



HSNC UNIVERSITY, MUMBAI

(2023-2024)

Ordinances and Regulations With
Respect to
Choice Based Credit System (CBCS)
For the Programmes Under

The Faculty of Humanities

For the Course

FYBA–Statistics

2023-2024

SYLLABUS FOR MINOR COURSE (STATISTICS)

Framed According to the National Education Policy (NEP 2020)

To be implemented from Academic Year: 2023-2024

Semester-I and Semester -II

2023-2024



HSNC UNIVERSITY, MUMBAI

Board of Faculty of Humanities

Board of Studies in the Subjects of Statistics and Data Science & Business Analytics

1) Name of Chairperson/Co-Chairperson/Coordinator:-

- a) **Dr Asha Jindal**, Professor and (UG: Head & PG: Coordinator), Department of Statistics, K. C. college, HSNC University Churchgate, Mumbai – 400 020. Email ID- asha.jindal@kccollege.edu.in
Mobile no- 9821235627

2) Two to five teachers each having minimum five years teaching experience amongst the full time teachers of the Departments, in the relevant subject.

- a) **Dr. S. B. Muley**, Assistant Professor, Department of Statistics, K. C. college, HSNC University Churchgate, Mumbai – 400 020. Email ID sakharam.muley@kccollege.edu.in,
Mobile No- 9323817918
- b) **Mrs. Pratiksha Kadam**, Assistant Professor, Department of Statistics, K. C. college, HSNC University Churchgate, Mumbai – 400 020. Email ID pratiksha.kadam@kccollege.edu.in,
Mobile No- 7507162816
- c) **Ms. Shailaja Rane**, Assistant Professor, Department of Statistics, K. C. college, HSNC University Churchgate, Mumbai – 400 020. Email ID shailaja.rane@kccollege.edu.in, Mobile No- 7506986359

3) One Professor / Associate Professor from other Universities or professor / Associate Professor from colleges managed by Parent Body;

- a) **Dr Anjum Ara Ahmed**; Professor and I/C Principal, Rizvi College, Mumbai. Email ID anjumahmed8@gmail.com, Mobile No- 8451046220

4) Four external experts from Industry / Research / eminent scholar in the field relevant to the subject nominated by the Parent Body;

- a. **Prof. Suresh Kumar Sharma**, Senior Professor, Department of Statistics, Panjab University, Chandigarh.
Email ID ssharma643@yahoo.co.in, **Mobile No**-9815911381
- b. **Mr Mukesh Jain**, Vice President and Chief Technological Officer, Capgemini. Email ID mdjain@hotmail.com, **Mobile No**-7972637347.
- c. **Dr Santosh Gite**, Professor, Dept. of Statistics, University of Mumbai, Mumbai. Email ID santgite@yahoo.com, **Mobile No**- 9167157717.
- d. **Mr Prashant Kumar Nair**, Director, Geo Spatial Analytics Global Lead, Intelligent Analytics, Nielsen Connect, Email ID prashantkumar.nair@nielsen.com , **Mobile No**-9833747057.

5. Top rankers of the Final Year Graduate and Final Year Post Graduate examination of previous year of the concerned subject as invitee members for discussions on framing or revision of syllabus of that subject or group of subjects for one year.

- a) **Mr. Chinmay Mokal** (Postgraduate student 22-23) Email ID- chinmay30mokal@gmail.com
; Mobile no- 9372323901
- b) **Ms. Aanchal Goyal** (undergraduate student 22-23) Email [ID- aanchalgoyal2703@gmail.com](mailto:aanchalgoyal2703@gmail.com)
; Mobile no- 7738886488

Part 1- Statistics

Preamble

The Minor in Statistics program aims to equip students with a thorough understanding of statistical concepts and methodologies, developing their ability to apply statistical tools to real-world problems. The course is designed to balance theoretical foundations with practical applications, particularly emphasizing computational tools such as SPSS, Excel, Python. The integration of continuous assessment, project work, and applied learning ensures that students develop not only academic knowledge but also critical thinking, ethical decision-making, and effective communication skills, essential for careers in statistics, data science, finance, research, and beyond. The curriculum supports the objectives of the National Education Policy (NEP 2020) by focusing on interdisciplinary collaboration, sustainable practices and lifelong learning.

