

**To,
Assistant Registrar,
Academic Section, SGBAU,
Amravati.**

Sub: Submission of Required Documents by BOS (Ad-hoc) in Statistics, faculty of Humanities...

Respected Sir,

As per the discussion in Faculty meeting held on 17/07/2026, here by I am submitting the soft copy of following documents for your reference,

- 1) Curriculum – Teaching-Learning and Evaluation scheme of subject Statistics for semester I to VI,
- 2) Mahadnyandee courses list of subject Statistics,
- 3) Mooc's / Swayam courses list of subject Statistics.

Thanking you,

Date : 22-07-2026

Yours faithfully,

Dr. Sagar S. Kuthe
Chairman,
BOS(Ad-hoc) in Statistics,
Faculty of Humanities

Sant Gadge Baba Amravati University, Amravati
Faculty of Humanities
Social Science Group
Subject: Statistics
Academic Year: 2026-27

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1	Curriculum – Teaching-Learning and Evaluation scheme of subject Statistics for semester I to VI,
2	Mahadnyandeeep courses list of subject Statistics,
3	Mooc's / Swayam courses list of subject Statistics.

Sant Gadge Baba Amravati University, Amravati
Faculty: Humanities
Three Years – Six Semester Bachelor's Degree Program
For Degree of Bachelor of Arts – Statistics
B. A. First Year – Semester I & Semester II

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Program Outcomes:

- PO1 Disciplinary Knowledge: Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate program. Execute strong theoretical and practical understanding generated from the specific graduate program in the area of work.
- PO2 Critical Thinking and Problem solving: Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions.
- PO3 Social competence: Display the understanding, behavioral skills needed for successful social adaptation, working groups, exhibits thoughts and ideas effectively in writing and orally.
- PO4 Research-related skills and Scientific temper: Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research
- PO5 Personal and professional competence: Performing dependently and also collaboratively as a part of team to meet defined objectives and carry out work across interdisciplinary fields. Execute inter personal relationships, self-motivation and adaptability skills and commit to professional ethics
- PO6 Effective Citizenship and Ethics: Demonstrate empathetic social concern and equity centered national development, and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
- PO7 Environment and Sustainability: Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
- PO8 Self-directed and Life-long learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.

Program Specific Outcomes: At the end of the program, students are able to,

- PSO1 Understand the elementary techniques of data analysis such as, graphical and numerical.
- PSO2 Get the knowledge of different concepts, principles, methodologies and tools (skills) of Statistics.
- PSO3 Collect, represent graphically, analyze and interpret data /information by using appropriate Statistical tools.
- PSO4 Identify and solve a wide range of problems in real life /industry related to Statistics.
- PSO5 Apply various measures of central tendency and dispersion and hence enable them to infer about the nature and characteristics of a particular data set.
- PSO6 Understand the basic concepts of probability, Understand the concept of random variable, univariate probability distribution, expectation and moments of probability distribution.
- PSO7 Understand bivariate probability distributions and their applications in real life
- PSO8 Summarize, analyze and interpret data through various techniques learnt by manual

calculations as well as by using MS-Excel.

The examination in Statistics in BA Part I Semester I and Semester II will comprise of theory paper, internal assessment and practical examination. Theory paper will be of two hours duration and carry 30 Marks. The internal assessment for theory will be of 20 marks and practical examination will be of 3 Hours duration and carry 50 marks.

The distribution of Marks will be as follows:

- Theory Examination : 50 Marks
- External Examination : 30 Marks
- Long Answer Type Questions : 10 Marks
- Short Answer Type Question : 20 Marks
- Internal Assessment : 20 Marks

- Practical Examination : 50 Marks
- External : 25 Marks
- Practical problems : 20 Marks
- Viva voce : 05 Marks
- Internal : 25 Marks
- Practical record : 15 Marks.
- Attendance : 10 Marks

- SEC, VSC, FP/CES and Internship / Apprenticeship assessment will be done as per SGBAU guidelines.

The syllabus of statistics in Semester I and Semester II (major and minor) is based on the basis of Two theory periods per week and four practical periods (2 Practical of 2 Periods each) per batch per week, for each vertical a (Major), b (Minor), c (GOEC), d (VSC & SEC).

Notes :

- a. The strength of batch of practical for UG classes in statistics shall be 16 with an addition of 10% with the permission of Honorable Vice Chancellor.
- b. For theory, 1 credit shall mean 1 hour teaching per week per semester (Total 15 Hrs / semester). The duration of 1 teaching period will be 60 minutes.
- c. For practical, 1 credit shall mean 2 Hrs teaching per week per semester (Total 30 Hrs / semester).
- d. For examination and evaluation for theory course, 40% marks shall be assigned to Internal Examination and 60% marks shall be assigned to End semester External University Examination.

B. A. First Year – Semester I**Subject / Course Name : Statistics Major/Minor****Syllabus: Vertical a, Major/Minor Theory I**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
4.5	I	665201	Basic Statistics	2	30	2 Hrs	30

Course Objectives :

After completing this course students will be able to,

1. Understand basic concepts of Statistics subject.
2. Learn various types of data.
3. Learn to express the vast and diverse data into compact and more specific manner.
4. Get the knowledge of various statistical organizations working in India.

Course Outcomes :

After completing this course students will be able to

1. Students develop with basic knowledge about Statistics and its scope in various fields.
2. Become familiar with handling of data.
3. Can express the vast and diverse data into compact and more specific manner.
4. Get the knowledge of various statistical organizations working in India.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	Introduction to Statistics 1.1 Meaning, origin and definition of Statistics 1.2 Importance and Scope of Statistics in planning, economics, Agriculture, medical science and education, limitation of Statistics. 1.3 Types of data: Quantitative, qualitative, nominal, ordinal, discrete, continuous, Time series, frequency and non-frequency, population and Sample. 1.4 Primary and secondary data and its major sources.	8 Hrs	8 Marks
Unit II	Data Procedure 2.1 Collection : Definition, Methods, Advantages and Dis-advantages 2.2 Classification : Definition, Rules, Types and Importance	7 Hrs	7Marks

	2.3 Tabulation: Definition, Types parts and advantages. 2.4 Attribute Data : Definition, Rules and its importance		
Unit III	Official Statistics in India 3.1 Statistical Organizations in India and their functions: CSO, NSSO 3.2 Method of collection of official Statistics 3.3 Population Statistics, Agriculture Statistics and their publications.	7 Hrs	7Marks
Unit IV	Vital Statistics / Mortality 4.1 Definition, use and sources of Vital Statistics 4.2 Measurement of mortality : Crude Death Rate(CDR), Specific Death Rate(SDR) , Age SDR with merits and Demerits. 4.3 Infant Mortality Rate 4.4 Standardized Death Rate: Direct and Indirect methods	8 Hrs	8Marks

References :

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Gupta M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B. A. First Year – Semester I**Subject / Course Name : Statistics Major/Minor****Syllabus: Vertical a, Statistics 1 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
4.5	I	665202	Statistics 1 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Become familiar with handling of data.
2. Can express the vast and diverse data into compact and more specific manner.
3. Can calculate various Mortality rates.
4. Can measure Central tendency using different devices.

*** List of Practical/Laboratory Experiments/Activities etc.**

1	Presentation of data by frequency table
2	Graphical representation of numerical data
3	Diagrammatic representation of numerical data
4	Calculation of arithmetic mean for grouped and ungrouped frequency distribution
5	Calculation of median for grouped and ungrouped frequency distribution
6	Calculation mode for grouped and ungrouped frequency distribution
7	Calculation of partition value: quartile, deciles and percentiles
8	Computation crude death rate
9	Computation of specific death rate
10	Computation of standardized death rate by direct and indirect method
11	Calculation of CBR, GFR and TFR

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B. A. First Year – Semester I**Subject / Course Name: Statistics SEC(Basket)****Syllabus: Vertical d, SEC Lab / Practical 1****Course Objectives:**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
4.5	I	665276	SEC Lab / Practical 1	2	4Hrs/week	2Hrs	50

Course Objectives:

After completing this course students will be able to,

1. Understand the spreadsheets of MS Excel.
2. Learn the concept of data-collection, classification.
3. Are able to compute measures of central tendency using MS-Excel.

Course Outcomes:

After completing this course students will be able to,

2. Students get familiar with the spreadsheets of MS Excel.
2. Become familiar with handling of data-collection, classification.
3. Can express the vast and diverse data into compact and more specific manner in tables.
4. Are able to compute measures of central tendency

*** List of Practical/Laboratory Experiments.**

1	Collection of Primary data – Personal Interview Method
2	Collection of Primary data – Questionnaire Method
3	Preparation of Frequency table – Inclusive class method using MS-Excel
4	Preparation of Frequency table – Exclusive class method using MS-Excel
5	Computation of CDR using MS-Excel
6	Computation of SDR using MS-Excel
7	Computation of ASDR using MS-Excel
8	Calculation of Infant Mortality rate using MS-Excel

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.
5. Desktop Microsoft Office 2010 and above

B.A. First Year – Semester II**Subject / Course Name: Statistics Major****Syllabus: Vertical a, Graphical representation and Dispersion**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
4.5	II	665203	Graphical representation and Dispersion	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to

1. Understand the basic concepts of Dispersion.
2. Learn to handle Dispersion data.
3. Are able to study and measure dispersion.
4. Identify the nature of data using moments.

