

**SYLLABUS**  
**DERGAON KAMAL DOWERAH COLLEGE (AUTONOMOUS)**  
**FOUR YEARS UNDER GRADUATE PROGRAMME (FYUGP)**  
**[AS PER NEP 2020]**



**STATISTICS**

**(Recommended by Board of Studies in Statistics, D. K. D. C. (Autonomous), in its meetings held on 09.05.2026 and approved by the academic Council meeting held on 30.06.2026 and effective from the session 2026-2027)**

## **PREAMBLE:**

As recommended by Board of Studies and approved by the Academic Council of Dergaon Kamal Dowerah College (Autonomous), the Department of Mathematics works to implement the relevant components of New Education Policy (NEP), 2020 for Four Years Under Graduate Programmes (FYUGP) under Choice Based Credit System (CBCS). The following facts are taken into consideration when designing the basic structure of the FYUGP programme:

- a) Flexibility to switch between disciplines of study,
- b) Opportunity for learners to select the courses of their interest across all disciplines,
- c) Flexible entry and exit options with UG certificates, UG diplomas, or Bachelor degrees depending on the number of credits earned,
- d) Flexibility for students to switch between institutions so they can engage in multi- and/or interdisciplinary learning,
- e) Flexibility to switch to alternative modes of learning,
- f) Knowledge required for self-employment initiatives and entrepreneurship mindset, g) Ability for complex critical thinking and real-life problem solving,
- h) Capability to understand global issues, multicultural competence and digital literacy,
- i) Capable on research skills, communication skills, community-based engagement, environment awareness, responsibility and accountability.

## **INTRODUCTION:**

The Four Years Under Graduate Programme (FYUGP) syllabus of Mathematics in light of NEP-2020, consists of Major (MJ) disciplines, Minor (MN) disciplines, Multi-Disciplinary Generic Elective Courses (GEC), Ability Enhancement Courses (AEC), Value Added Courses (VAC), Skill Enhancement Courses (SEC), Research Methodology (RM), Dissertation (D) (Collection of Data, Analysis and Preparation of Report) and Major Electives (MJE).

The FYUGP degree programme offers certificates, diplomas and degrees as follows:

**UG Certificate:** Certificate course consists of two Major disciplines, two Minor disciplines, two GEC, two AEC, two VAC and two SEC.

**UG Diploma:** Diploma course consists of eight Major disciplines, four Minor disciplines, three GEC, two AEC, three VAC, three SEC.

**3-year UG Degree:** 3-year UG degree course consists of fifteen Major disciplines, six Minor disciplines, three GEC, two AEC, three VAC, three SEC, Community engagement (NCC/NSS/Adult Education/Student mentoring/ NGO/ Govt. Institutions, etc.) and Internship.

**4-year Honours Degree:** 4-year honours degree course consists of twenty Major disciplines, eight Minor disciplines, three GEC, two AEC, three VAC, three SEC, Community engagement (CE) (NCC/NSS/Adult Education/Student mentoring/ NGO/ Govt. Institutions, etc.), Internship(I), Research Methodology (RM), Dissertation/ two MJE.

#### **AIM:**

The UG Programme in statistics is designed to teach students how to think analytically, critically and logically, which enables them to employ mathematical reasoning in real-world situations. A UG degree in statistics will expose students to a variety of intriguing and practical concepts that will help them in their preparation for data-scientist/statistician/strategic banker/ researcher/biostatistician and other statistics-oriented job profiles in industry, government, public-sector undertaking companies, business, commerce, finance and research.

The program covers a broad range of topics on mathematical and applied statistics. This also covers hands-on sessions in Computer Lab using various software such as C/C++, R, SPSS etc. The comprehensive training on coding and use of software will enable the students to grasp the subject matter better and will make them complete in terms of research and industry perspectives.

The programme aims to increase students' skill in statistics (both mathematical and applied), mathematical analysis and algebra and coding as well as other cross-disciplinary subjects like mathematics, commerce, physics, computer sciences, economics etc. By choosing papers from the MDGEC, AEC, SEC, VAC, YOGA, EE, DTS, DSE, Community based engagement etc., they are able to apply the skills they have learned to situations that happen in the real world. Also aims students' flexibility to move from one discipline to another, to move one institution to another, to switch alternative modes of learning.

## **PROGRAM OUTCOMES (POs)**

**PO1:** Graduates will demonstrate a strong understanding of fundamental statistical concepts, theories, and methodologies.

**PO2:** Graduates will be proficient in collecting, cleaning, analysing, and interpreting data using statistical software and techniques.

**PO3:** Graduates will possess a solid foundation in mathematical concepts and techniques relevant to statistics, including calculus, linear algebra, and probability theory.

**PO4:** Graduates will be competent in using statistical software packages such as R, Python, or SPSS to conduct data analysis and visualization.

**PO5:** Graduates will be able to design experiments, surveys, and observational studies to address research questions and hypotheses effectively.

**PO6:** Graduates will understand and apply inferential statistical methods such as hypothesis testing, confidence intervals, regression analysis, and analysis of variance.

**PO7:** Graduates will have knowledge of advanced statistical techniques for analysing complex datasets with multiple variables, including multivariate analysis, factor analysis, and cluster analysis.