Program Outcomes

After completing the program, student will be able to

PO1 Disciplinary knowledge- Demonstrate multi-disciplinary knowledge and understanding of various socio, economic, political, psychological, linguistic and environmental disciplines.

PO2 Communication Skills - Demonstrate the ability to listen carefully and express themselves confidently in a clear and concise manner, thereby leading to meaningful exchange of thoughts/ ideas with various sections of the society.

PO3 Critical thinking & Reflective Thinking - Critically evaluate and reflect upon practices, policies and theories and formulate coherent thoughts for real-world application.

PO4 Problem solving, Scientific and Analytical reasoning- Analyse, interpret, and draw conclusions from qualitative/quantitative data and apply the concepts /learning in socio, economic, political, psychological, linguistic, and environmental disciplines to analyse and address real life problems situations as open minded and rational citizens.

PO5 Research-related skills and Lifelong learning- Develop the skills of observing, inquiry, questioning, problematizing, synthesizing, articulating, and establishing cause and effect in one or more humanities discipline and real-life situations which are necessary for learning throughout life.

PO6 Cooperation/Teamwork & Leadership readiness/qualities -Develop the values of cooperation, coordination, teamwork, respect, understanding and tolerance across different and globally diverse groups and aspire for an inclusive society for the betterment of all by challenging the challenges.

PO7 Information/digital literacy - Access and use Information and Communication Technology (ICT) in various learning experience; use appropriate digital mediums/software for gathering, storing, and disseminating information in a simplified way

PO8 Self-directed learning - Set simple, measurable, attainable, realistic, and time-bound goals for one-self and work in that direction to achieve them.

PO9 Multicultural competence- Appreciate diversity of language, norms, values, and beliefs of multiple cultures at regional, local, national and global levels making them capable to integrate and engage in a multicultural diverse society.

PO10 Moral and ethical awareness/reasoning - Embrace moral and ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, use ethical practices in all work and research avoiding fabrication, falsification or plagiarism

2. Program Objective: The main objectives of the course are-

- 1) Graduates will build a strong foundation in core statistical principles and methodologies, allowing them to apply statistical techniques to real-world problems.
- 2) Graduates will commit to lifelong learning and remain updated on emerging statistical methods, computational tools, and technological advancements.
- 3) Graduates will develop problem-solving and analytical skills, enabling them to apply statistical models and methods in various industries, including finance, healthcare, and research.
- 4) Graduates will demonstrate professionalism, ethical responsibility, and effective communication in multidisciplinary and collaborative environments.
- 5) Graduates will possess the skills necessary for employability and entrepreneurship, and they will be well-prepared to pursue higher education or careers in data analysis, statistical consulting, or related fields.

3. Program Specific Outcomes (PSOs):

1. **Foundational Statistical Knowledge:** Demonstrate a comprehensive understanding of statistical principles and methodologies to apply them effectively in real-world scenarios.
2. **Data Analysis Skills:** Develop expertise in data collection, management, and analysis using statistical software such as SPSS, Excel, and Python.
3. **Interdisciplinary Applications:** Employ statistical tools to address problems across diverse domains, including finance, healthcare, and social sciences.
4. **Research Proficiency:** Gain competence in designing experiments, conducting hypothesis tests, and interpreting results in a scientific context.
5. **Ethical Awareness:** Evaluate and apply ethical considerations in statistical research and analysis, promoting sustainable practices.
6. **Communication Skills:** Articulate statistical findings effectively in both verbal and written formats to diverse audiences.
7. **Professional Readiness:** Equip students with industry-relevant skills for roles in data analysis, quality control, and operations research, enhancing employability and entrepreneurship potential.

4. Process adopted for curriculum designing.

The members of Department of Statistics initially drafted the syllabus. The draft syllabus was shown to Industry Partners, Academic Partners and Research Institute Partners through mail and in person invited to college. They suggested some changes. These changes were incorporated.

5. Salient features, how it has been made more relevant.

Statistics deals with collection, organization, analysis and interpretation of data. Statistical knowledge is very important as it helps to use appropriate methodologies for collecting data, tools for employing analysis and interpretation of results. It also provides us with techniques which are important in designing and planning of experiments.

A lot of data is generated at each and every moment. Data literacy has become crucial and indispensable to the society. Statistics has the quality of quantifying and measuring uncertainty which helps in assessing risk. It helps in extracting the meaningful information from the data, making predictions and taking decisions. Study of data has become an integral part of education, business, and overall human progress. This has put Statistics on the center stage of teaching, research, policy making and development all over the globe.