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about Dispersion and its scope in various fields.
2. Become familiar with handling of Dispersion data.
3. Are able to analyze measure dispersion.
4. Use concept of dispersion in real life situations.
5. Identify the nature of data using moments.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	Presentation of data 1.1 Graphical representation: Rules, Types and Importance. Histogram, frequency polygon, frequency curves. 1.2 Diagrammatic representation: Line diagram, Simple, multiple and subdivided bar diagram, 1.3 Pie Diagram, Stem and Leaf chart. 1.4 Rules, advantages, disadvantages of diagrammatic representation.	7 Hrs	7 Marks
Unit II	Dispersion 2.1 Meaning, concept and need of dispersion. 2.2 Comparison between central tendency and dispersion. 2.3 Ideal measure of dispersion. 2.4 Range and quartile deviation, its coefficient.	8 Hrs	8 Marks
Unit III	Measures of dispersion 3.1 Mean deviation, its coefficient. 3.2 Root mean square deviation, its	8 Hrs	8 Marks

	relation with standard deviation. 3.3 Effect of change of origin and scale on standard deviation, moments. 3.4 Coefficient of variation and its use.		
Unit IV	Skewness and Kurtosis 4.1 Skewness, meaning and types, positive and negative skewness with diagram. 4.2 Measures of skewness, absolute and relative measures, coefficient of skewness - Karl Pearson's, Bowley's and based on moments. 4.3 Kurtosis: Meaning and types with diagram. Measures of Kurtosis.	7 Hrs	7 Marks

References:

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
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- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

Subject / Course Name: Statistics Major**Syllabus: Vertical a, Statistics 2 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
4.5	II	665204	Statistics 2 Laboratory Work	2	4 Hrs/Week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about Dispersion and its scope in various fields.
2. Become familiar with handling of Dispersion data.
3. Are able to analyze measure dispersion.
4. Use concept of dispersion in real life situations.
5. Identify the nature of data using moments.

*** List of Practical/Laboratory Experiments:**

1	Presentation of data using Histogram, multiple and subdivided bar diagram.
2	Presentation of data using Line diagram: frequency polygon, frequency curves.
3	Calculation of range and coefficient of range.
4	Calculation of quartile deviation.
5	Calculation of mean deviation.
6	Calculation of Variance.
7	Calculation of Standard deviation.
8	Calculation of Coefficient of variation.
9	Calculation of measures of Skewness and Kurtosis.
10	Calculation of measures of Kurtosis.

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B. A. First Year – Semester II**Subject / Course Name : Statistics VSC****Syllabus: Vertical d, VSC Lab/Practical 1**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
4.5	II	665271	VSC Lab/ Practical1	2	4 Hrs/week	2Hrs	50

Course Outcomes:

After completing this course students will be able to

1. Students develop with basic knowledge about Statistics and its scope in various fields.
2. Able to represent numeric data with tables and graphs.
3. Understand the graphical representation through MS excel

*** List of Practical/Laboratory Experiments etc.**

1	Simple bar Diagram using MS-Excel
2	Multiple bar Diagram using MS-Excel
3	Sub-divided bar diagram using MS-Excel
4	Histogram using MS-Excel
5	Frequency Polygon using MS-Excel
6	Frequency Curve using MS-Excel
7	Pie Diagram using MS-Excel
8	Stem and Leaf chart using MS-Excel

List of equipments and instruments:

5. Twelve digit Desk Model calculators.
6. Biometric Tables volume I and II.
7. Logarithmic tables.
8. Statistical posters and charts.
9. Desktop Microsoft Office 2010 and above

B. A. First Year – Semester II**Subject / Course Name : Statistics SEC****Syllabus: Vertical d, SEC Lab / Practical 2**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
4.5	II	665277	SEC Lab / Practical 2	2	4 Hrs/week	2 Hrs	50

Course Outcomes:

At the end of the course student is able to do....

1. Understanding with some fundamental concepts, which play a critical role in understanding and visualizing real world data.
2. Able to represent numeric data in tables.
3. Understand the basic function of analyses through MS excel

*** List of Practical/Laboratory Experiments/Activities etc.**

1	Computation of Range and Coefficient of range using MS-Excel
2	Computation of Variance and Standard deviation using MS-Excel
3	Computation of Coefficient of Variance using MS-Excel
4	Computation of Quartile deviation using MS-Excel
5	Computation of Mean deviation using MS-Excel
6	Computation of Root mean square deviation using MS-Excel
7	Computation of Coefficient of Skewness using MS-Excel
8	Computation of Coefficient of Kurtosis using MS-Excel

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric tables volume I and II.
3. Statistical posters and charts.
4. Desktop Microsoft Office 2010 and above

Sant Gadge Baba Amravati University, Amravati
Faculty: Humanities
Three Years – Six Semester Bachelor's Degree Program
For Degree of Bachelor of Arts – Statistics
B. A. Second Year – Semester III & Semester IV

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Program Outcomes:

- PO1 Disciplinary Knowledge: Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate program. Execute strong theoretical and practical understanding generated from the specific graduate program in the area of work.
- PO2 Critical Thinking and Problem solving: Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions.
- PO3 Social competence: Display the understanding, behavioral skills needed for successful social adaptation, working groups, exhibits thoughts and ideas effectively in writing and orally.
- PO4 Research-related skills and Scientific temper: Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research
- PO5 Personal and professional competence: Performing dependently and also collaboratively as a part of team to meet defined objectives and carry out work across interdisciplinary fields. Execute inter personal relationships, self-motivation and adaptability skills and commit to professional ethics
- PO6 Effective Citizenship and Ethics: Demonstrate empathetic social concern and equity centered national development, and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
- PO7 Environment and Sustainability: Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
- PO8 Self-directed and Life-long learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.

Program Specific Outcomes: At the end of the program, students are able to,

- PSO1 Understand the elementary techniques of data analysis such as, graphical and numerical.
- PSO2 Get the knowledge of different concepts, principles, methodologies and tools (skills) of Statistics.
- PSO3 Collect, represent graphically, analyze and interpret data /information by using appropriate Statistical tools.
- PSO4 Identify and solve a wide range of problems in real life /industry related to Statistics.
- PSO5 Apply various measures of central tendency and dispersion and hence enable them to infer about the nature and characteristics of a particular data set.
- PSO6 Understand the basic concepts of probability, Understand the concept of random variable, univariate probability distribution, expectation and moments of probability distribution.
- PSO7 Understand bivariate probability distributions and their applications in real life

PSO8 Summarize, analyze and interpret data through various techniques learnt by manual calculations as well as by using MS-Excel.

The examination in Statistics in BA Part II Semester III and Semester IV will comprise of theory paper, internal assessment and practical examination. Theory paper will be of two hours duration and carry 30 Marks. The internal assessment for theory will be of 20 marks and practical examination will be of 3 Hours duration and carry 50 marks.

The distribution of Marks will be as follows:

- Theory Examination : 50 Marks
External Examination : 30 Marks
Long Answer Type Questions : 10 Marks
Short Answer Type Question : 20 Marks
Internal Assessment : 20 Marks
- Practical Examination : 50 Marks
External : 25 Marks
Practical problems : 20 Marks
Viva voce : 05 Marks
Internal : 25 Marks
Practical record : 15 Marks.
Attendance : 10 Marks
- SEC, VSC, FP/CES and Internship / Apprenticeship assessment will be done as per SGBAU guidelines.

The syllabus of statistics in Semester III and Semester IV (major and minor) is based on the basis of Two theory periods per week and four practical periods (2 Practical of 2 Periods each) per batch per week, for each vertical a (Major), b (Minor), c (GOEC), d (VSC & SEC).

Notes :

- a. The strength of batch of practical for UG classes in statistics shall be 16 with an addition of 10% with the permission of Honorable Vice Chancellor.
- b. For theory, 1 credit shall mean 1 hour teaching per week per semester (Total 15 Hrs / semester). The duration of 1 teaching period will be 60 minutes.
- c. For practical, 1 credit shall mean 2 Hrs teaching per week per semester (Total 30 Hrs / semester).
- d. For examination and evaluation for theory course, 40% marks shall be assigned to Internal Examination and 60% marks shall be assigned to End semester External University Examination.

B. A. Second Year – Semester III**Subject / Course Name: Statistics Major****Syllabus: Vertical-a, Major-III(Theory)****Course Objective :**

To make students able to:

1. Understand the basic concepts of random experiment, random variable, probability, etc.
2. Use concept of probability in real life situations.
3. Compute probability of real-life events.
4. Identify the nature of data using moments.
5. Check the dependency of events using probability or conditional probability.

Course Outcomes:

After completing this course students will be able to

- 1 Understand the basic concepts of random experiment, random variable, probability, etc.
- 2 Use concept of probability in real life situations.
- 3 Compute probability of real-life events.
- 4 Identify the nature of data using moments.
- 5 Check the dependency of events using probability or conditional probability.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	III	665205	Major III (T) Probability and Mathematical Expectation	2	30	2 Hrs	30

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	Introduction to Probability 1.1 Deterministic and probabilistic phenomenon with example, 1.2 basic terminology in probability 1.3 Mathematical and Statistical probability – and limitations 1.4 Simple theorems on probability of events	7 Hrs	7 Marks
Unit II	2.1 Axioms of probability. 2.2 Addition theorem of probability (only statement) with diagram 2.3 Multiplication theorem of probability (only statement) with diagram 2.4 Simple problems on probability	7 Hrs	7 Marks

Unit III	3.1: Random variable - discrete, and continuous with example. 3.2: Probability mass function and probability density function. 3.3 Simple problems on probability mass function. 3.4 Distribution Function: Concept , definition and properties of distribution function	8 Hrs	8 marks
Unit IV	4.1: Definition of mathematical expectation for discrete and continuous random variable 4.2 Properties of mathematical expectation 4.3 Addition and multiplication theorem of expectation. 4.4: Simple problems on mathematical expectation	8 Hrs	8 Marks

References:

Course Material/Learning Resources-

Text books -

- 1) मुलभूत सांख्यिकी: प्रा. राम देशमुख -विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे: प्रा. राम देशमुख -विद्याप्रकाशन
- 3) सांख्यिकी मुलभूत तंत्रे: प्रा. पुरुषोत्तम नवघरे -विद्याप्रकाशन

Reference books-

- 1) Bhat B.R. Shrivankataraman T and Rao Madhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Gupta M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Gupta S.C. , Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand

B. A. Second Year – Semester III**Subject / Course Name: Statistics Major-III Practical****Syllabus: Vertical-a, Statistics 3 Laboratory Work****Course Outcomes:**