**PO8:** Graduates will be proficient in analysing time-series data and forecasting future trends using appropriate statistical models and techniques.

**PO9:** Graduates will be able to communicate statistical findings effectively to diverse audiences through written reports, oral presentations, and data visualization.

**PO10:** Graduates will demonstrate critical thinking skills and the ability to apply statistical reasoning to solve real-world problems in various domains.

**PO11** Graduates will understand the ethical principles and guidelines governing the conduct of statistical research and practice, including issues related to confidentiality, data integrity, and bias.

**PO12:** Graduates will engage in lifelong learning and professional development activities to stay updated with advancements in the field of statistics and pursue career opportunities in academia, industry, government, or research.

**STRUCTURE OF FOUR YEARS UNDER GRADUATE PROGRAMME (FYUGP) AS  
PER NEP-2020 IN STATISTICS FOR  
DERGAON KAMAL DOWERAH COLLEGE (AUTONOMOUS)**

| <b>Semester</b>       | <b>Course with Paper code</b> | <b>Title of the Paper</b>                                                                  | <b>Credit</b> |
|-----------------------|-------------------------------|--------------------------------------------------------------------------------------------|---------------|
| <b>1<br/>(FIRST)</b>  | <b>STAT1MJ01</b>              | Descriptive Statistics                                                                     | 4             |
|                       | <b>STAT1 MN01</b>             | Basic Statistical Methods                                                                  | 4             |
|                       | <b>GEC1STAT01</b>             | Statistical Methods                                                                        | 3             |
|                       | <b>AEC 1A/AEC1B</b>           | <b>Any One:</b><br><b>AEC1A:</b> Assamese/<br><b>AEC1B:</b> Alternative English            | 4             |
|                       | <b>SEC1STAT01</b>             | Collection of Data and its Presentation                                                    | 3             |
|                       | <b>VAC 1</b>                  | <b>Any One:</b><br><b>VAC1A: Understanding India/</b><br><b>VAC1B: Health and Wellness</b> | 2             |
|                       | <b>Total Credit</b>           |                                                                                            | <b>20</b>     |
| <b>2<br/>(SECOND)</b> | <b>STAT2MJ02</b>              | Probability Theory and Statistical Distributions                                           | 4             |
|                       | <b>STAT2MN02</b>              | Basic Probability Theory and Distributions                                                 | 4             |
|                       | <b>GEC2STAT02</b>             | Basics of Statistical Distributions and Inference                                          | 3             |
|                       | <b>AEC 2</b>                  | AEC: Language and Communication Skills<br>(English) II                                     | 4             |
|                       | <b>SEC2STAT02</b>             | Data Science using MS EXCEL                                                                | 3             |
|                       | <b>VAC 2</b>                  | Environmental Education                                                                    | 2             |
|                       | <b>Total Credit</b>           |                                                                                            | <b>20</b>     |

### DETAILED SYLLABUS OF 1<sup>ST</sup> SEMESTER

|                              |   |                                              |
|------------------------------|---|----------------------------------------------|
| <b>Title of the Course</b>   | : | <b>Descriptive Statistics</b>                |
| <b>Course Code</b>           | : | <b>STAT1MJ01</b>                             |
| <b>Nature of the Course</b>  | : | <b>Major</b>                                 |
| <b>Total Credits</b>         | : | <b>04</b>                                    |
| <b>Distribution of Marks</b> | : | <b>60(45T + 15P) (End Sem) + 40 (In-Sem)</b> |

#### COURSE OBJECTIVES:

- To be familiar with basic tools and techniques of descriptive Statistics and various aspects of univariate and bivariate data.
- To apply the knowledge in the context of an applied topic such as index number.

| UNIT            | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | L  | T  | P | Total Hours |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|-------------|
| 1<br>(10 Marks) | <b>Basic Statistics:</b> Definition, scope and limitations of Statistics, concepts of statistical population and sample. Ancient data handling system in India.<br><b>Types of Data and its Collection:</b> quantitative and qualitative, primary and secondary, time series data ,attributes, variables, scales of measurement: nominal, ordinal, interval and ratio. Medical data recording in Ayurveda Texts, Agricultural data Vrikshayurveda, population and economic surveys in Arthashastra etc.<br><b>Presentation of Data:</b> Tabular and graphical.<br><b>Categorical Data:</b> Attributes and different measures of their association. Idea of Geometry and symmetry from Sulba sutras in tabular and spatial arrangement of data. | 09 | 01 | - | 10          |
| 2<br>(13 Marks) | <b>Measures of Central Tendency:</b> Mathematical and positional.<br><b>Measures of Dispersion:</b> Range, quartile deviation, mean deviation, standard deviation, coefficient of variation, moments, absolute moments, factorial moments, skewness and kurtosis, Sheppard's corrections.                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10 | 02 | - | 12          |
| 3<br>(12 Marks) | <b>Bivariate Data:</b> Definition, scatter diagram, simple correlation, interpretation of r and rank correlation. Simple linear regression, principle of least squares and its geometry, fitting of polynomials and exponential curves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10 | 02 | - | 12          |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |    |    |    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|
|                 | <b>Multivariate Data:</b> Definition, partial and multiple correlations, interpretation of R, and coefficient of determination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |    |    |    |
| 4<br>(10 Marks) | <b>Index Numbers:</b> Definition, construction of index numbers and problems thereof for weighted and unweighted index numbers including Laspeyre's, Paasche's, Edgeworth-Marshall and Fisher's. Chain index numbers, conversion of fixed based to chain based index numbers and vice-versa. Consumer price index numbers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 08 | 02 | -  | 10 |
| 5<br>(15 Marks) | <b>List of Practical: (both calculator and computer based)</b><br>1. Graphical representation of data.<br>2. Problems based on measures of central tendency.<br>3. Problems based on measures of dispersion.<br>4. Problems based on combined mean and variance and coefficient of variation.<br>5. Problems based on moments, skewness and kurtosis.<br>6. Fitting of polynomials, exponential curves.<br>7. Karl Pearson correlation coefficient.<br>8. Correlation coefficient for a bivariate frequency distribution.<br>9. Fitting of Lines of regression and angle between them.<br>10. Spearman rank correlation with and without ties.<br>11. Partial and multiple correlations.<br>12. Calculation of price and quantity index numbers using simple and weighted average of price relatives.<br>13. Calculation of Chain Base index numbers.<br>14. Calculation of Consumer Price Index Number. | -  | -  | 08 | 16 |
| Total           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 37 | 07 | 08 | 60 |

