Course Structure for S.Y. B. Com. (2024 Pattern) as per NEP-2020

A) B.Com. in Accountancy and Taxation

Sem.	Course Type	Course Code	Course Title	Theory/ Practical	Credits
III	Minor	STA -205-MN(E)	Applied Statistics – I	Theory	04
IV	Minor	STA -255-MN(E)	Applied Statistics – II	Theory	04

CBCS Syllabus as per NEP 2.0 for S.Y.B.Com.
(2024 Pattern)

Name of the Programme	**:** B.Com.
Program Code	**:** UCOM
Class	**:** S.Y.B.Com.
Semester	**:** III
Course Type	**:** Minor Theory
Course Code	**:** STA-205-MN(E)
Course Title	**:** Applied Statistics – I
No. of Credits	**:** 4 credits
No. of Teaching Hours	**:** 60

Course Objectives:

1) Introduce students to statistical tools like mean, median, mode, standard deviation, and their applications.
2) Develop an understanding of attributes, classification, association, and consistency of data.
3) Explain the concept, construction, and interpretation of life tables for demographic analysis.
4) Understand various demographic measures such as birth rates, fertility rates, and population growth.
5) Explain National Income concepts, estimation methods, and challenges in economic assessment.
6) Equip students with the ability to solve problems related to real-life applications in demography and economics.
7) Enhance students' ability to interpret statistical results and apply them in social and economic contexts.
8) Lay a strong foundation for further studies in statistics, economics, and data analysis.

Course Outcome:

By the end of the course, students will be able to:

CO1. Compute and analyze measures of central tendency (mean, median, mode) and dispersion (range, variance, standard deviation) for grouped and ungrouped data.

CO2. Understand and apply concepts of attributes, their classification, and relationships, including Yule's coefficient of association.

CO3. Construct and interpret life tables, including functions such as lx, dx, px, qx, and their implications on life expectancy.

CO4. Apply demographic analysis techniques, including crude birth and death rates, fertility rates, and population growth measures.

CO5. Explain and compute different measures of National Income such as GDP, NNP, personal income, and per capita income.

CO6. Utilize various methods (output, income, and expenditure) for estimating National Income and discuss associated challenges.

CO7. Solve real-world problems using statistical and demographic techniques, developing data-driven decision-making skills.

CO8. Demonstrate an understanding of statistical concepts and their interdisciplinary applications in economics and demography.

TOPICS/CONTENTS:

UNIT-1 Preliminaries **(10L)**

- Measures of Central Tendency: Mean median and mode for ungrouped and grouped data. Geometric mean: definition, merits and demerits. Harmonic mean: definition, merits and demerits. Choice of A.M., G.M. and H.M. Examples and problems. Measures of Dispersion: Concept of dispersion.
- Measures of dispersion: Range, Variance, Standard deviation (SD) for grouped and ungrouped data, combined SD Measures of relative dispersion: Coefficient of range, coefficient of variation

UNIT- 2 Theory of Attributes **(15L)**

- Attributes: Concept of a Likert scale, classification, notion of manifold classification, dichotomy, class-frequency, order of a class, positive class-frequency, negative class frequency, ultimate class frequency.
- Relationship among different class frequencies (up to three attributes) and dot operator to find the relation between frequencies, fundamental set of class frequencies.
- Consistency of data up to 2 attributes. Concepts of independence and association of two

attributes. Yule's coefficient of association (Q), $-1 \leq Q \leq 1$, interpretation.

- Examples and problems (up to three attributes).

UNIT 3: Life Table **(10L)**

- Introduction, Construction of life table, functions (l_x, d_x, p_x, q_x, L_x, T_x, e_x) and their interpretation, expectation of life. Example, and problems.

UNIT-4: Demography **(15L)**

- Demography: Definition, nature and scope, its relation with other disciplines. Techniques of Analysis-Crude birth rate and death rate, Age specific birth rate and death rate, standardized birth rate and death rate.
- Study of fertility – total fertility rate, gross reproduction rate and net reproduction rate. Measurement of population growth rate – simple growth rate and compound growth rate.

Unit-5 National Economy **(10L)**

- Definition of National Income by (a) Marshall (b) Pigou (c) Fisher. Different concept of National Income (a) Gross National Product (GNP) (b) Net National Product (NNP), Personal income, disposable income, per capita income, Gross Domestic Product (GDP), National Income at market price, National Income at factor cost, National Income at current prices, National Income at constant prices.
- Methods of estimation of National Income and the difficulties in methods. (a) Output method (b) income method (c) expenditure method. Importance of National Income.

References:

1. Gass, S. L. (1997). Linear programming methods and applications, Narosa Publishing House, New Delhi.
2. Gupta, P. K. and Hira, D. S. (2008). Operation Research, 3rd edition S. Chand and company Ltd, New Delhi.
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problems,Willey International Edition.

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8. Gupta S. C. &Kapoor V. K.: Fundamentals of Mathematical Statistics. (Eleventh Edition), Sultan Chand and Sons, 23, Daryaganj, New Delhi, 110002.

Programme Outcomes and Course Outcomes Mapping:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO15
CO1	3	2	3	2	3	2	1	1	2	1	1	2	1	1
CO2	3	2	3	2	3	2	2	1	2	1	2	3	1	1
CO3	3	2	3	2	3	2	2	2	2	1	1	3	1	2
CO4	3	3	3	2	3	2	3	2	2	2	2	3	1	3
CO5	3	3	3	2	3	3	3	2	2	2	2	3	1	2
CO6	3	3	3	2	3	3	3	2	2	2	2	3	1	2
CO7	3	3	3	2	3	3	3	3	2	2	2	3	2	2
CO8	3	3	3	3	3	3	3	3	3	2	3	3	2	3

Justification:

PO1: Fundamental Knowledge and Coherent Understanding

Covers fundamental statistical concepts and their applications in demography and economy.

