Marks: 25	External Marks: 75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To equip the knowledge of probability. • To acquire knowledge about one dimensional random variables. • To impart knowledge about two dimensional random variables. • To impart the knowledge about mathematical expectation. • To study the discrete probability distributions.	
UNIT	**CONTENT**	**HOURS**
Unit I	**Theory of Probability** Probability – Mathematical and Statistical Probability, Axiomatic approach to Probability - Addition and multiplication theorem (two events only) - Boole's inequality – Simple problems.	**12Hours**
Unit II	**One Dimensional Random Variables** Random variables – concepts – one dimensional random variable – discrete and continuous r.v – probability mass function – probability density function – distribution function – Simple problems.	**12Hours**
Unit III	**Two Dimensional Random Variables** Two dimensional random variables – discrete – continuous random variables – marginal, conditional probability functions – Simple problems.	**12Hours**
Unit IV	**Mathematical Expectation** Mathematical expectation – definition – properties of expectation (with proof). Moments – relation between raw moments and central moments only– their relations. Variance –properties of variance, covariance (concept only) – Simple problems – conditional expectations and conditional variance (concept only) – Simple problems.	**12Hours**

Unit V	**Discrete Probability Distributions** Concept of Moment Generating Function (m.g.f)- Cumulant Generating Function (c.g.f)- Characteristic function. Binomial and Poisson distribution – definition – moments- mean and variance only - recurrence relation for the moments – Moment generating function - Characteristic function - Simple problems only.	**12Hours**

Text Book:

S.C. Gupta &V.K.Kapoor , Fundamentals of Mathematical Statistics- Sultan Chand and Sons,11th Edition ,2014

Unit I: Chapter 3 - 3.1, 3.3, 3.4, 3.5, 3.9, 3.9.1, 3.9.3, 3.11, 3.12, 3.13

Unit V: Chapter 8 - 8.4, 8.4.1, 8.4.2 ,8.4.6, 8.4.7, 8.4.8, 8.5, 8.5.2, 8.5.4,8.5.5 8.5.6, 8.5.7, 8.5.8

Reference Books:

1. S.P. Gupta, Statistical methods- Sultan Chand and Sons, 45th Edition 2017
2. R.S.N.Pillai&V.Bagavathi, Statistics –S.Chand& company LTD, Reprint 2014.

e- Resources:

1. http://www.dcpehvpm.org
2. https://pdfbooksforstd.blogspot.com

Course Outcomes:

On completion of the course, the learner will be able to

CO 1:	apply the theory of probability.
CO 2:	utilize one dimensional random variables.
CO 3:	compute two dimensional random variables.
CO 4:	discuss the mathematical expectation.
CO 5:	explain discrete probability distributions.

Semester-III & IV / II B.Sc Maths Allied Course-V	**Statistical Practical**	Course Code: **SUA2Y**
Instruction Hours: 3	Credits: 3	Exam Hours: 3
Internal Marks: 40	External Marks: 60	Total Marks: 100

Course Objectives	• To impart the knowledge about measures of central tendency, dispersion and skewness • To understand the various measures of discrete probability distribution • To understand fitting of Binomial, Poisson and Normal distributions • To impart the knowledge about the degree of relationship between variables and estimate unknown value from known value • To study the different types of testing of hypothesis	
UNIT	**CONTENT**	**HOURS**
Unit I	**Measures of Central Tendency, Dispersion and Skewness** Calculation of Mean, Median, Mode, Geometric mean, Harmonic mean, Quartile deviation, Standard deviation and their coefficients. Skewness – Karl Pearson's and Bowley's coefficient of Skewness.	**9Hours**
Unit II	**Discrete Probability Distribution** Calculation of Mean and Standard deviation for discrete probability distributions. Marginal and Conditional probabilities, expectations, variances, conditional expectations, conditional variance, covariance and correlation for bivariate discrete probability distributions.	**9Hours**
Unit III	**Fitting of Binomial, Poisson and Normal Distribution** Fitting of Binomial, Poisson and Normal distribution (area method only).	**9Hours**
Unit IV	**Correlation and Regression** Calculation of Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient (repeated and not-repeated ranks). Lines of Regression.	**9Hours**
Unit V	**Testing of Hypothesis** Tests of significance: Large sample tests for single proportion, difference of proportions, single mean, difference of means and difference of standard deviations. Small sample tests: t-test for single mean, difference of means and paired t-test. F – test for equality of variances. Chi square test for independence of attributes.	**9Hours**
(Five questions must be answered out of six questions. At least one question should be taken from each unit. Each question carries ten marks)		