The F.Y.B.A Statistics syllabus is a Choice based credit system comprising of one paper having three units each in both the semesters. The current course is designed to enhance the knowledge of the subject. While designing of the syllabus care has been taken to balance the fundamental techniques of Statistics with soft skills like analysis using Statistical Software.

Several radical changes have been made in the syllabi. Firstly, the concept of having separate papers in practicals has been abandoned. All the numerical / practical work has been integrated with the teaching of theory courses. Secondly, majorly the numerical /practical work be carried out on computers.

The course would give the students option to develop skills in areas which have direct relevance to employability in insurance and finance industries, banks, econometrics, quality control, pharmaceutical, medical statistics, agricultural statistics, weather forecasting, civil services, stock market, machine learning and artificial intelligence related job opportunities in Statistics.

6. Learning/Course Outcomes:

Semester I (FYBA)

1. STA113B – Introduction to Statistics:

- **Unit 1:** Define statistics, its nature, scope, and application in various fields. Differentiate between types of data and collection methods. Construct frequency distributions and graphical representations.
- **Unit 2:** Calculate measures of central tendency (mean, median, mode) and dispersion (range, variance, standard deviation etc). Analyze skewness and kurtosis.
- **Unit 3:** Study correlation and regression methods, compute Pearson and Spearman correlation coefficients, and fit regression lines.

2. STA117D – Hands-on Training with SPSS-I:

- **Unit 1:** Manage data in SPSS, including data manipulation and preprocessing. Create visualizations such as histograms and scatter plots.

Semester II (FYBA)

1. STA114B – Introduction to Probability and Probability Distributions:

- **Unit 1:** Learn probability concepts and theorems, including Addition, Multiplication and Bayes' theorem. Solve probability-related problems.
- **Unit 2:** Understand discrete and continuous random variables and Distinguish between them.. Compute probability functions and moments upto order 4.
- **Unit 3:** Derive and apply properties of Binomial, Poisson, Uniform, and Normal distributions. Solve problems on the same.

2. STA118D – Hands-on Training with SPSS-II:

- **Unit 1:** Perform descriptive and inferential statistics, regression, and correlation analysis in SPSS. Create statistical reports.

**Part 2- The Scheme of Teaching and Examination is as under:
Semester I Summary**

Sr. No.	Choice Based Credit System			Subject Code	Remarks
1	Core Course (Statistics)			STA113B STA113D	Nil
2	Elective Course	Discipline Specific Elective (DSE) Course			
		2.1	Interdisciplinary Specific Elective (IDSE) Course		
		2.2	Dissertation/Project		
		2.3	Generic Elective (GE) Course		
3	Ability Enhancement Courses (AEC)				
	Skill Enhancement Courses (SEC)			STA117D	

First Year Semester I Internal and External Detailed Evaluation Scheme

Sr. No.	Semester	Subject Code	Subject Title	NEP Course Type	Hours Per Week					Cred it	Seasonal Evaluation Scheme (Internal + External)			Total Marks
					Units	S. L. E.	L	T	P		S . L . E	PA/A	SE E	
1	I	STA113B	Introduction to Statistics	Minor	3	20 % *	3	0	0	3	10	5	60	100
		STA113D	Computer Applications & Practical Based on Introduction to Statistics						2	1			25	
	I	STA117D	Hands on Training on Basics of SPSS-I	VSE C	1	20 % *	0	0	1	1			25	25

***One to two lectures to be taken for CONTINUOUS self -learning Evaluation.**

First Year Semester I - Units – Topics – Teaching Hours

S. N	Subject Code	Subject Unit Title		Hours/Lectures	Total No. of hours/lectures	Credit	Total Marks
1	STA113B	I	Introduction to Statistics	15	45 H	3	100
		II	Measures of Central Tendency, Dispersion, Skewness & Kurtosis	15			
		III	Correlation and Regression	15			
	STA113D	IV	Practical based on STA113B	30	30H	1	
2	STA117D	I	Managing Data in SPSS	15	15H	1	50
			TOTAL			5	150

- **Lecture Duration – One hour**
- **One Credit =15 class room teaching hours.**