Where, L :Lectures

T: TUTORIALS

P: PRACTICAL

#### MODES OF IN-SEMESTER ASSESSMENT:

(40 Marks)

- Sessional test(s)
- Objective test, Assignments (Class, Home), Paper Presentation, Laboratory Works, Concept note writing.

## **LEARNING OUTCOMES:**

After the completion of this course:

- Students are expected to develop a clear understanding of the fundamental concepts of descriptive Statistics.
- Students will also learn handling various types of data and their graphical representation.
- Students are expected to apply different measures of location and dispersion in real life problems.
- Students will also learn handling bivariate data and are expected to understand significance of various coefficients of correlation, fitting of linear/nonlinear curve and formulation index numbers.

## **SUGGESTED READINGS:**

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edition. The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edition), Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edition, (Reprint), Tata McGraw-Hill Pub. Co. Ltd, Delhi.
4. Medhi, J. (1992). Statistical Methods: An Introductory Text, New Age International. New Delhi. India.
5. Barman. M. P., Hazarika. J, Bora. T (2021): Statistical Methods, Mahaveer Pub, Dibrugarh.
6. McColl, J. H. (2004). Multivariate probability. John Wiley and Sons.
7. Elhance, D. N., Elhance, V., & Aggarwal, B. M. (1958). Fundamentals of Statistics, Allahabad. Kitab Mahal.
8. Kakaty, S. C.(2003). Mathematical Statistics: Theory and Applications, Kaustubh Prakashan, Dibrugarh.

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**Title of the Course** : **Basic Statistical Methods**  
**Course Code** : **STAT1 MN01**  
**Nature of the Course** : **Minor**  
**Total Credits** : **04**  
**Distribution of Marks** : **60 (45T + 15P) (End Sem) + 40 (In-Sem)**

**COURSE OBJECTIVES:**

- To be familiar with basic tools and techniques of descriptive Statistics.
- To apply the knowledge in the context of an applied topic such as index number.

| UNITS           | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | L  | T  | P | Total Hours |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|-------------|
| 1<br>(10 Marks) | <b>Statistical Methods:</b> Definition and scope of Statistics, concepts of statistical population & sample. Ancient data handling system in India.<br><b>Data:</b> Quantitative and qualitative, primary and secondary, attributes, variables, scales of measurement nominal, ordinal, interval and ratio. Medical data recording in Ayurveda Texts, Agricultural data gathering in Vrikshayurveda, population and economic surveys in Artha shastra etc.<br><b>Presentation:</b> Tabular and graphical, including histogram and ogives. Idea of Geometry and symmetry from Sulba sutras in tabular and spatial arrangement of data.<br><b>Categorical Data:</b> Attributes and different measures of their association. | 08 | 01 | - | 09          |
| 2<br>(13 Marks) | <b>Measures of Central Tendency:</b> Mathematical and positional measures with their geometry.<br><b>Measures of Dispersion:</b> Range, quartile deviation, mean deviation, standard deviation, coefficient of variation, moments, absolute moments, factorial moments, skewness and kurtosis, Sheppard's corrections with their geometry.                                                                                                                                                                                                                                                                                                                                                                                | 10 | 02 | - | 12          |
| 3<br>(12 Marks) | <b>Bivariate Data:</b> Definition, scatter diagram, simple correlation, interpretation of r and rank correlation.<br>Simple linear regression, principle of least squares and its geometry, fitting of polynomials and exponential curves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10 | 02 | - | 12          |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |    |    |    |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|
|                 | <b>Multivariate Data:</b> Definition, partial and multiple correlation, interpretation of R, and coefficient of determination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |    |    |    |
| 4<br>(10 Marks) | <b>Index Numbers:</b> Definition, Construction of index numbers and problems thereof for weighted and unweighted index numbers including Laspeyre's, Paasche's, Edgeworth-Marshall and Fisher's. Chain index numbers, conversion of fixed based to chain based index numbers and vice-versa. Consumer price index numbers, tests of adequacy of Index Numbers, inflation(Core and Headline)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 09 | 02 | -  | 11 |
| 5<br>(15 Marks) | <b>List of Practical: (both calculator and computer based)</b><br>1. Graphical representation of data.<br>2. Problems based on measures of central tendency.<br>3. Problems based on measures of dispersion.<br>4. Problems based on combined mean and variance and coefficient of variation.<br>5. Problems based on moments, skewness and kurtosis.<br>6. Fitting of polynomials, exponential curves.<br>7. Karl Pearson correlation coefficient.<br>8. Correlation coefficient for a bivariate frequency distribution.<br>9. Lines of regression, angle between lines and estimated values of variables.<br>10. Spearman rank correlation with and without ties.<br>11. Partial and multiple correlations.<br>12. Planes of regression and variances of residuals for given simple correlations.<br>13. Planes of regression and variances of residuals for raw data.<br>14. Calculate price and quantity index numbers using simple and weighted average of price relatives.<br>15. To calculate the chain base index numbers.<br>16. To calculate consumer price index number. | -  | -  | 08 | 16 |
|                 | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 37 | 07 | 08 | 60 |