By the end of the Lab/Practical Course, students should be able to:

1. Understand the basic concepts of random experiment, random variable, probability, etc.
2. Use concept of probability in real life situations.
3. Compute probability of real-life events.
4. Check the dependency of events using probability or conditional probability.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	III	665206	Statistics 3 Laboratory Work	2	2 per batch	3Hrs	50

*** List of Practical/Laboratory Experiments etc.**

1	Evaluation of probabilities-simple problems
2	Evaluation of probabilities using addition theorem
3	Evaluation of probabilities using multiplication theorem
4	Simple problems on Discrete and Continuous random variable
5	Simple problems on probability mass function
6	Simple problems on probability distribution function.
7	Calculation of mean using mathematical expectations
8	Calculation of variance using mathematical expectations
9	Problems on Addition theorem of expectation
10	Problems on multiplication theorem of expectation

List of equipments and instruments:

1. Twelve digit Desk Model calculators
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B. A. Second Year – Semester III
Subject / Course Name: Statistics Major
Syllabus: Vertical a, Major-IV(Theory)

Course Objectives:

After completing this course students will be able to,

1. Understand the relationship between two variables.
2. Learn to calculate and interpret correlation coefficient.
3. Learn to Identify the difference between linear and non-linear regression models.
4. Apply the methods to real life situations ,draw valid conclusions and their interpretation

Course Outcomes:

After completing this course students will be able to,

1. Establish the relationship between two variables.
2. Calculate and interpret correlation coefficient for bivariate data.
3. Identify the linear and non-linear regression models.
4. Apply the correlation and regression methods to real life situations.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	III	665207	Major VI (T) Correlation, Regression and Theory of Attributes.	2	30	2 hrs	30

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1: Meaning of Bivariate data, bivariate frequency table, covariance, 1.2: Correlation: Meaning, example, positive, negative and perfect correlation. 1.3: Measurement of correlation: Scatter diagram, 1.4 Karl Pearson's coefficient of correlation, its limits properties, assumptions.	7 Hrs	7 Marks

Unit II	2.1: Rank Correlation: need, meaning, formula and limits. 2.2: Partial correlation: concept, formula of partial correlation coefficient, its limits. 2.3: Multiple correlation: concept, formula of multiple correlation coefficient, limits 2.4 properties of .multiple correlation	8 Hrs	8 Marks
Unit III	3.1: Concept, definition of Regression, principle of least square regression. 3.2 Lines of Regression 3.3: Lines of regression, fitting of regression X on Y, Y on X. 3.4: Coefficients of regression, their properties.	7 Hrs	7 Marks
Unit IV	4.1: Introduction, notations, dichotomy. 4.2: Classes, class frequency, order of class frequency. 4.3: Consistency of data, independence of attributes, criteria of independence. 4.4: Association of attributes, Yule's coefficient of association, coefficient of colligation.	8 Hrs	8 Marks

References :

Course Material/Learning Resources

Text books -

- 1) मुलभूत सांख्यिकी: प्रा. राम देशमुख -विद्याप्रकाशन
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- 3) सांख्यिकी मुलभूत तंत्रे: प्रा. पुरूषोत्तम नवघरे -विद्याप्रकाशन

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- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Second Year – Semester III**Subject / Course Name : Statistics IKS (Indian Knowledge System)****Syllabus : Vertical-a, Major-IKS(Theory)****Course Objective**

1. To understand the brief history of statistics.
2. To know the importance of statistics in government organization.
3. To understand the basic knowledge of statistics useful for the competitive examination.
4. To improve the statistical reasoning of ability.

Course Outcomes

1. Student will able to understand the brief history of statistics of India pre-independence and after independence.
2. Student becomes familiar with the contribution of Indian Statisticians.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	III	665208	Major-IKS(Theory) - Biography of Statistics	2	30	2 Hr	30

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Simple Definition of Statistics 1.2 Historic Development of Statistics 1.3 Statistical Systems in British Period in India	7 Hrs	7 Marks
Unit II	2.1 Prof. P. C. Mahalanobis and his work 2.2 Prof. C. R. Rao and his work 2.3 Prof. V. S. Huzurbazar and his work 2.4 Prof. P. V. Sukhatme and his work	8 Hrs	8 Marks
Unit III	3.1 Applications of Statistics in central and state government ministries 3.2 In industrial development, health program 3.3 In, socio economic development of India	8 Hrs	8 Marks
Unit IV	4.1 In five year plan 4.2 In agricultural development of India 4.3 In family welfare	7 Hrs	7 Marks

References : Course Material/Learning Resources**Text books -**

- 1) मुलभूत सांख्यिकी: प्रा. राम देशमुख -विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे: प्रा. राम देशमुख -विद्याप्रकाशन
- 3) सांख्यिकी मुलभूत तंत्रे : प्रा. पुरूषोत्तम नवघरे -विद्याप्रकाशन

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and Rao Madhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Gupta M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J. and Kellin S: Applied General Statistics, Prentice Hall India
- 4) Gupta S.C. , Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B. A. Second Year – Semester III

Subject / Course Name: Statistics Minor
Syllabus: Vertical - b, Minor-III (Theory)

Course Objectives:

To make students able to;

1. Understand the concept of Central Tendency.
2. Learn to handle Central Tendency data.
3. Can express the vast and diverse Central Tendency data into compact and more representative manner.

Course Outcomes:

After completing this course students will be able to,

1. Students developed with basic knowledge Central Tendency and its scope in various fields.
2. Become familiar with handling of Central Tendency data.
3. Can compute Central Tendency measures.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	III	665251	Minor-III (Theory) Descriptive Statistics Measures	2	30	2 hrs	30

Serial No.	Contents	Workload Allotted	Weightage of Marks Allotted
Unit I	1.1 Central Tendency: Concept, definition and measures 1.2 Characteristics of ideal measure, definition, merits, demerits and uses of arithmetic mean Properties of am. 1.3 Definition, merits, demerits and uses of, median and mode.	8 Hrs	8 Marks
Unit II	2.1 Definition merits, demerits and uses of geometric mean 2.2 Definition, merits, demerits and uses of harmonic mean 2.3 Relation between AM, GM and HM.	7 Hrs	8 Marks
Unit III	3.1 Meaning, definition and need of dispersion. 3.2 Characteristics of ideal measure of dispersion. 3.3 Range, quartile deviation and mean deviation, 3.4 Standard deviation and variance.	7 Hrs	7 Marks
Unit IV	4.1 Coefficient of dispersion, coefficient of variation, and its uses 4.2 Partition Values quartiles, deciles and percentiles 4.3 Moments: Definition of raw and central moments, 4.4 Relation between raw and central moments beta1 and beta2	8 Hrs	8 Marks

References:

Text books –

- 1) मुलभूत सांख्यिकी : प्रा. राम देशमुख – विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे : प्रा. राम देशमुख – विद्याप्रकाशन
- 3) सांख्यिकी मुलभूत तंत्रे : प्रा. पुरुषोत्तम नवघरे – विद्याप्रकाशन

Reference Books-

- 1) Bhat B.R. Shrivankataraman T and Rao Madhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Gupta M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Gupta S.C. , Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand

B. A. Second Year – Semester III**Subject / Course Name: Statistics Minor-III(P)****Syllabus: Vertical - a, Statistics 4 Laboratory Work****Course Outcomes:**

By the end of the Lab/Practical Course students should be able to,

1. Understand basic knowledge about Descriptive Statistics measures and its scope in various fields.
2. Become familiar with handling of Descriptive Statistics data.
3. Can express the vast and diverse Descriptive Statistics data into compact and more specific manner.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	III	665252	Statistics 4 Laboratory Work	2	4 Hrs/Week	3Hrs	50

*** List of Practical/Laboratory Experiments/Activities etc.**

1	Calculation of arithmetic mean of simple series of data
2	Calculation of arithmetic mean of discrete and continuous frequency distributions
3	Calculation of median of simple series of data
4	Calculation of median of discrete and continuous frequency distributions
5	Calculation of mode of simple series of data
6	Calculation of mode of discrete and continuous frequency distributions
7	Calculation of range of simple series and frequency distribution
8	Calculation of quartile deviation of simple series and frequency distribution
9	Calculation of mean deviation of simple series and frequency distribution
10	Calculation of standard deviation of simple series and frequency distribution
11	Calculation of coefficient of skewness and kurtosis

List of equipments and instruments:

5. Twelve digit Desk Model calculators
6. Biometric Tables volume I and II.
7. Logarithmic tables.
8. Statistical posters and charts.

B. A. Second Year – Semester III**Subject / Course Name: Statistics VSC (Vocational Skill Course)****Syllabus: Vertical-d, VSC Lab / Practical 2**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	III	665272	VSC Lab / Practical 2	2	4 Hrs/week	2 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Learn to compute probabilities using MS-Excel.
2. Can apply probability theory in real life situations by using MS-Excel.
3. Compute probability of real-life events by using MS-Excel.

*** List of Practical/Laboratory Experiments/Activities etc.**

1	Evaluation of probabilities simple problems using MS-Excel
2	Evaluation of probabilities using addition theorem using MS-Excel
3	Evaluation of probabilities multiplication theorem using MS-Excel
4	Simple problems on mathematical expectation using MS-Excel
5	Calculation of mean using mathematical expectations using MS-Excel
6	Calculation of variance using mathematical expectations using MS-Excel
7	Simple problems on moment generating function using MS-Excel

List of equipments and instruments:

5. Twelve digit Desk Model calculators.
6. Biometric Tables volume I and II.
7. Logarithmic tables.
8. Statistical posters and charts.
9. Desktop Microsoft Office 2010 and above.