L: Lecture: Tutorials P: Practical Ct-Core Theory, Cp-Core Practical, SLE- Self learning evaluation CT-Commutative Test, SEE- Semester End Examination , PA- Project Assessment, AT- Attendance

Part -3 Detailed Scheme Theory

Course Code: STA113B

Course Title: Introduction to Statistics

		Clock Hours
Unit-1	Introduction to Statistics : Introduction: Meaning of Statistics. Applications of Statistics in various fields of business. Definition of data. Types of data-Primary and Secondary data, Qualitative and Quantitative data. Definition of Population and Sample. Methods of data collection- Census method and Sampling Method. Advantages of Sampling Method over Census Method. Concepts of Simple Random Sampling (Without replacement and With Replacement) and Stratified Random Sampling. Presentation of data in Tabulation and Frequency Distribution form- Discrete and Continuous frequency distributions. Relative and Cumulative frequency distributions. Graphical and Diagrammatic Representation: Construction of Histogram, Ogive Curves, Pie Chart, Bar diagrams etc.	15
Unit-2	Measures of Central Tendency: Meaning of Central Tendency and measure of central tendency. Various measures of central tendency- Arithmetic mean, Geometric mean, Harmonic Mean, Median, Mode, Quartiles. Empirical relation between Mean, Median and Mode. Numerical problems based on various forms of data. Measures of Dispersion: Meaning of dispersion (or variability) and measure of dispersion. Types Absolute and Relative measures of dispersion. Various measures of dispersion - Range and coefficient of range, Quartile Deviation and coefficient of quartile deviation, Mean Deviation about median and coefficient of mean deviation about median, Standard Deviation and Coefficient of variation, variance. Numerical problems based on various forms of data Skewness and Kurtosis based on Moments.	15
Unit-3	Correlation and Regression: Meaning of bivariate data and examples. Definition of covariance. Meaning of correlation. Types of Correlation- Positive, Negative, No correlation. Methods of studying correlation- (i) Scatter diagram method, (ii) Karl Pearson's coefficient of correlation r (for ungrouped data only). Interpretation when $r = +1$, $r = -1$ and $r = 0$. (iii) Spearman's Rank correlation coefficient R. Numerical problems on computations of r and R. Meaning of Regression. Lines of regression of Y on X and of X on Y. Equations due to Least Squares method for finding lines of regression of Y on X and of X on Y. Regression coefficients and their relations with Karl Pearson's coefficient of correlation r. Numerical problems on regression coefficients and fitting of lines of regression.	15

Self-Learning topics (Unit wise)

Unit	Topics
1	Introduction to definition of Statistics
1	Types of data: Qualitative and quantitative data
1	Different types of scales: nominal, ordinal, interval and ratio.
2	Mathematical averages Arithmetic mean (Simple, weighted mean, combined mean), Geometric mean, Harmonic mean
2	Locational averages: Median, Mode.
2	Partition Values: Quartiles, Deciles and Percentiles.

3	Meaning of bivariate data and examples. Definition of covariance. Meaning of correlation. Types of Correlation- Positive, Negative, No correlation. Methods of studying correlation- (i) Scatter diagram method
---	---

Online Resources

‘Business Statistics’ by Dr Mukesh Kumar Barua from IIT Roorkee available on the Swayam portal, <https://nptel.ac.in/courses/110/107/110107114/> for unit-I, unit II and unit-III

Course Code: STA117D

Course Title: Hands on Training on Basics of SPSS-I

	Pre-requisites: Have used a computer with either the Windows or any other operating system. Learning Objectives: • This course is designed to equip students with SPSS, its working, data entry, various inbuilt functions, statistical formulae, etc. • Students will learn to use data visualization statistical tools. • Students will have an experience of using measures of central tendencies, measures of dispersion, data distribution techniques, etc. Course Outcomes: On successful completion of this course students will be able to: 1. Identify the different components of the SPSS spreadsheet. 2. Open, close and save workbook. 3. Import, sort and format statistical data etc data manipulation tools,. 4. Data preprocessing. 5. Apply essential keyboard shortcuts, data visualization techniques, for data Analysis	
Unit	Content	No. of Lectures
I	Managing Data in SPSS 1.1 Creating and Editing Data File 1.2 Data Manipulation: Sorting Data, Merging and Appending Data/files, Aggregating/summarizing Data, Reshaping Data, Recording Variables, Sub setting Data, Data Type Conversions, Sampling, Renaming-formatting data, Handling duplicates/Missing values, Computing new variables, Selecting cases 1.3 Data Preprocessing: Detection and treatment of Missing values, Outliers, Scaling 1.4 Visualization for Univariate, Bivariate and Multivariate Data: 1.5 Diagram Vs Graphs, Creating available Graphs, Histograms & Density Plot, Dot Plots – Bar Plots(Column, Subdivided, Percentage) – Line Charts – Pie Charts –Boxplots – Scatterplots Story telling on dataset Titanic dataset (http://biostat.mc.vanderbilt.edu/wiki/pub/Main/DataSets/titanic3.csv)	15