Where, L: Lectures

T: TUTORIALS

P: PRACTICAL

**MODES OF IN-SEMESTER ASSESSMENT:****(40 Marks)**

- Sessional test(s)
- Objective test, Assignments (Class, Home), Paper Presentation, Laboratory Works, Concept note writing.

**LEARNING OUTCOMES:**

After the completion of this course:

- Students are expected to develop a clear understanding of the fundamental concepts of descriptive Statistics.
- Students will also learn handling various types of data and their graphical representation.
- Students are expected to apply different measures of location and dispersion in real life problems.
- Students will also learn handling bivariate data and are expected to understand significance of various coefficients of correlation, fitting of linear/nonlinear curve and formulation index numbers.

**SUGGESTED READINGS:**

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edition, The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, 7th Edition, Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edition, (Reprint), Tata McGraw-Hill Pub. Co. Ltd, Delhi.
4. Barman, M. P., Hazarika. J, Bora. T (2021): Statistical Methods, Mahaveer Pub, Dibrugarh.
5. McColl, J. H. (2004). Multivariate probability. John Wiley and Sons.
6. Elhance, D. N., Elhance, V., & Aggarwal, B. M. (1958). Fundamentals of Statistics, Allahabad, Kitab Mahal.
7. Kakaty, S. C. (2003). Mathematical Statistics: Theory and Applications, Kaustubh Prakashan, Dibrugarh.
8. Srirams, 2014. Mathematics in Ancient India: Probability and Games of Chance.

|                              |                                                |
|------------------------------|------------------------------------------------|
| <b>Title of the Course</b>   | <b>: Statistical Methods</b>                   |
| <b>Course Code</b>           | <b>: GEC1STAT01</b>                            |
| <b>Nature of the Course</b>  | <b>: Generic Elective</b>                      |
| <b>Total Credits</b>         | <b>03</b>                                      |
| <b>Distribution of Marks</b> | <b>: 60(45T + 15P) (End Sem) + 40 (In-Sem)</b> |

#### **COURSE OBJECTIVES:**

- To be familiar with basic tools and techniques of Statistics.
- To gain knowledge about the basics of probability theory and its applications.

| <b>UNIT</b>     | <b>CONTENTS</b>                                                                                                                                                                                                                                                                                                                                                           | <b>L</b> | <b>T</b> | <b>P</b> | <b>Total Hours</b> |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|--------------------|
| 1<br>(10 Marks) | <b>Introduction:</b> Definition and scope of Statistics, concepts of statistical population and sample.<br><b>Data:</b> Quantitative and qualitative, primary and secondary, attributes, variables, scales of measurement - nominal, ordinal, interval and ratio.<br><b>Presentation:</b> Tabular and graphic, including histogram and ogives.                            | 07       | 01       | -        | 08                 |
| 2<br>(13 Marks) | <b>Measures of Central Tendency:</b> Mathematical and positional measures with their geometry.<br><b>Measures of Dispersion:</b> range, quartile deviation, mean deviation, standard deviation, coefficient of variation, Moments, absolute moments, factorial moments, skewness and kurtosis, Sheppard's corrections with their geometry.                                | 08       | 02       | -        | 10                 |
| 3<br>(12 Marks) | <b>Bivariate Data:</b> Definition, scatter diagram, simple correlation, interpretation of r and rank correlation. Simple linear regression, principle of least squares and its geometry, fitting of polynomials and exponential curves.<br><b>Multivariate Data:</b> Definition, partial and multiple correlation, interpretation of R, and coefficient of determination. | 09       | 01       | -        | 10                 |
| 4<br>(10 Marks) | <b>Categorical Data:</b> Attributes and different measures of their association. Contingency table.                                                                                                                                                                                                                                                                       | 06       | 01       | -        | 07                 |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |    |    |    |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|
| 5<br>(15 Marks) | List of Practical: (both calculator and computer based)<br>1. Graphical representation of data.<br>2. Problems based on measures of central tendency.<br>3. Problems based on measures of dispersion.<br>4. Problems based on combined mean and variance and coefficient of variation.<br>5. Problems based on moments, skewness and kurtosis.<br>6. Karl Pearson correlation coefficient.<br>7. Spearman rank correlation with and without ties.<br>8. Correlation coefficient for a bivariate frequency distribution. | -  | -  | 05 | 10 |
|                 | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30 | 05 | 05 | 45 |

Where,

L: Lectures

T: Tutorials

P: Practical

#### **MODES OF IN-SEMESTER ASSESSMENT:**

**(40 Marks)**

- Sessional test(s)
- Objective test, Assignments (Class, Home), Paper Presentation, Laboratory Works, Concept note writing.