B. A. Second Year – Semester IV**Subject / Course Name: Statistics Major****Syllabus: Vertical a, Major-V(Theory)****Course Objectives:** After completing this course students will be able to,

- 1 Develop with basic knowledge about discrete distributions.
2. Become familiar with handling of data.
3. Can express real life situation following certain distribution
4. Enable to estimate the trends mean and variance life events

Course Outcomes:

After completing this course students will be able to

1. Understand discrete distributions
2. Understand parameters of discrete distributions
3. Can apply discrete distributions in real life situation

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	IV	665209	Major V- (T) Theoretical Distributions	2	30	2 hrs	30

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1Concept and definition of Binomial distribution with example 1.2 Physical conditions for Binomial distribution 1.3Mean ,variance and mgf of BD 1.4 Additive property and recurrence relation	8 Hrs	8 Marks
Unit II	2.1Concept and definition of Poisson distribution with example 2.2 Physical conditions for Poisson distribution 2.3Mean ,variance and mgf of Poisson distribution 2.4Additive property and recurrence relation	8 Hrs	8 Marks
Unit III	3.1Concept and definition of Negative Binomial distribution with example 3.2 Physical conditions for Negative Binomial distribution 3.3Mean ,variance and mgf of Negative Binomial distribution	7 Hrs	7 Marks

Unit V	4.1 Concept and definition of Normal distribution with example 4.2 Physical conditions for normal distribution 4.3 Mean, variance and mgf of normal distribution 4.4 Chief characteristics and area property of normal distribution	7 Hrs	7 Marks
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References :

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे विद्याप्रकाशन

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Second Year – Semester IV**Subject / Course Name: Statistics Major V(P)****Syllabus: Vertical a – Statistics 5 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	IV	665210	Statistics 5 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes :

After completing this course students will be able to

1. Become familiar with handling of theoretical distributions .
2. Can express the vast and diverse probability distribution data into compact and more specific manner.
3. Can estimate the probabilities using theoretical distributions .
4. Can analyze variation in data using theoretical distributions technique.

*** List of Practical/Laboratory Experiments.**

1	Computation of probabilities using Binomial Distribution
2	Problems on additive property of Binomial Distribution
3	Fitting of Binomial Distribution
4	Computation of probabilities using Poisson Distribution
5	Problems on additive property of Poisson Distribution
6	Fitting of Poisson Distribution
7	Problems on Negative Binomial Distribution
8	Computation of probabilities using Normal Distribution
9	Problems on area property of Normal Distribution
10	Fitting of Normal Distribution

List of equipments and instruments:

1. Twelve digit Desk Model calculators
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B. A. Second Year – Semester IV**Subject / Course Name: Statistics Major****Syllabus: Vertical-a, Major-VI(Theory)****Course Objectives:**

To make students able to;

1. Students developed with basic knowledge about Statistics and its scope in various fields.
2. Become familiar with mortality and fertility.
3. Can express the vast and diverse data into compact and more specific manner
4. Enable to estimate the trends in vital events like births and deaths

Course Outcomes:**After completing this course students will be able to**

1. Students developed with basic knowledge about Statistics and its scope in various fields.
2. Become familiar with mortality and fertility.
3. Can express the vast and diverse data into compact and more specific manner
4. Enable to estimate the trends in vital events like births and deaths

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	IV	665211	Major VI(T) Statistical Organizations and Vital Statistics	4	60	3Hrs	60

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	Population Statistics 1.1 Meaning and definition of population statistics and its sources. 1.2 Meaning and definition of official statistics. 1.3 Sources of obtaining official statistics. 1.4 De Jure method with merits and demerits 1.5 De Facto method with merits and demerits	10 Hrs	10 Marks
Unit II	2.1 Agriculture Statistics, Industrial Statistics and their publications. 2.2 Principal publication of, Transportation and Educational Statistics. 2.3 Statistical Organizations: DES and its functions	10 Hrs	10 Marks

	2.4 ISI and its functions 2.5 IPPS and its functions		
Unit III	Vital Statistics 3.1 Definition and uses of Vital Statistics 3.2 Uses of Vital Statistics 3.3 Sources of Vital Statistics 3.4 Measurement of mortality : Crude Death Rate(CDR) with merits and demerits 3.5 Specific Death Rate(SDR) with merits and demerits	10 Hrs	10 Marks
Unit IV	4.1 Age SDR with merits and Demerits 4.2 Infant Mortality Rate 4.3 Standardized Death Rate by Direct method 4.4 Standardized Death Rate by Indirect method	10 Hrs	10 Marks
Unit V	5.1 Fertility – Meaning, definition 5.2 Fertility - importance. 5.3 Crude Birth Rate(CBR) 5.4 Specific Fertility Rate, General Fertility Rate 5.5 Total Fertility Rate	10 Hrs	10 Marks
Unit VI	6.1 Measurement of Population growth. 6.2 Net Reproduction rate(NRR) 6.3 Gross Reproduction Rate(GRR) 6.4 Life table and its components	10 Hrs	10 Marks

References :

Course Material/Learning Resources

Text books:

- 1) मुलभूतसांख्यिकीप्रा. रामदेशमुखविद्याप्रकाशन
- 2) संख्यात्मकतंत्रप्रा. रामदेशमुखविद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तमनवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and Rao Madhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J. and Kellin S: Applied General Statistics, Prentice Hall India
- 4) Gupta S.C. , Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B. A. Second Year – Semester IV

Subject / Course Name: Statistics Minor (T)
Syllabus: Vertical b, - Statistics Minor IV (Theory)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	IV	665253	Minor IV (T) Bivariate Data Analysis	2	30	2hrs	30

Course Objectives:

After completing this course students will be able to,

1. Understand the relationship between two variables.
2. Learn to calculate and interpret correlation coefficient.
3. Identify the difference between linear and non-linear regression models.
4. Apply the Bivariate Data Analysis methods to real life situations.

Course Outcomes :

After completing this course students will be able to

1. Establish the relationship between two variables.
2. Calculate and interpret correlation coefficient for bivariatedata.
3. Develops the linear and non-linear regression models.
4. Apply the Bivariate Data Analysis methods to real life situations, draw valid conclusions and their interpretation.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	Bivariate Data 1.1: Meaning of Bivariate data with example, bivariate frequency table, covariance, 1.2: Correlation: Meaning, example, positive, negative and perfect correlation. 1.3: Measurement of correlation: Scatter diagram,	7 Hrs	7 Marks
Unit II	Correlation Coefficient 2.1.Karl Pearson's coefficient of correlation, its limits 2.2Properties and assumptions underlying Karl Pearson's coefficient of correlation. 2.3: Rank Correlation: need, meaning, formula and limits. 2.4.Rank correlation with repeated ranks.	8 Hrs	8 Marks

Unit III	Regression Analysis 3.1.Rank correlation with repeated ranks 3.2 Line of best fit 3.3: Concept, definition of Regression, 3.4 Principle of least square regression.	7 Hrs	7 Marks
Unit IV	4.1: Lines of regression, fitting of regression X on Y, Y on X. 4.2: Angle between lines of regression 4.3 Coefficients of regression, their properties.	8 Hrs	8 Marks

References :

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे विद्याप्रकाशन

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and Rao Madhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.and Kelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. , Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B. A. Second Year – Semester IV**Subject / Course Name: Statistics Minor (P)****Syllabus: Vertical b, - Statistics 6 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	IV	665254	Statistics 6 Laboratory Work	2	4 Hrs/Week	3Hrs	50

Course Outcomes:

By the end of the Lab/Practical Course, students should be able to:

1. Understand the relationship between two variables.
2. Calculate and interpret correlation coefficient for bivariate data.
3. Identify the difference between linear and non-linear regression models.
4. Apply the methods to real life situations ,draw valid conclusions and their interpretation

*** List of Practical/Laboratory Experiments/Activities etc.**

1	Study of correlation by scatter diagram
2	Calculation of Karl Pearson's coefficient of correlation for bivariate data
3	Calculation of Spearman's rank correlation coefficient for bivariate data
4	Calculation of Spearman's rank (repeated ranks) correlation coefficient for bivariate data
5	Fitting of line of regression
6	Problems on regression coefficients
7	Problems on positive, negative association
8	Calculation of Yule's coefficient of association

List of equipments and instruments:

1. Twelve digit Desk Model calculators
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B. A. Second Year – Semester IV**Subject / Course Name: Statistics VSC (Vocational Skill Course)****Syllabus: Vertical d, VSC Lab/Practical 3**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	IV	665273	VSC Lab / Practical 3	2	4 Hrs/week	3 Hrs	50

Course Outcomes :

After completing this course students will be able to

1. Understand the basic concepts of random correlation, regression, Large Sample Tests etc.
2. Use concept of probability distribution in real life situations.
3. Compute coefficient of correlation, regression and association .

*** List of Practical/Laboratory Experiments:**

1	Calculation of Karl Pearson's and Spearman's rank coefficient of correlation for bivariate data using Ms-Excel
2	Fitting of line of regression using Ms-Excel
3	Calculation of Yule's coefficient of association using Ms-Excel
4	Problems on Binomial, Poisson and Normal Distribution using Ms-Excel
5	Single-Sample Large Sample Z-Tests for Population Mean using Ms-Excel
6	Two-Sample Large Sample Z-Tests for Comparing Means using Ms-Excel
7	Single-Sample Large Sample Z-Tests for Population Proportion using Ms-Excel
8	Two-Sample Large Sample Z-Tests for Comparing Proportions using Ms-Excel

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.
5. Desktop Microsoft Office 2010 and above.

Sant Gadge Baba Amravati University, Amravati
Faculty: Humanities
Three Years – Six Semester Bachelor's Degree Program
For Degree of Bachelor of Arts – Statistics
B. A. Third Year – Semester V & Semester VI

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Program Outcomes:

- PO1 Disciplinary Knowledge: Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate program. Execute strong theoretical and practical understanding generated from the specific graduate program in the area of work.
- PO2 Critical Thinking and Problem solving: Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions.
- PO3 Social competence: Display the understanding, behavioral skills needed for successful social adaptation, working groups, exhibits thoughts and ideas effectively in writing and orally.
- PO4 Research-related skills and Scientific temper: Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research
- PO5 Personal and professional competence: Performing dependently and also collaboratively as a part of team to meet defined objectives and carry out work across interdisciplinary fields. Execute inter personal relationships, self-motivation and adaptability skills and commit to professional ethics
- PO6 Effective Citizenship and Ethics: Demonstrate empathetic social concern and equity centered national development, and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
- PO7 Environment and Sustainability: Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
- PO8 Self-directed and Life-long learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.