Course Code: STA113D

Course Title: Practical based on Introduction to Statistics

Practical List (30 Clock Hours):

- 1) Random Sampling
- 2) Graphs
- 3) Diagram
- 4) Tabulation.
- 5) Measures of Central Tendency-1
- 6) Measures of Central Tendency-1
- 7) Measures of Dispersion-1
- 8) Measures of Dispersion-1
- 9) Karl Pearson's Correlation Coefficient
- 10) Spearmans Rank Correlation Coefficient
- 11) Regression Analysis

Reference:

Course Code: STA113B

Course Title: Introduction to Statistics

- 1) **Medhi J.:** *Statistical Methods, An Introductory Text*, Second Edition, New Age International Ltd.
- 2) **Spiegel M. R.:** *Theory and Problems of Statistics*, Schaum's Publications series, Tata McGraw-Hill.
- 3) **Kothari C. R.:** *Research Methodology*, Wiley Eastern Limited.
- 4) **Goon A. M., Gupta M. K., Dasgupta B.:** *Fundamentals of Statistics*, Volume II, The World Press Private Limited, Calcutta.

Course Code: STA117D

Course Title: Hands on Training on Basics of SPSS-I

- 1) SPSS for Windows Step by Step: A simple Guide and Reference, Darren George and Paul Mallery, Pearson
- 2) Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE Publications.
- 3) [Brian C. Cronk](#), How to Use SPSS®: A Step-By-Step Guide to Analysis and Interpretation Paperback
- 4) Malhotra, N. K. (2007). *Marketing research: An applied orientation*. Upper Saddle River, NJ: Pearson/Prentice Hall.

**Part 5- The Scheme of Teaching and Examination is as under:
Semester II Summary**

Sr. No.	Choice Based Credit System			Subject Code	Remarks
1	Core Course (Statistics)			STA114B STA114D	Nil
2	Elective Course	Discipline Specific Elective (DSE) Course			
		2.1	Interdisciplinary Specific Elective (IDSE) Course		
		2.2	Dissertation/Project		
		2.3	Generic Elective (GE) Course		
3	Ability Enhancement Courses (AEC)				
	Skill Enhancement Courses (SEC)			STA118D	

First Year Semester II Internal and External Detailed Evaluation Scheme

Sr. No.	Semester	Subject Code	Subject Title	NEP Course Type	Hours Per Week					Credit	Seasonal Evaluation Scheme (Internal + External)			Total Marks
					Units	S. L. E.	L	T	P		S. L. E.	PA/	SE E	
1	II	STA114B	Introduction to probability and probability distribution	Minor	3	20 % *	3	0	0	3	10	5	60	0
		STA114D	Practical Based on Introduction to probability and probability distribution						2	1			25	
	II	STA118D	Hands on Training on Basics of SPSS-II	VSEC	1	20 % *	1	0	0	1			25	25

First Year Semester – II Units – Topics – Teaching Hours

S. No	Subject Code	Subject Unit Title		Hours/ Lectures	Total No. of hours/ lectures	Credit	Total Marks
1	STA114B	I	Elementary Probability Theory	15	45	3	100
		II	Discrete and Continuous Random variables	15			
		III	Some Standard Discrete and Continuous Distributions	15			
	STA114D	IV	Practicals based on STA114B	30	30 hours	1	
2	STA118D		Data Preparation, Statistical Analysis	15	15H	1	25
			TOTAL			5	125

- **One Credit =15 Classroom hours**

L: Lecture: Tutorials P: Practical Ct-Core Theory, Cp-Core Practical, SLE- Self learning evaluation CT-Commutative Test, SEE- Semester End Examination , PA- Project Assessment, AT- Attendance