#### **LEARNING OUTCOMES:**

After the completion of this course:

- Students are expected to develop a clear understanding of the fundamental concepts of descriptive Statistics.
- Students will also learn handling various types of data and their graphical representation.
- Students are expected to apply different measures of location and dispersion in real life problems.
- Students should have developed knowledge of the role of probability and its distributions in statistical analyses.

#### **SUGGESTED READINGS:**

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edition. The World Press, Kolkata.

2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edition), Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edition, (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
4. Barman. M. P., Hazarika. J, Bora. T (2021): Statistical Methods, Mahaveer Pub, Dibrugarh.
5. McColl, J. H. (2004). Multivariate probability. John Wiley and Sons.
6. Hogg, R.V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, 17th edition, Pearson Education, New Delhi.
7. Ross, S. M. (2014). Introduction to probability models. Academic Press Inc.
8. Johnson, R. A., Miller, I., and Freund, J. E. (2000). Probability and statistics for engineers. 6th Edition, Pearson Education India.
9. Elhance, D. N., Elhance, V., & Aggarwal, B. M. (1958). Fundamentals of Statistics, Allahabad. Kitab Mahal.
10. Kakaty, S. C. (2003). Mathematical Statistics: Theory and Applications, Kaustubh Prakashan, Dibrugarh.

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**Title of the Course** : **Collection of Data and its Presentation**  
**Course Code** : **SEC1STAT01**  
**Nature of the Course** : **Skill Enhancement**  
**Total Credits** : **03**  
**Distribution of Marks** : **60 (End Sem) + 40 (In-Sem)**

#### **COURSE OBJECTIVES:**

- Understand the importance of data collection & presentation in decision-making processes.
- Identify appropriate data collection methods based on research objectives and constraints.
- Design and conduct surveys, interviews, and observations to collect primary data.
- Evaluate and utilize secondary data from reliable sources. Clean, organize, and validate collected data for analysis.
- Apply statistical techniques to analyse data and derive meaningful insights.
- Effectively visualize data using charts, graphs, and other graphical representations.
- Interpret and communicate data findings accurately and concisely.

| UNIT            | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | L | T | P | Total Hours |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-------------|
| 1<br>(12 Marks) | <b>Introduction to Data Collection</b> and Presentation, Scientific data and its importance, Importance of data in decision-making, The role of data collection and presentation in research, Qualitative and Quantitative data, primary and Secondary data. Idea of Big Data                                                                                                                                                                                                   | 6 | 1 | - | 7           |
| 2<br>(14 Marks) | <b>Data Collection Methods:</b> Primary data collection techniques, Surveys: questionnaires and schedule with respect to different objectives in the field of health sciences, social sciences, Behavioural Sciences, Business etc. Interviews: structured, semi structured, and unstructured interviews. Observations: participant and non-participant observations. Secondary data collection techniques, Publicly available datasets, Government and organizational reports. | 9 | 2 | - | 11          |
| 3<br>(12 Marks) | <b>Data Collection Design and Execution:</b> Planning and formulating research questions, Idea of Sampling techniques and sample size determination and interview protocols, Conducting observations and maintaining                                                                                                                                                                                                                                                            | 6 | 2 | - | 11          |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |    |   |    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|----|
|                 | objectivity, Ethical considerations in data collection, Editing and coding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |    |   |    |
| 4<br>(14 Marks) | <b>Statistical Analysis Techniques:</b><br>Descriptive statistics: measures of central tendency and dispersion, Exploratory data analysis: data visualization and graphical techniques Choosing appropriate visualization methods, Creating effective charts, graphs, and info graphics. Data Analysis and Interpretation                                                                                                                                                                                                                      | 6  | 2  | - | 11 |
| 5<br>(10 Marks) | <b>Co-requisites</b> (with simple numerical examples)<br>1. Preparation of questionnaires and schedule to solve a particular research question.<br>2. Conduct of a small sample survey in the institution among the students.<br>3. Collect of a secondary data set from a local government or private organization.<br>4. Determination of sample size of a survey.<br>5. Detection of outliers<br>6. Graphical representation of data.<br>7. Problems based on measures of central tendency.<br>8. Problems based on measures of dispersion. | 8  | -  | - | 8  |
|                 | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 38 | 07 | - | 45 |

Where, **L** :Lecutures

**T**: TUTORIALS

**P**: PRACTICAL

#### MODES OF IN-SEMESTER ASSESSMENT:

- Sessions test(s) **(40 Marks)**
- Objective test, Assignments (Class, Home),Paper Presentation, Laboratory Works, Concept not writing.