Program Specific Outcomes: At the end of the program, students are able to,

- PSO1 Understand the elementary techniques of data analysis such as, graphical and numerical.
- PSO2 Get the knowledge of different concepts, principles, methodologies and tools (skills) of Statistics.
- PSO3 Collect, represent graphically, analyze and interpret data /information by using appropriate Statistical tools.
- PSO4 Identify and solve a wide range of problems in real life /industry related to Statistics.
- PSO5 Apply various measures of central tendency and dispersion and hence enable them to infer about the nature and characteristics of a particular data set.
- PSO6 Understand the basic concepts of probability, Understand the concept of random variable, univariate probability distribution, expectation and moments of probability distribution.
- PSO7 Understand bivariate probability distributions and their applications in real life
- PSO8 Summarize, analyze and interpret data through various techniques learnt by manual calculations as well as by using MS-Excel.

The examination in Statistics in BA Part III Semester V and Semester VI will comprise of theory paper, internal assessment and practical examination. Theory paper will be of two hours duration and carry 30 Marks. The internal assessment for theory will be of 20 marks and practical examination will be of 3 Hours duration and carry 50 marks.

The distribution of Marks will be as follows:

- Theory Examination : 50 Marks
 - External Examination : 30 Marks
 - Long Answer Type Questions : 10 Marks
 - Short Answer Type Question : 20 Marks
 - Internal Assessment : 20 Marks

- Practical Examination : 50 Marks
 - External : 25 Marks
 - Practical problems : 20 Marks
 - Viva voce : 05 Marks
 - Internal : 25 Marks
 - Practical record : 15 Marks.
 - Attendance : 10 Marks

- SEC, VSC, FP/CES and Internship / Apprenticeship assessment will be done as per SGBAU guidelines.

The syllabus of statistics in Semester V and Semester VI (major and minor) is based on the basis of Two theory periods per week and four practical periods (2 Practical of 2 Periods each) per batch per week, for each vertical a (Major), b (Minor), c (GOEC), d (VSC & SEC).

Notes :

- e. The strength of batch of practical for UG classes in statistics shall be 16 with an addition of 10% with the permission of Honorable Vice Chancellor.
- f. For theory, 1 credit shall mean 1 hour teaching per week per semester (Total 15 Hrs / semester). The duration of 1 teaching period will be 60 minutes.
- g. For practical, 1 credit shall mean 2 Hrs teaching per week per semester (Total 30 Hrs / semester).
- h. For examination and evaluation for theory course, 40% marks shall be assigned to Internal Examination and 60% marks shall be assigned to End semester External University Examination.

B.A. Third Year – Semester V**Subject / Course Name: Statistics Major (T)****Syllabus: Vertical a, Major-VII (Theory)**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-V	665212	Major- VII (Theory)- SQC & Demand Analysis	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to,

1. Students will understand the concept of SQC and Demand Analysis.
2. Learn to handle SQC data.
3. Learn to represent SQC data into compact and more representative manner.
4. Get the knowledge of analytical tools of SQC and Demand Analysis.

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about SQC, Demand Analysis and its scope in various fields.
2. Become familiar with handling of SQC data.
3. Can express the vast and diverse SQC data into compact and more specific manner.
4. Get the knowledge of analytical tools of Demand Analysis.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Definition, purpose and uses of SQC 1.2 Chance and assignable causes of variation, Process and production control. 1.3 General theory of control charts and control limits, Control charts for variables 1.4 Construction of X bar and R charts	7 Hrs	7 Marks

Unit II	2.1 Control charts for attributes, Construction of p and np-chart 2.2 Construction of d and c-chart 2.3 Acceptance Sampling Plans: Concept of AQL, LTPD, Producer's Risk, Consumer's Risk, ASN, AOQ, AOQL, ATI and OC curves 2.4 Designing Single/Double inspection plans	8 Hrs	8 Marks
Unit III	3.1 Concept of Demand and Supply 3.2 Necessities and luxuries 3.3 Law of Demand and Supply 3.4 Concept Equilibrium price	7 Hrs	7Marks
Unit IV	4.1 General principles of elasticity of Demand 4.2 Price elasticity of demand 4.3 Income elasticity of demand 4.4 Cross elasticity of demand 4.5 Pareto's law of income distribution	8 Hrs	8Marks

References :

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivenkataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
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- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
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B.A. Third Year – Semester V**Subject / Course Name: Statistics Major (P)****Syllabus: Vertical a, Statistics 7 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	V	665213	Statistics 7 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Become familiar with handling of SQC data.
2. Can express the vast and diverse SQC data into compact and more specific manner.
3. Can calculate various Elasticity of Demand.
4. Can analyze demand patterns.

* List of Practical/Laboratory Experiments

1	Construction of control charts for variables - R chart
2	Construction of control charts for variables – X bar chart
3	Construction of control charts for attributes of p-chart
4	Construction of control charts for attributes of np-chart
5	Construction of control charts for attributes of d-chart
6	Construction of control charts for attributes of c-chart
7	Problems on Single Sampling Plan
8	Problems on Double Sampling Plan
9	Problems on Price Elasticity of demand
10	Problems on Income Elasticity of demand

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B.A. Third Year – Semester V**Subject / Course Name: Statistics Major (T)****Syllabus: Vertical a, Major-VIII (Theory)**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	V	665214	Major- VIII (Theory)- Sample Survey	4	60	3 Hrs	60

Course Objectives:

After completing this course students will be able to,

1. Understand the concept of Sample survey and ANOVA.
2. Learn to handle Sample survey data.
3. Learn to express Sample survey data into compact and more representative manner.
4. Get the knowledge of various ANOVA techniques

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about Sample survey, ANOVA and its scope in various fields.
2. Become familiar with handling of Sample survey data.
3. Can express the vast and diverse Sample survey data into compact and more specific manner.
4. Get the knowledge of various ANOVA techniques.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Introduction parameter and statistic, population and sample, complete enumeration and sample surveys 1.2 Principal steps in sample survey, sampling and non sampling errors. 1.3 Advantages of sampling over complete census, limitations of sampling 1.4 Types of sampling-subjective, probability and mixed sampling	10 Hrs	10 Marks
Unit II	2.1 SRS – definition, SRS with and without replacement basic theorems on SRS 2.2 Selection of simple random sample- lottery method, random number method, mean and variance in SRSWOR 2.3 Comparisons of SRWOR and SRSWR, merits and demerits of SRS	10 Hrs	10 Marks
Unit III	3.1 Introduction, need and advantages of stratified random sampling, drawing a stratified	10 Hrs	10 Marks

	sample, stratification factor 3.2 Sample mean and variance of sample mean in stratified sampling 3.2 Allocation of sample size proportional and optimum allocation, comparisons of SRS with proportional, Neyman with proportional and Neyman with SRS.		
Unit IV	4.1 Systematic Sampling: Introduction, Mean and Variance, 4.2 Comparison of variance with linear trend 4.3 Cluster Sampling: Introduction, Mean and Variance	10 Hrs	10 Marks
Unit V	5.1 Introduction, definition of ANOVA, assumptions in ANOVA 5.2 Mathematical Models of ANOVA: Fix effect model, Random effect model 5.3 Merits and Demerits of ANOVA 5.4 Concept of One-Way Classification, its Assumptions 5.5 Complete analysis of one-way classification	10 Hrs	10 Marks
Unit VI	6.1 Concept of Two Way Classification, its Assumptions for ANOVA test 6.2 Complete analysis of two-way classification with one observation per cell 6.3 Least square estimates of various effects. 6.4 Concept of Two-way classification with Multiple observations per cell 6.5 Complete analysis of two-way data with m-observations per cell-fixed effect model	10 Hrs	10 Marks

References :

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester V**Subject / Course Name : Statistics Major IX (T) - Elective (A)****Syllabus: Vertical a, Major IX (T) Elective (A)**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-V	665215	Major IX (T) Elective (A) Research Methodology-I	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to,

1. Understand basic concepts of Research Methodology.
2. Learn to deal with Research Methodology data.
3. Learn to express the vast and diverse Research Methodology data into compact and more representative manner.
4. Get the knowledge of analytical tools of Research Analysis.

Course Outcomes:

After completing this course students will be able to,

1. Develop basic knowledge about Research Methodology and its scope in various fields.
2. Become familiar with handling of Research Methodology data.
3. Can express the vast and diverse Research Methodology data into compact and more specific manner.
4. Get the knowledge of analytical tools of Research Analysis.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Meaning of Research: Definition, objectives, and importance of research in statistics. 1.2 Types of Research: Basic vs. applied, descriptive vs. analytical, and conceptual vs. empirical. 1.3 Research Process: Step-by-step overview from identifying a problem to final reporting. 1.4 Ethics in Research: Basic concept of plagiarism, honesty, and ethical data collection.	8 Hrs	8 Marks
Unit II	2.1 Defining the Problem: How to select a research topic and formulate a statement. 2.2 Literature Review: Purpose of reading existing papers and finding research gaps. 2.3 Research Design: Meaning, need, and features of a good research plan.	7 Hrs	7 Marks

Unit III	3.1 Primary Data: Designing simple questionnaires, schedules, and interview methods. 3.2 Secondary Data: Sources of existing data, government reports, and checking data reliability. 3.3 Scaling Techniques: Basic understanding of Nominal, Ordinal, Interval, and Ratio scales. 3.4 Data Validation: Simple ways to check for missing values and data entry errors.	8 Hrs	8 Marks
Unit IV	4.1 Structure of a Report: Layout of a basic research paper (Abstract, Introduction, Methodology, Results, Conclusion). 4.2 Visualizing Results: Using simple charts, graphs, and tables to display statistical data. 4.3 Referencing Styles: Basic introduction to citation formats like APA or Harvard.	7 Hrs	7 Marks

References :

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरूषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Gupta M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester V

Subject / Course Name: Statistics Major IX (T) Elective (B)**Syllabus: Vertical a, Major IX (T) Elective (B)**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-V	665217	Major IX (T) Elective (B) - Bio-essay	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to,

1. Understand the concept of Bio-Essay.
2. Learn to deal with Bio-Essay data.
3. Learn to express the vast and diverse Bio-Essay data into compact and more representative manner.
4. Get the knowledge of analytical tools of Bio-Essay Analysis.