Part -6 Detailed Scheme Theory

Course Code: STA114B

Paper Title: Introduction to probability and probability distribution

Unit	Content	Clock Hours
I	Elementary Probability Theory 1.1. Permutation and Combination 1.2. Trial, random experiment, sample point and sample space. 1.3. Definition of an event. Operation of events, mutually exclusive and exhaustive events. Equally likely, complimentary events. Venn Diagram 1.4. Classical (Mathematical), Empirical and Axiomatic definitions of Probability and their properties. 1.5. Theorems on Addition and Multiplication of probabilities. Numerical basic and advanced with respect to theorems. 1.6. Independence of events, Theorem of total probability, pair wise independence upto three events, Conditional probability, Bayes theorem and its applications.	15
II	Discrete random variable 2.1 Random variables and Types of random variables. Definition and properties of probability mass function and cumulative distribution function of discrete random variable. 2.2 Central and Non- Central moments (definition only) and their relationship (up to order four). Calculation of moments, Skewness	15

	and Kurtosis using probability concept. 2.3 Expectation of a random variable. Theorems on Expectation & Variance. 2.4 Joint probability mass function of two discrete random variables. 2.5 Marginal and conditional distributions. Theorems on Expectation & Variance. 2.6 Covariance and Coefficient of Correlation. Independence of two random variables. Continuous Random Variable 2.7 Concept of Continuous random variable and properties of its probability distribution. 2.8 Probability density function and cumulative distribution function. Their graphical representation. 2.9 Expectation of a random variable and its properties. Measures of location, dispersion and kurtosis. Raw and central moments (simple illustrations).	
III	Some Standard Discrete Distributions 3.1 Discrete Uniform, Binomial, Poisson distributions: derivation of their mean and variance. 3.2 Recurrence relation for probabilities of Binomial and Poisson distributions. Poisson approximation to Binomial distribution Some Standard Continuous Distributions 4.3 Rectangular and Normal distribution. 4.4 Derivations of Cumulative distribution function, mean, median and variance for Uniform distribution 4.5 Properties of Normal distribution (without proof). Additive Property of Normal Distribution (Statement only). Properties of normal curve. Use of standard normal tables. 4.6 Exponential, memory less property of exponential distribution. 4.7 Derivations of Cumulative distribution function, mean, median and variance for Exponential distribution	15

Self-Learning topics (Unit wise)

Unit	Topics
1	1.1. Permutation and Combination
1	1.2. Trial, random experiment, sample point and sample space.
1	1.3. Definition of an event. Operation of events, mutually exclusive and exhaustive events.
1	1.4. Classical (Mathematical), Empirical and Axiomatic definitions of Probability and their properties.
1	1.6. Independence of events

Online Resources

‘Introduction to Probability and Statistics’ by Prof. G. Srinivasan from IIT Madras available on the Swayam portal, <https://nptel.ac.in/courses/111/106/111106112/> for US-FST- 102 for unit I.

Course Code: STA118D

Course: Hands on Training on Basics of SPSS-II

	Pre-requisites: Have used a computer with either the Windows or any other operating system. Learning Objectives: • This course is designed to equip students with SPSS, various inbuilt functions used to study correlation and causality, regression, etc. • Students will learn to use SPSS for analysis of chronological and economics related data. • Students will learn to apply inferential statistics while solving statistical problems. Course Outcomes: On successful completion of this course students will be able to: 1) Identify the correlation coefficients using Karl Pearson's and Spearman's method, correlation matrix, etc. using SPSS. 2) Apply descriptive statistics for data analysis. 3) Students will get hands on training on SPSS to enter multiple response data and to carry out analysis. 4) Apply SSPSS in statistical data analysis.	
Unit	Content	No. of Lectures
II	Data Preparation, Statistical Analysis: 2.1 Descriptive statistics: Measures of Central Tendency, Variability, deviation from normality, size and stability 2.2 Application of OLAP CUBES 2.3 Coding and analysing multiple responses 2.4 Bivariate Correlations, partial correlation and the correlation matrix 2.5 Simple Linear Regression 2.6 Plotting of various standard distributions 2.7 Fitting of available curve using scatter plot 2.8 Reliability Analysis: Guttman, Parallel and split half reliability Story telling using inbuilt datasets 2.9 Cross tabulation and Cramer V, Phi, Fisher Exact Test, odds Ratio Story telling using inbuilt datasets And interpretations of all above.	15