## **LEARNING OUTCOMES:**

After the completion of this course:

- This course is designed to provide students with the essential knowledge and skills required for effective collection, analysis and presentation of data.
- The course covers various methods and techniques for data collection, including surveys, interviews, observations, and secondary sources.
- Students will learn how to organize, analyze, and visualize data using appropriate tools and techniques to present meaningful insights.

## **SUGGESTED READINGS:**

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edition, The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edition), Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edition, (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
4. Barman. M. P., Hazarika. J, Bora. T (2021): Statistical Methods, Mahaveer Pub, Dibrugarh.
5. Brace, I (2013) Questionnaire Design: How to Plan, Structure and Write Survey Material for Effective Market Research. Kogan Page. UK.

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**B.Sc. IN STATISTICS PROGRAMME (NEP)**  
**DETAILED SYLLABUS OF 2<sup>ND</sup> SEMESTER**

**Title of the Course : Probability Theory and Statistical Distributions**

**Course Code : STAT2MJ02**

**Nature of the Course: Major**

**Total Credits 04**

**Distribution of Marks: 60 (45T + 15P) (End Sem) + 40 (In-Sem)**

**COURSE OBJECTIVES:**

- To be familiar with probability theory.
- To learn different methods of studying theoretical distributions.
- To study useful probability distributions and their properties.

| UNIT            | CONTENTS                                                                                                                                                                                                                                                                                                                                                                          | L  | T  | P | Total Hours |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|-------------|
| 1<br>(10 Marks) | <b>Probability:</b> Introduction, random experiments, sample space, events and algebra of events. Definitions of probability—classical, statistical, and axiomatic. Conditional probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem and its applications.                                                          | 08 | 01 | - | 09          |
| 2<br>(10 Marks) | <b>Random variables:</b> Discrete and continuous random variables, pmf, pdf and cdf, illustrations and properties of random variables, univariate transformations with illustrations. Two dimensional random variables: Discrete and continuous type, joint, marginal and conditional pmf, pdf, and cdf, independence of variables, bivariate transformations with illustrations. | 08 | 01 | - | 09          |
| 3<br>(13 Marks) | <b>Mathematical Expectation and Generating Functions:</b> Expectation of single and bivariate random variables and its properties. Moments and cumulants, moment generating function, cumulant generating function and characteristic function. Uniqueness and inversion                                                                                                          | 11 | 03 | - | 14          |

|                 |                                                                                                                                                                                                                                                                                                                                                                                               |    |    |    |    |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|
|                 | theorems (without proof) along with applications. Conditional expectations                                                                                                                                                                                                                                                                                                                    |    |    |    |    |
| 4<br>(12 Marks) | <b>Standard Probability Distributions:</b><br>Binomial, Poisson, geometric, uniform, normal, exponential, beta and gamma along with their properties and limiting/approximation cases.                                                                                                                                                                                                        | 10 | 02 |    | 12 |
| 5<br>(15 Marks) | <b>List of Practical: (both calculator and computer based)</b><br>1. Fitting of binomial distribution.<br>2. Fitting of Poisson distribution.<br>3. Fitting of geometric distribution.<br>4. Fitting of negative binomial distribution.<br>5. To find the ordinate for a given area for normal distribution.<br>6. Fitting of normal distribution.<br>7. Fitting of exponential distribution. | -  | -  | 08 | 16 |
|                 | Total                                                                                                                                                                                                                                                                                                                                                                                         | 37 | 07 | 08 | 60 |

Where, **L** : Lectures

**T**: TUTORIALS

**P**: PRACTICAL

#### MODES OF IN-SEMESTER ASSESSMENT:

(40 Marks)

- Sessional test(s)
- Objective test, Assignments (Class, Home), Paper Presentation, Laboratory Works, Concept note writing.

#### LEARNING OUTCOMES:

After the completion of this course:

- Students should have developed knowledge of the role of probability theory in Statistics.
- Students are expected to learn useful probability distributions in statistical analyses.

#### SUGGESTED READINGS:

1. Hogg, R. V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, 17th edition, Pearson Education, New Delhi.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th edition), Pearson Education, Asia.
3. Myer, P.L. (1970): Introductory Probability and Statistical Applications, Oxford & IBH Publishing, New Delhi.
4. Kakaty, S. C. (2003): Mathematical Statistics: Theory and Applications, Kaustubh Prakashan, Dibrugarh.
5. McColl, J. H. (2004): Multivariate probability, John Wiley and Sons.
6. Ross, S. M. (2014): Introduction to probability models, Academic Press Inc.

7. Johnson, R. A., Miller, I., and Freund, J. E. (2000): Probability and statistics for engineers, 6th Edition, Pearson Education India.
8. Elhance, D. N., Elhance, V., & Aggarwal, B. M. (1958): Fundamentals of Statistics, Allahabad, Kitab Mahal.
9. Kakaty, S. C. (2003): Mathematical Statistics: Theory and Applications, Kaustubh Prakashan, Dibrugarh.