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about Bio-Essay and its scope in various fields.
2. Become familiar with handling of Bio-Essay data.
3. Can express the vast and diverse Bio-Essay data into compact and more specific manner.
4. Get the knowledge of analytical tools of Bio-Essay Analysis.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 What is Bioassay?: Simple definition of measuring drug strength using living tissue or organisms. 1.2 Why Use Bioassays?: Situations where chemical testing fails but biological testing works. 1.3 Standard vs. Test: Basic concept of comparing a new unknown sample against a known standard. 1.4 Basic Rules: General requirements like using similar subjects and uniform environments.	8 Hrs	8 Marks
Unit II	2.1 Yes/No Response: Basic concept of Quantal response (e.g., alive or dead, cured or not). 2.2 Measured Response: Basic concept of Graded response (e.g., reduction in blood pressure, increase in weight). 2.3 Dose and Response: Understanding how changing the drug dose changes the final effect.	7 Hrs	7 Marks
Unit III	3.1 Direct Estimation: Measuring the exact	8 Hrs	8 Marks

	threshold dose needed to trigger a specific reaction. 3.2 Relative Potency: Simple definition of how many times a test drug is stronger than the standard. 3.3 Simple Calculation: Using basic ratios and averages to find potency without complex formulas. 3.4 Practical Examples: Easy numerical problems based on calculating the strength of simple vitamins or insulin.		
Unit IV	Straight Line Idea: Learning how dose-response data looks when plotted as parallel straight lines. The 2x2 Design: Simplest experiment design using exactly two doses of standard and two doses of test drug. Simple Conditions: Knowing why lines must look parallel and straight for a valid test. 4.4 Visual Reading: How to read a simple bioassay graph to check which drug is more effective.	7 Hrs	7 Marks

References:

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester V**Subject / Course Name: Statistics Major IX (P) Elective (A)****Syllabus: Vertical a, Statistics 8 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-V	665216	Statistics 8 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to

1. Become familiar with handling of Research methodology data.
2. Can express the vast and diverse Research methodology data into compact and more specific manner.
3. Can calculate various Plagiarism Percentage, Survey Response Rate Percentage.
4. Can analyze Data Deficiency.

*** List of Practical/Laboratory Experiments/Activities**

1	Calculation of Plagiarism Percentage in a Research Manuscript.
2	Determination of Applied-to-Basic Research Ratio for Academic Projects.
3	Estimation of Research Gap Percentage using Data Deficiency Analysis.
4	Budget Allocation Analysis and Component Percentage Calculation for a Research Survey.
5	Computation of Mean Satisfaction Score from a Likert-Scale Questionnaire.
6	Calculation of Data Entry Error Rate during Validation of a Dataset.
7	Proportional Allocation of Sample Size across Strata using Stratified Sampling.
8	Estimation of Absolute Sampling Error between Population Mean and Sample Mean.
9	Calculation of Central Sector Angles for Pie Chart Presentation of Survey Data.
10	Computation of Survey Response Rate Percentage for a Field Study.

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B.A. Third Year – Semester V

Subject / Course Name: Statistics Major IX (P) Elective (B)**Syllabus Vertical a, Statistics 9 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-V	665218	Statistics 9 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes :

After completing this course students will be able to

1. Become familiar with handling of Bio-Essay data.
2. Can express the vast and diverse Bio-Essay data into compact and more specific manner.
3. Can calculate various Percentage Relative Error, Absolute Statistical Error.
4. Can analyze Mean Corrected Response.

*** List of Practical/Laboratory Experiments/Activities**

1	Calculation of Mean Mortality Rate Percentage from Quantal Response Batches.
2	Determination of Statistical Variance for a Graded Bioassay Response Dataset.
3	Estimation of Arithmetic Mean Threshold Dose from Direct Assay Biological Replicates.
4	Computation of Relative Potency Index Using the Geometric Ratio of Effective Doses.
5	Baseline Correction Analysis and Calculation of Mean Corrected Response in Biological Tissues.
6	Estimation of Pooled Average Slope for a 2x2 Parallel-Line Experiment Design.
7	Determination of Unknown Log-Dose Concentration Using a Simple Linear Regression Equation.
8	Estimation of Absolute Statistical Error between Observed Potency and True Potency Values.
9	Calculation of Range and Median for Threshold Doses in a Direct Estimation Assay.
10	Computation of Percentage Relative Error in Standard vs. Test Concentration Measurements.

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B.A. Third Year – Semester V**Subject / Course Name : Statistics Minor (T)**

Syllabus: Vertical b – Minor-V Theory

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	V	665255	Minor-V(T) Large Sample tests	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to,

1. Understand basic concepts of Large Sample tests.
2. Learn to deal with Large Sample data.
3. Learn to express the vast and diverse Large Sample data into compact and more representative manner.
4. Get the knowledge of various Large Sample techniques.

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about Large Sample tests and its scope in various fields.
2. Become familiar with handling of Large Sample data.
3. Can express the vast and diverse Large Sample data into compact and more specific manner.
4. Get the knowledge of various Large Sample techniques.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Concept of Infinity: Meaning of large samples in real-world data. 1.2 Types of Convergence: Simple explanation of convergence in probability and distribution. 1.3 Law of Large Numbers: Weak Law of Large Numbers (WLLN) without complex proofs.	7 Hrs	7 Marks
Unit II	2.1 Parameter vs. Statistic: Understanding population parameters and sample statistics. 2.2 Standard Error Concept: Definition, purpose, and importance of standard error. 2.3 Mean Standard Error: Formula and derivation for a single sample mean.	7 Hrs	7 Marks
Unit III	3.1 Point Estimation: Using large samples to find a single best guess. 3.2 Unbiasedness & Consistency: Simple definitions of good estimator properties. 3.3 Interval Estimation: Basic concepts of confidence intervals and confidence levels. 3.4 Confidence Intervals: Practical calculation for population means and proportions.	8 Hrs	8 Marks
Unit IV	4.1 Test Formulation: Understanding null	8 Hrs	8 Marks

	hypotheses, alternative hypotheses, and p-values. 4.2 Single Mean Test: Z-test for testing one sample mean against population. 4.3 Two Means Test: Z-test for comparing two independent sample means. 4.4 Proportion Tests: Z-tests for single proportion and comparing two proportions		
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References:

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकी मुलभूत तंत्रे : प्रा. पुरूषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India.
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

Subject / Course Name: Statistics Minor (P)**Syllabus: Vertical b – Statistics 10 Laboratory Work**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	V	665256	Statistics 10 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to

1. Become familiar with handling of Large sample data.
2. Can express the vast and diverse Large sample data into compact and more specific manner.
3. Can estimate test statistics.
4. Can analyze variation in data using Large sample technique.

*** List of Practical/Laboratory Experiments.**

1	Computation of Standard Error.
2	Computation of Mean Standard Error.
3	Construction of Confidence Interval for population mean.
4	Construction of Confidence Interval for population proportion.
5	Single-Sample Large Sample Z-Tests for Population Mean
6	Two-Sample Large Sample Z-Tests for Comparing Means
7	Single-Sample Large Sample Z-Tests for Population Proportion
8	Two-Sample Large Sample Z-Tests for Comparing Proportions

List of equipments and instruments:

1. Twelve digit Desk Model calculators
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B. A. Third Year – Semester V**Subject / Course Name: Statistics VSC (Vocational Skill Course)**

Syllabus: Vertical d, VSC Lab/Practical 4

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	V	665274	VSC Lab / Practical 4	2	4 Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Understand the basic concepts of Sampling and ANOVA.
2. Use concept of Sampling and ANOVA in real life situations.
3. Compute Sampling and ANOVA of real-life events.

* List of Practical/Laboratory Experiments:

1	Drawing a random sample by random number method using MS-Excel
2	Estimation of population mean using simple random sampling using MS-Excel
3	Estimation of population variance using simple random sampling using MS-Excel
4	Estimation of population mean using stratified random sampling using MS-Excel
5	Estimation of population variance using stratified random sampling using MS-Excel
6	Problems on Proportional and Neyman allocation in stratified sampling using MS-Excel
7	Problems on one way classification using MS-Excel
8	Problems on two way classification (with one observation per cell) using MS-Excel

List of equipments and instruments-

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Statistical posters and charts.
4. Desktop Microsoft Office 2010 and above

B.A. Third Year – Semester V

Subject / Course Name: Statistics SEC (Skill Enhancement Course)

Syllabus: Vertical d, SEC Lab/Practical-3

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	V	665278	SEC Lab/Practical-3	2	4 Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Understanding with some fundamental concepts of MS excel
2. Get familiar with the Statistical functions of MS Excel
3. Understand the basic calculations of Statistical measures through MS excel

* List of Practical/Laboratory Experiments:

1	Construction of control charts for variables – X bar and R charts using MS excel
2	Construction of control charts for attributes of p-chart MS excel
3	Construction of control charts for attributes of np-chart MS excel
4	Construction of control charts for attributes of d-chart MS excel
5	Construction of control charts for attributes of c-chart MS excel
6	Problems on Price Elasticity of demand MS excel
7	Problems on Income Elasticity of demand MS excel
8	Problems on Cross Elasticity of demand MS excel

List of equipments and instruments-

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Statistical posters and charts.
4. Desktop Microsoft Office 2010 and above

B.A. Third Year – Semester VI

Subject / Course Name: Statistics Major (T)

Syllabus: Vertical a, Major- X (Theory)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-VI	665219	Major- X (Theory)- Operation Research	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to,

1. Understand the concepts of Operation Research.
2. Learn to handle Operation Research data.
3. Can express Operation Research data into representative manner.
4. Get the knowledge of analytical tools of Operation Research.