Course Code: STA114D

List of Practical (30 clock Hours):

- 1) Elementary Probability Calculations
- 2) Advance Probability Calculations
- 3) Discrete Random Variables
- 4) Continuous Random Variable
- 5) Uniform Distribution
- 6) Binomial distribution
- 7) Poisson distribution
- 8) Rectangular Distribution
- 9) Exponential Distribution
- 10) Problems based on area property of normal distribution and to find the ordinate for a given area for normal distribution.
- 11) Application based problems using normal distribution-Normal Distribution-1

Reference:**Course Code:** STA114B**Course Title:** Introduction to probability and probability distribution

- 1) **David S.:** Elementary Probability, Cambridge University Press.
- 2) **Hogg R. V. and Tannis E. P.:** Probability and Statistical Inference, McMillan Publishing Co. Inc.
- 3) **Miller I. & Miller M.:** John E. Freund's Mathematical Statistics with Applications, 7th Edition, Pearson Education Asia.
- 4) **Gupta, S. C. and Kapoor, V. K.:** Fundamentals of Mathematical Statistics, Eighth Edition, Sultan Chand and Sons Publishers, New Delhi.

Course Code: STA118D**Course:** Hands on Training on Basics of SPSS-II

1. SPSS for Windows Step by Step: A simple Guide and Reference, Darren George and Paul Mallery, Pearson
2. Field, A. (2013). Discovering statistics using IBM SPSS statistics (4th ed.). SAGE Publications.
3. Brian C. Cronk, How to Use SPSS®: A Step-By-Step Guide to Analysis and Interpretation Paperback
4. Malhotra, N. K. (2007). Marketing research: An applied orientation. Upper Saddle River, NJ: Pearson/Prentice Hall.

The Scheme of Teaching and Examination:

The performance of the learners shall be evaluated in two components: Internal Assessment with 40% marks by way of continuous evaluation and by Semester End Examination with 60% marks by conducting the theory examination.

Examination Pattern for First Year Degree as per NEP 2020 Academic Year 2023-2024**1) Evaluation of Major and Minor Subjects**

Subject	Formative Assessment (Marks)	Summative Assessment (Marks)
Major Subject	40	60
Minor Subject	40	60
Major (Practical based Subject)	-	25
Minor (Practical based Subject)	-	25
General Elective (GE/OE)	20	30

FORMATIVE ASSESSMENT:- It is defined as the assessment of the learners on the basis of continuous evaluation as envisaged in the credit based system by way of participation of learners in various academic and correlated activities in the given semester of the programme.

A). Formative Assessment – 40

B). Practical's (internal Components of the Practical Course)

40 marks

1. For Theory Courses

Sr. No.	Particulars	Marks
1	Self-Learning Evaluation with Active participation in routine class instructional deliveries	10+5 Marks

2. For Courses with Practicals

Each practical course can be conducted out of 50 marks with 10 marks for internal **component of the Practical** and 40 marks for formative assessment which will be converted to 25 marks.

Practical's (Internal component of the Practical Course)

Sr. No	Evaluation type	Marks
1	Journal	5
2	Viva	5

C). SUMMATIVE ASSESSMENT =SEMESTER END EXAMINATION :-

It is defined as the examination of the learners on the basis of performance in the semester end theory / written examinations.

The semester end examination (external component) of 60 % for each course will be as follows:

a. For Theory Courses

Duration – 2 Hours

Theory Question Paper pattern for Main Papers of 60 Marks:

Sr. No.	All questions are Compulsory.	Marks
Q. 1	Attempt either a & b or p & q based on unit 1.	20
Q. 2	Attempt either a & b or p & q based on unit 2.	20
Q. 3	Attempt either a & b or p & q based on unit 3.	20

b. For Practical Courses

Duration – 2 Hours

Practical Question Paper Pattern:-

Sr. No.	All questions are Compulsory.	Marks
Q. 1	Attempt any two out of three based on unit 1.	10

Q. 2	Attempt any two out of three based on unit 2.	10
Q. 3	Attempt any two out of three based on unit 3.	10
Q. 4	Attempt any two out of three based on all three units using Statistical Software.	10