Text Book:

S.C. Gupta &V.K.Kapoor , Fundamentals of Mathematical Statistics- Sultan Chand and Sons,11th Edition ,2014

Reference Books:

1. S.P. Gupta, Statistical methods- Sultan Chand and Sons, 45th Edition 2017
2. R.S.N.Pillai&V.Bagavathi, Statistics –S.Chand& company LTD, Reprint 2014.

e- Resources:

1. http://www.dcpehvpm.org
2. https://pdfbooksforstd.blogspot.com

Course Outcomes:

On completion of the course the learner will be able to

CO 1:	know about measures of central tendency, dispersion and skewness
CO 2:	apply various measures of discrete probability distribution
CO 3:	utilize fitting of Binomial, Poisson and Normal distributions
CO 4:	compute correlation coefficients and regression equations.
CO 5:	use large sample and small sample tests.

Semester-IV /II B.Sc. Maths Allied Course-VI	**Mathematical Statistics-III**	Course Code: **SUA3**
Instruction Hours: 3	Credits: 2	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive Level	**K1-Recalling** **K2-Understanding** **K3-Applying** **K4-Analyzing** **K5-Evaluating** **K6-Creating**	
Course Objectives	• To impart the knowledge about the degree of relationship between variables and estimate unknown variable from known variable. • To acquire knowledge about normal distribution. • To impart the knowledge about exact sampling distribution. • To study large sample tests • To study small sample tests	
UNIT	**CONTENT**	**HOURS**
Unit I	**Continuous Distribution** Normal distribution – definition– properties of Normal distribution -mode - median -moment generating function- moments of normal distribution. Uniform distribution – definition- mean and variance.	**9Hours**
Unit II	**Correlation and Regression Analysis** Correlation (two variables only) – Karl Pearson's Coefficient of Correlation and its properties. Spearman's Rank Correlation Coefficient (repeated and non-repeated). Lines of Regression – definition – properties of Regression Coefficients – Simple problems.	**9Hours**
Unit III	**Exact Sampling Distributions** Sampling distributions – Chi Square distribution– definition, derivation of the distribution and its mean and variance only. Student's t- distribution – definition, derivation of the distribution and its mean and variance only, F- distribution – definition - derivation of the distribution and its mean and variance only. Relationship among t, F & Chi Square distribution.	**9Hours**

Unit IV	**Large Sample Tests** Test of hypothesis – null and alternative, type I and type II errors, one tailed and two tailed tests, level of significance, Procedure for testing hypothesis. Test of significance – large sample tests; test of significance for single proportion, difference of proportions, single mean, difference of means –Simple problems.	**9Hours**
Unit V	**Small Sample Tests** Small sample tests – t-test for single mean, difference of means and paired t-test. F-test for equality of variances - Simple problems.	**9Hours**

Text Book:

S.C. Gupta &V.K.Kapoor , Fundamentals of Mathematical Statistics- Sultan Chand and Sons,11th Edition ,2014

UNIT I : Chapter 9 - 9.2,9.2.1,9.2.2,9.2.3,9.2.4,9.2.5,9.2.6,9.2.7,9.2.8

UNIT III : Chapter 16-16.1,16.2,16.2.1,16.2.4,16.5,16.5.1,16.5.2,16.7,16.
Chapter 15-15.1,15.2,15.3,15.3.1

Reference Books:

1. S.P. Gupta, Statistical methods- Sultan Chand and Sons, 45th Edition 2017
2. R.S.N. Pillai &V. Bagavathi, Statistics –S.Chand & company LTD, Reprint 2014.

e- Resources:

1. http://www.dcpehvpm.org
2. https://pdfbooksforstd.blogspot.com

Course Outcomes:

On completion of the course, the learner will be able to

CO 1:	compute correlation coefficients and regression equations.
CO 2:	identify the applications of normal distribution.
CO 3:	explain exact sampling distribution.
CO 4:	apply large sample tests.
CO 5:	use small sample tests.