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**Title of the Course** : **Basic Probability Theory and Distributions**  
**Course Code** : **STAT2MN02**  
**Nature of the Course** : **Minor**  
**Total Credits** : **04**  
**Distribution of Marks** : **60(45T + 15P) (End Sem) + 40 (In-Sem)**

**COURSE OBJECTIVES:**

- To be familiar with probability theory.
- To learn different methods of studying a theoretical distribution.
- To study useful probability distributions and their properties.

| UNIT            | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                    | L  | T  | P | Total Hours |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|-------------|
| 1<br>(10 Marks) | <b>Probability:</b> Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability—classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem and its applications                                                                     | 07 | 01 | - | 08          |
| 2<br>(12 Marks) | <b>Random Variables:</b> Discrete and continuous random variables, pmf, pdf and cdf, illustrations and properties of random variables, univariate transformations with illustrations.<br><b>Two Dimensional Random Variables:</b> Discrete and continuous type, joint, marginal and conditional pmf, pdf, and cdf, independence of variables, bivariate transformations with illustrations. | 10 | 02 | - | 12          |
| 3<br>(12 Marks) | <b>Mathematical Expectation and Generating Functions:</b> Expectation of single and bivariate random variables and its properties. Moments and cumulants, moment generating function, cumulant generating function and characteristic function. Uniqueness and inversion theorems (without proof) along with applications. Conditional expectations                                         | 10 | 02 | - | 12          |

|                 |                                                                                                                                                                                                                                                                                                                                                                                               |           |           |           |           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|
| 4<br>(11 Marks) | <b>Standard Probability Distributions:</b><br>Binomial, Poisson, geometric, uniform, normal, exponential, beta and gamma along with their properties and limiting/approximation cases.                                                                                                                                                                                                        | 10        | 02        | -         | 12        |
| 5<br>(15 Marks) | <b>List of Practical: (both calculator and computer based)</b><br>1. Fitting of binomial distribution.<br>2. Fitting of Poisson distribution.<br>3. Fitting of geometric distribution.<br>4. Fitting of negative binomial distribution.<br>5. To find the ordinate for a given area for normal distribution.<br>6. Fitting of normal distribution.<br>7. Fitting of exponential distribution. | -         | -         | 08        | 16        |
|                 | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                  | <b>38</b> | <b>07</b> | <b>08</b> | <b>60</b> |

Where, L : Lectures

T: TUTORIALS

P: PRACTICAL

#### **MODES OF IN-SEMESTER ASSESSMENT:**

**(40 Marks)**

- Sessional test(s)
- Objective test, Assignments (Class, Home), Paper Presentation, Laboratory Works, Concept note writing.
- 

#### **LEARNING OUTCOMES:**

After the completion of this course:

- Students should have developed knowledge of the role of probability theory in Statistics.
- Students are expected to learn useful probability distributions in statistical analyses.

#### **SUGGESTED READINGS:**

1. Hogg, R.V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, 7th edition, Pearson Education, New Delhi.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th edition), Pearson Education, Asia.
3. Myer, P.L. (1970): Introductory Probability and Statistical Applications, Oxford & IBH Publishing, New Delhi.
4. McColl, J. H. (2004). Multivariate probability. John Wiley and Sons.
5. Hogg, R.V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, 17th edition, Pearson Education, New Delhi.
6. Ross, S. M. (2014). Introduction to probability models. Academic Press Inc.

7. Johnson, R. A., Miller, I., and Freund, J. E. (2000). Probability and statistics for engineers. 6th Edition, Pearson Education India.
10. Elhance, D. N., Elhance, V., & Aggarwal, B. M. (1958). Fundamentals of Statistics, Allahabad. Kitab Mahal.
11. Kakaty, S. C. (2003). Mathematical Statistics: Theory and Applications, Kaustubh Prakashan, Dibrugarh.

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**Title of the Course** : Basics of Statistical Distributions and Inference Course  
**Code** : GEC2STAT02  
**Nature of the Course** : Generic Elective  
**Total Credits** : 03  
**Distribution of Marks** : 60 (End Sem) + 40 (In-Sem)

**Course Objectives:**

- To study useful probability distributions and their properties.
- To study useful sampling distributions and their properties.
- To make informative decisions using statistical tests.

| UNIT            | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                              | L  | T  | P | Total Hours |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|-------------|
| 1<br>(16 Marks) | <b>Probability:</b> Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability – classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability. Random variables: discrete and continuous random variables, p.m.f., p.d.f. and c.d.f.                                                                                           | 09 | 02 | - | 11          |
| 2<br>(14 Marks) | Mathematical Expectation and Generating Functions: Idea of mathematical expectation and generating functions.<br>Basic Statistical Distributions: Binomial, Poisson, Normal.<br>Basic Sampling Distributions: Chi-square, t and F (Definition and use only). Idea of population and sample. Idea of parameter and statistic. The basic idea of significance test. Null and alternative hypotheses. Type I & Type II errors, level of significance, concept of p-value | 09 | 02 | - | 11          |
| 3<br>(20 Marks) | Tests of Significance: Tests of hypotheses for the parameters of a normal distribution (one sample and two sample problems). Tests for the significance of correlation coefficient.                                                                                                                                                                                                                                                                                   | 12 | 03 |   | 15          |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |    |   |    |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|----|
|              | Categorical Data: Tests of proportions, tests of association and goodness-of-fit using Chi-square test, Yates' correction. Analysis of Variance (one way classification only)                                                                                                                                                                                                                                                                                  |    |    |   |    |
| 4<br>(Marks) | Co-requisites (with simple numerical examples)<br>1. Tests of hypotheses for the parameters of a normal distribution (one sample and two sample problems).<br>2. Chi-square test of proportions.<br>3. Chi-square tests of association.<br>4. Chi-square test of goodness-of-fit.<br>5. Test for correlation coefficient.<br>6. Analysis of Variance of a one way classified data<br>7. Checking consistency of data and finding association among attributes. | 08 | -  | - | 08 |
|              | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 38 | 07 | - | 45 |