Course Outcomes:

After completing this course students will be able to

1. Students develop with basic knowledge about Operation Research and its scope in various fields.
2. Become familiar with handling of Operation Research data.
3. Can express the vast and diverse Operation Research data into compact and more specific manner.
4. Get the knowledge of analytical tools of Operation Research.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Introduction to OR, definition of OR origin and development of OR, OR in India. 1.2 Advantages, applications, limitations and uses of operations research. 1.3 Linear programming problem –Introduction. Definitions of LPP, GLPP, objective function, non negative restrictions, constraints, solution, feasible solution, optimum solution. 1.4 Canonical and standard form of LPP solution to LPP by graphical method.	8 Hrs	8 Marks
Unit II	2.1 Introduction and LP formation, transportation table, loops in TP 2.2 Solution of transportation problem, initial basic feasible solution 2.3 Northwest corner method, row minima	8 Hrs	8 Marks

	method, column minima method, matrix minima method, Vogel approximation method 2.4 Degeneracy in transportation problem, unbalanced transportation problem.		
Unit III	3.1 Assignment Problem : Definition and example of a A.P. 3.2 Mathematical formulation of a A.P. 3.3 Hungarian assignment Algorithm 3.4 Numerical Example	7 Hrs	7 Marks
Unit IV	4.1 Introduction to theory of games, two person sum games 4.2 The maximin-minimax principle, Definition of a saddle point, games with saddle points 4.3 Pure strategies and mixed strategy, games with mixed strategies 4.4 Numerical Example	7 Hrs	7 Marks

References:

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Gupta M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester VI

Subject / Course Name: Statistics Major-X (P)

Syllabus: Vertical a - Statistics 11 Laboratory Work

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	VI	665220	Statistics 11 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to

1. Become familiar with handling of OR data.
2. Can express the vast and diverse OR data into compact and more specific manner.
3. Can calculate TP, AP, LPP.
4. Can analyze OR patterns.

List of Practical/Laboratory Experiments:

1	Solution of LPP by Graphical Method
2	IBFS to transportation problem by NWCM
3	IBFS to transportation problem by row minima method
4	IBFS to transportation problem by column minima method
5	IBFS to transportation problem by matrix minima method,
6	IBFS to transportation problem by Vogel approximation method
7	Problems on Assignment problem
8	Problems on two-person zero sum games based on maximin-minimax principle
9	Problems on two-person zero sum games with saddle points
10	Problems on two-person zero sum games without saddle points

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B.A. Third Year – Semester VI

Subject / Course Name: Statistics Major (T)

Syllabus: Vertical a, Major- XI (Theory)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	VI	665221	Major- XI (Theory)- Design of Experiments	4	60	3 Hrs	60

Course Outcomes:

After completing this course students will be able to,

1. Understand the concepts of Design of Experiments.
2. Learn to handle Design of Experiments data.
3. Can express the Design of Experiments data into more representative manner.
4. Get the knowledge of various Design of Experiments techniques.

Course Outcomes:

After completing this course students will be able to

1. Students develop with basic knowledge about Design of Experiments and its scope in various fields.
2. Become familiar with handling of Design of Experiments data.
3. Can express the vast and diverse Design of Experiments data into compact and more specific manner.
4. Get the knowledge of various Design of Experiments techniques.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Introduction and terminology, treatments, experimental units, blocks, yield 1.2 Experimental error, Replication, precision, efficiency of design 1.3 Principles of DOE, Replication, 1.4 Randomization and Local control, 1.5 Size and shape of plots and blocks	10 Hrs	10 Marks
Unit II	2.1 Completely randomized design-layout, 2.2 Advantages and disadvantages of CRD 2.3 Application of CRD 2.4 Null hypothesis, mathematical model 2.5 Statistical analysis, ANOVA table of CRD	10 Hrs	10 Marks
Unit III	3.1 Randomized Block Design -layout, 3.2 Advantages and disadvantages of RBD, 3.3 Application of RBD, 3.4 Null hypothesis, mathematical model 3.5 Statistical analysis and ANOVA table of RDB	10 Hrs	10 Marks
Unit IV	4.1 Latin square design – layout, 4.2 Advantages and disadvantages of LSD, 4.3 Applications of LSD, 4.4 Null hypothesis, mathematical model 4.5 Statistical analysis and ANOVA table in LSD	10 Hrs	10 Marks

Unit V	5.1 Factorial Experiment: Concept of Factorial Experiment, 5.2 Advantages and disadvantages of factorial experiment, 5.3 Concept of 2^2 Factorial experiment, 5.4 Null hypothesis and ANOVA table. 5.5 Yates method for computing factorial effects of 2^2 Factorial experiment.	10 Hrs	10 Marks
Unit VI	6.1 Concept of 2^3 Factorial experiment, 6.2 Null hypothesis of 2^3 Factorial experiment, 6.3 ANOVA table of 2^3 Factorial experiment, 6.4 Yates method for computing factorial effects of 2^3 Factorial experiment.	10 Hrs	10 Marks

References :

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरूषोत्तम नवघरे

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester VI

Subject / Course Name: Statistics Major-XII (T) Elective (A)

Syllabus: Vertical a, Major-XII (T) Elective (A)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-VI	665222	Major-XII (T) Elective (A) - Research Methodology-II	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to,

1. Understand the concepts of Research Methodology.
2. Learn to handle Research Methodology data.
3. Learn how to analyze Research Methodology data.
4. Get the knowledge of analytical tools of Research Methodology.

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about Research Methodology and its scope in various fields.
2. Become familiar with handling of Research Methodology data.
3. Can express the vast and diverse Research Methodology data into compact and more specific manner.
4. Get the knowledge of analytical tools of Research Methodology Analysis.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Research Plan: Making a simple blueprint or step-by-step checklist before starting. 1.2 Group Division: How to split samples into a test group and a normal group. 1.3 Simple Experiments: Testing if a new method works better than an old one. 1.4 Real Examples: Simple test cases like comparing two study methods for students.	8 Hrs	8 Marks
Unit II	2.1 Cleaning Data: How to find and fix missing or wrong entries in your data sheet. 2.2 Data Coding: Changing text answers (like Yes/No) into numbers (like 1/0) easily. 2.3 Finding Averages: Using basic tools like mean and percentage to summarize findings.	7 Hrs	7 Marks
Unit III	3.1 Right Test Selection: A simple guide to pick the right test for your data. 3.2 Right vs. Wrong Decisions: Understanding simple mistakes in testing (Type 1 and 2 errors) 3.3 Final Conclusion: Writing a clear final	8 Hrs	8 Marks

	answer to your research question.		
Unit IV	4.1 Simple Report Layout: Step-by-step headings for a college project report. 4.2 Copying Rules: Why you must write in your own words and not copy-paste. 4.3 Book List (References): Writing down a simple list of books or websites you used	7 Hrs	7 Marks

References :

Course Material/Learning Resources

Text books:

- 4) मुलभूत सांख्यिकी : प्रा. राम देशमुख-विद्याप्रकाशन
- 5) संख्यात्मक तंत्रे : प्रा. राम देशमुख-विद्याप्रकाशन
- 6) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे-विद्याप्रकाशन

Reference Books:

- 7) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 8) Goon A.M., Gupta M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 9) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester VI

Subject / Course Name : Statistics Major-XII (T) Elective (B)

Syllabus: Vertical a, Major-XII (T) Elective (B)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-VI	665224	Major-XII (T) Elective (B) – Clinical Trials	2	30	2 Hrs	30

Course Objectives:

After completing this course students will be able to,

1. Understand the basic concepts of Clinical Trials.
2. Learn to handle Clinical Trials data.
3. Learn to analyze Clinical Trials data.
4. Get the knowledge of analytical tools of Clinical Trials Analysis.

Course Outcomes :

After completing this course students will be able to

1. Students develop with basic knowledge about Clinical Trials and its scope in various fields.
2. Become familiar with handling of Clinical Trials data.
3. Can express the vast and diverse Clinical Trials data into compact and more specific manner.
4. Get the knowledge of analytical tools of Clinical Trials Analysis.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Role of a Statistician: Why statisticians are needed to remove human bias from medical experiments. 1.2 The Trial Protocol: Simple blueprint of a trial, focusing strictly on the statistical section. 1.3 Inclusion & Exclusion Criteria: Setting easy numerical boundaries (like age 18–60) to select patients.	8 Hrs	8 Marks
Unit II	2.1 Simple Randomization: Using a coin toss or basic computer code to assign patients to groups. 2.2 Block Randomization: Simple method to keep group sizes equal (e.g., 10 patients in Group A, 10 in Group B). 2.3 Stratified Randomization: Balancing groups easily based on one factor like gender (Male/Female).	7 Hrs	7 Marks

Unit III	3.1 Phase-wise Sample Sizes: Knowing how sample sizes grow from Phase 1 (20 people) to Phase 3 (thousands). 3.2 Primary Endpoints: Choosing the main measurement variable (e.g., blood pressure numbers). 3.3 Secondary Endpoints: Choosing extra variables to track (e.g., number of headache complaints).	8 Hrs	8 Marks
Unit IV	4.1 Baseline Table: Using simple means, standard deviations, and percentages to describe patient groups. 4.2 Simple Hypothesis Testing: Applying basic t-tests (for means) and Chi-Square tests (for cure rates). 4.3 Visual Charts: Making easy bar charts and pie charts to show drug success rates clearly.	7 Hrs	7 Marks

References:

Course Material/Learning Resources

Text books:

- 1) मुलभूत सांख्यिकी : प्रा. राम देशमुख-विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे : प्रा. राम देशमुख-विद्याप्रकाशन
- 3) सांख्यिकीमुलभूततंत्रे : प्रा. पुरुषोत्तम नवघरे-विद्याप्रकाशन

Reference Books:

- 1) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester VI

Subject / Course Name: Statistics Major-XII (P) Elective (A)

Syllabus: Vertical a, Statistics 12 Laboratory Work

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-VI	665223	Statistics 12 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will,

1. Become familiar with handling of Research Methodology data.
2. Can express the vast and diverse Research Methodology data into compact and more specific manner.
3. Can calculate various measures and Type 1 and 2 Errors.
4. Can study Group Division Methods.

*** List of Practical/Laboratory Experiments/Activities**

1	Making a Simple Research Plan Checklist to Compare Two Student Study Methods
2	Group Division Methods to Split a Sample into Test and Normal Groups
3	Simple Experiments to Test if a New Study Method Works Better Than an Old One
4	Cleaning Data Sheets by Finding and Fixing Missing or Wrong Entries
5	Data Coding to Change Yes/No Text Answers into 1/0 Numbers Easily
6	Finding Averages and Percentages to Summarize Student Survey Findings
7	A Simple Guide to Pick the Right Test for Mean and Percentage Data
8	Understanding Right vs. Wrong Decisions and Type 1 and 2 Errors using Data
9	Making a Simple Research Plan Checklist to Compare Two Student Study Methods
10	Group Division Methods to Split a Sample into Test and Normal Groups

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B.A. Third Year – Semester VI

Subject / Course Name : Statistics Major-XII (P) Elective (B)

Syllabus: Vertical a, Statistics 13 Laboratory Work

Level	Semester	Course	Course Name	Credits	Teaching	Exam	Max.
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		Code			Hours	Duration	Marks
5.0	Sem-VI	665225	Statistics 13 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Become familiar with handling of Clinical Trials data.
2. Can express the vast and diverse Clinical Trials data into compact and more specific manner.
3. Can calculate central tendency, dispersion for Clinical Trials data.
4. Can study test of hypothesis for Clinical Trials data.

*** List of Practical/Laboratory Experiments/Activities**

1	Implementing and Testing Simple Randomization Using Coin Toss Method for Two Patient Groups
2	Creating a Block Randomization Scheme to Keep Group Sizes Equal in a Simulated 20-Patient Trial
3	Stratified Randomization Technique: Balancing Patient Groups Based on Gender
4	Using Mean (Average) to Analyze the Primary Endpoint of Blood Pressure Reductions After Treatment
5	Tracking Primary vs. Secondary Endpoints: Comparing Fever Recovery Time against Headache Complaints
6	Designing a Baseline Characteristics Table Using Mean, Standard Deviation, and Percentages for Trial Patients
7	Using a Simple t-test to Compare the Mean Effectiveness of a New Medicine vs. an Old Medicine
8	Using a Chi-Square Test to Compare the Cure Rates of Two Treatments
9	Visualizing Drug Success Rates Using Bar Charts and Pie Charts Based on Patient Recovery Data
10	Screening Patient Data Sheet Using Inclusion and Exclusion Criteria: A Percentage Analysis of Eligible Patients

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B.A. Third Year – Semester VI

Subject / Course Name: Statistics Minor (T)

Syllabus: Vertical b - Minor-VI (Theory)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	Sem-VI	665257	Minor-VI	2	30	2 Hrs	30

			(Theory)- Non- Parametric Tests				
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Course Objectives:

After completing this course students will be able to,

1. Understand the basic concepts of NP tests.
2. Learn to handle NP tests data.
3. Learn to analyze NP tests data.
4. Get the knowledge of analytical tools of NP tests.

Course Outcomes:

After completing this course students will be able to,

1. Students develop with basic knowledge about NP tests and its scope in various fields.
2. Become familiar with handling of NP tests data.
3. Can express the vast and diverse NP tests data into compact and more specific manner.
4. Get the knowledge of analytical tools of NP tests.

Serial No.	Contents	Workload Allotted	Weight age of Marks Allotted
Unit I	1.1 Simple definition , meanings and importance of NP tests, 1.2 When data does not follow a normal bell curve 1.3 Data Types: Understanding simple categories, counts, and ranked lists 1.4 How to Rank Data: Step-by-step ranking from smallest to largest numbers	7 Hrs	7 Marks
Unit II	2.1 Simple Sign Test: Counting plus (+) and minus(-) signs to find the middle value 2.2 Wilcoxon Signed-Rank: Measuring if a group score is above or below a target 2.3 Run Test: Checking if data patterns are random or mixed up	8 Hrs	8 Marks
Unit III	3.1 Two Group Basics: Why we compare two different groups (e.g., Boys vs Girls) 3.2 Median Test: Finding if two groups have the same middle score 3.3 Mann-Whitney U Test: Simple ranking method to compare two separate groups	8 Hrs	8 Marks
Unit IV	4.1 Kruskal-Wallis Test: Comparing three or more different groups easily 4.2 Spearman's Rank Link: Checking how two ranked lists match each other 4.3 Some real-world examples	7 Hrs	7 Marks

References: Course Material/Learning Resources

Text books:

- 10) मुलभूत सांख्यिकी : प्रा. राम देशमुख-विद्याप्रकाशन
- 11) संख्यात्मक तंत्रे: प्रा. राम देशमुख-विद्याप्रकाशन
- 12) सांख्यिकीमुलभूततंत्रे : प्रा. पुरूषोत्तम नवघरे-विद्याप्रकाशन

Reference Books:

- 13) Bhat B.R. Shrivankataraman T and RaoMadhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 14) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 15) Croxton F.E. , Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C. ,Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

B.A. Third Year – Semester VI

Subject / Course Name: Statistics Minor (P)

Syllabus: Vertical b, Statistics 14 Laboratory Work

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	VI	665258	Statistics 14 Laboratory Work	2	4Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to

1. Become familiar with handling of NP tests data.
2. Can express the vast and diverse NP tests data into compact and more specific manner.
3. Can calculate test statistics, ranks.
4. Can analyze non parametric data.

*** List of Practical/Laboratory Experiments**

1	Basic data ranking and applying the simple sign test for median
2	Before-and-after analysis using Wilcoxon signed-rank tests
3	Checking data randomness using the one-sample run test
4	Comparing two independent groups using the Median test
5	Comparing two independent groups using the Mann-Whitney u test
6	Multi-group comparison using Kruskal-Wallis test
7	Multi-group comparison using Spearman's rank correlation

List of equipments and instruments:

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Logarithmic tables.
4. Statistical posters and charts.

B.A. Third Year – Semester VI

Subject / Course Name: Statistics VSC (Vocational Skill Course)

Syllabus: Vertical d, VSC Lab/Practical 5

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max. Marks
5.0	VI	665275	VSC Lab / Practical 5	2	4 Hrs/week	3 Hrs	50

Course Outcomes:

After completing this course students will be able to,

1. Understand the basic analysis of LPP, DOE etc. using MS-Excel.
2. Use MS-Excel for Measurement of trend in real life situations.
3. Estimate trend values of real-life events using MS-Excel.

*** List of Practical/Laboratory Experiments etc.**

1	Solution of LPP by Graphical Method using MS-Excel
2	Solution of TP by Row minima method using MS-Excel
3	Solution of TP by Column minima method using MS-Excel
4	Solution of TP by Matrix minima method using MS-Excel
5	Solution of AP using MS-Excel
6	Analysis of CRD using MS-Excel
7	Analysis of RBD using MS-Excel
8	Analysis of LSD using MS-Excel

List of equipments and instruments-

1. Twelve digit Desk Model calculators.
2. Biometric Tables volume I and II.
3. Statistical posters and charts.
4. Desktop Microsoft Office 2010 and above

2) Mahadnyandeeep courses list of subject Statistics

List of Mahadnyandeeep Courses in Subject Statistics for Undergraduate

LIST

Sr. No	Level	Course Title	NSQF
1	D	Data Analytics with AI	6
2	D	Data Science with Generative AI	6
3	D	Statistical Thinking & Data Interpretation	6
4	D	Research Methodology	5
5	H	Occupational Safety & Workplace Ethics	4
6	I	Game Theory and Strategic Decision Making	5
7	I	Natural Resource Management & Conservation	5
8	I	Biostatistics & Epidemiology	5
9	I	Biostatistics & Data Visualization in Biotechnology	5
10	J	Data Interpretation & Analytical Skills	5
11	J	Logical Reasoning & Quantitative Aptitude	4
12	J	Current Affairs & Government Schemes Analysis	5
13	J	Essay Writing & Answer Writing Skills(Mains Preparation)	5
14	J	Interview Skills & Personality Development for Civil Services	4

3) Mooc's / Swayam courses list of subject Statistics.

List OF SWYAM COURSES in Statistics for Undergraduate Courses

Sr. No	Course Title	Week
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1	Introduction to Probability and Statistics... Read more at: https://www.careers360.com/university/indian-institute-of-technology-madras/introduction-probability-and-statistics-certification-course	4
2	Non-Parametric Statistical Inference...Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	4
3	Statistical Inference... Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	8
4	Descriptive Statistics with R Software...Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	8
5	Handling Large Scale Unit Level Data Using STATA...Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	8
6	Biostatistics and Design of Experiments... Read more at: https://www.careers360.com/university/indian-institute-of-technology-madras/biostatistics-and-design-of-experiments-certification-course	8
7	Engineering Statistics... Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	12
8	Probability and Statistics...Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	12
9	Introduction to Stochastic Processes...Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	12
10	Probability and Probability Distributions... Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	12
11	Applied Time-Series Analysis... Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	12
12	Business Statistics... Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	12
13	Research Methodology and Statistical Analysis...Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	16
14	Foundations of Mathematical Statistics...Read more at: https://www.careers360.com/courses-certifications/swayam-statistics-courses-brp-org	13