Where, L :Lecutures

T: TUTORIALS

P: PRACTICAL

#### MODES OF IN-SEMESTER ASSESSMENTS:

(40 Marks)

- Sessional test )s)
- Objectives test, Assignments(Class,Home), Paper Presentation, Laboratory Works, Concept note writing

#### LEARNING OUTCOMES:

After the completion of this course:

- Students should possess skills concerning the small sample and large sample tests.
- Students are expected to analyze and interpret the data vis-à-vis statistical inference in data analysis.

#### SUGGESTED READINGS:

1. Goon, A.M., Gupta M.K. & Das Gupta, Fundamentals of statistics, Vol.-I & II (2005).
2. McColl, J. H. (2004). Multivariate probability. John Wiley and Sons.
3. Hogg, R.V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, 17th edition, Pearson Education, New Delhi.
4. Ross, S. M. (2014). Introduction to probability models. Academic Press Inc.
5. Johnson, R. A., Miller, I., and Freund, J. E. (2000). Probability and statistics for engineers. 6th Edition, Pearson Education India.
6. Elhance, D. N., Elhance, V., & Aggarwal, B. M. (1958). Fundamentals of Statistics, Allahabad. Kitab Mahal.
7. Kakaty, S. C.(2003). Mathematical Statistics: Theory and Applications, Kaustubh Prakashan, Dibrugarh.

**Title of the Course** : Data Science using MS EXCEL  
**Course Code** : SEC2STAT02  
**Nature of the Course** : Skill Enhancement  
**Total Credits** : 03  
**Distribution of Marks** : 60 (End Sem) + 40 (In-Sem)

#### COURSE OBJECTIVES:

- To be familiar with basic tools MS EXCEL and data analytic techniques.
- To apply the tools for real-life data analysis projects and reporting.

| UNIT            | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                     | L | T | P  | Total Hours |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|----|-------------|
| 1<br>(12 Marks) | <b>Layout of Excel Worksheet:</b><br>Variable name; data types; freezing panes, splitting data sheets, hiding operations; wrapping, merging, alignments.<br><b>Cell Operations:</b><br>Conditional formatting; sorting; filtering, custom filtering; insert, delete, format cells;<br><b>Data Tools:</b> Remove duplicates, data validation; data table formatting operations (Table Styles) | - | - | 07 | 14          |
| 2<br>(11 Marks) | <b>Simple Cell Functions:</b> SUM, Average, MAX, MIN, Count.<br><b>Column/row operations (arithmetic):</b> adding, subtracting, multiplying, dividing, powering, finding percentage. Transforming raw data to frequency table (discrete, continuous). Cumulative frequency table.<br>Data visualization using charts – bar, column, line, pie, scatter, etc.                                 | - | - | 08 | 16          |
| 3<br>(12 Marks) | <b>Excel Functions:</b><br>LOGICAL functions, TEXT functions, some MATHEMATICAL and STATISTICAL functions.<br>Pivot tables in excel.<br>Introduction to LOOKUP functions in Excel (How, Where and Why) – VLOOKUP, HLOOKUP, INDEX, MATCH)                                                                                                                                                     | - | - | 10 | 20          |

|                 |                                                                                                                                                                                                          |   |   |    |    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|----|----|
|                 |                                                                                                                                                                                                          |   |   |    |    |
| 4<br>(15 Marks) | <b>Excel Add-Ins:</b> Data analysis tool pack (descriptive statistics, histogram, correlation, regression, t-test, F-test, z-test, ANOVA),<br>Perform chi-square test using raw data and excel formulas. | - | - | 12 | 24 |
| 5<br>(10 Marks) | <b>Co-requisites and Problem Solving:</b><br>Reporting from Excel Outputs.<br>Project Compilation.<br>Real life Data Analysis                                                                            | - | - | 08 | 16 |
|                 | Total                                                                                                                                                                                                    | - | - | 45 | 90 |

Where, L :Lecutures

T: TUTORIALS

P: PRACTICAL

#### **MODES OF IN-SEMESTER ASSESSMENT:**

**(40 Marks)**

- Sessional test(s)
- Objective test, Assignments (Class, Home), Paper Presentation, Laboratory Works, Concept note writing.

#### **LEARNING OUTCOMES:**

After the completion of this course:

- Students are expected to develop a clear understanding of the fundamental concepts of descriptive Statistics
- Students will also learn MS EXCEL tools, handling various types of data and their graphical representation.
- Students are expected to apply different data analytic tools in real life problems.

#### **SUGGESTED READINGS:**

1. Berk, K N. (2003): Data analysis with Microsoft Excel. Duxbury Press, London.
2. Nigam, M. (2019): Data analysis with Excel. BPB Publications, New Delhi.
3. Ramirez, A. (2020): Excel Formulas and Functions 2020: The Step by Step Excel Guide with Examples on How to Create Powerful Formulas. Caprioru, India.

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