PO2: Procedural Knowledge for Skill Enhancement

Practical applications in demography, economy, and interdisciplinary studies enhance procedural knowledge.

PO3: Critical Thinking and Problem-Solving Skills

All statistical concepts require problem-solving skills to analyze and interpret data effectively.

PO4: Communication Skills

Effective communication is needed to present statistical findings and economic interpretations.

PO5: Analytical Reasoning Skills

Students develop analytical reasoning through statistical analysis and demographic interpretation.

PO6: Innovation, Employability, and Entrepreneurial Skills

Understanding national economy and statistical tools enhances employability and decision-making skills.

PO7: Multidisciplinary Competence

Statistics, demography, and economics intersect with various disciplines.

PO8: Value Inculcation through Community Engagement

Statistical and demographic studies contribute to social and economic awareness.

PO9: Traditional Knowledge into Modern Application

Many demographic and economic measures have evolved from traditional knowledge.

PO10: Design and Development of System

Concepts can be used to develop models for population studies and economic forecasting.

PO11: Ethical and Social Responsibility

Ethical considerations in data collection, economic policies, and demographic analysis.

PO12: Research-Related Skills

Research skills are essential for statistical data analysis and policy formulation.

PO13: Teamwork

Some aspects of statistical analysis may involve collaborative efforts.

PO15: Environmental Awareness

Demographic studies often include population-environment interactions.

Course Structure for S.Y. B. Com. (2024 Pattern) as per NEP-2020

B) B.Com. in Statistics

Sem.	Course Type	Course Code	Course Title	Theory/ Practical	Credits
III	Major Mandatory	COM-201-MRM(E)	Advanced Statistics – I	Theory	04
	Major Mandatory	COM -202-MRM(E)	Statistics Learning with Software	Theory	02
	Subject Specific Indian Knowledge System	COM-207-IKS(E)	Role of Statistics in India	Theory	02
IV	Major Mandatory	COM -251-MRM(E)	Advanced Statistics – I	Theory	04
	Major Mandatory	COM -252-MRM(E)	Statistical Computing Using MS-Excel	Theory	02

CBCS Syllabus as per NEP 2.0 for S.Y.B.Com.
(2024 Pattern)

Name of the Programme	**:** B.Com.
Program Code	**:** UCOM
Class	**:** S.Y.B.Com
Semester	**:** III
Course Type	**:** Major Theory
Course Code	**:** COM-201-MRM(E)
Course Title	**:** Advanced Statistics – I
No. of Credits	**:** 4 credits
No. of Teaching Hours	**:** 60

Course Objectives:

1) Introduce students to statistical tools like mean, median, mode, standard deviation, and their applications.
2) Develop an understanding of attributes, classification, association, and consistency of data.
3) Explain the concept, construction, and interpretation of life tables for demographic analysis.
4) Understand various demographic measures such as birth rates, fertility rates, and population growth.
5) Explain National Income concepts, estimation methods, and challenges in economic assessment.
6) Equip students with the ability to solve problems related to real-life applications in demography and economics.
7) Enhance students' ability to interpret statistical results and apply them in social and economic contexts.

Course Outcome:

By the end of the course, students will be able to:

CO1. Compute and analyze measures of central tendency (mean, median, mode) and dispersion (range, variance, standard deviation) for grouped and ungrouped data.

CO2. Understand and apply concepts of attributes, their classification, and relationships,

including Yule's coefficient of association.

CO3. Construct and interpret life tables, including functions such as lx, dx, px, qx, and their implications on life expectancy.

CO4. Apply demographic analysis techniques, including crude birth and death rates, fertility rates, and population growth measures.

CO5. Explain and compute different measures of National Income such as GDP, NNP, personal income, and per capita income.

CO6. Utilize various methods (output, income, and expenditure) for estimating National Income and discuss associated challenges.

CO7. Solve real-world problems using statistical and demographic techniques, developing data-driven decision-making skills.

CO8. Demonstrate an understanding of statistical concepts and their interdisciplinary applications in economics and demography.

TOPICS/CONTENTS:

UNIT-1 Preliminaries **(10L)**

- Measures of Central Tendency: Mean median and mode for ungrouped and grouped data. Geometric mean: definition, merits and demerits. Harmonic mean: definition, merits and demerits. Choice of A.M., G.M. and H.M. Examples and problems. Measures of Dispersion: Concept of dispersion.
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UNIT- 2 Theory of Attributes **(15L)**

- Attributes: Concept of a Likert scale, classification, notion of manifold classification, dichotomy, class-frequency, order of a class, positive class-frequency, negative class frequency, ultimate class frequency.
- Relationship among different class frequencies (up to three attributes) and dot operator to find the relation between frequencies, fundamental set of class frequencies.
- Consistency of data up to 2 attributes. Concepts of independence and association of two attributes. Yule's coefficient of association (Q), $-1 \leq Q \leq 1$, interpretation.

- Examples and problems (up to three attributes).

UNIT 3: Life Table **(10L)**

- Introduction, Construction of life table, functions (l_x, d_x, p_x, q_x, L_x, T_x, e_x) and their interpretation, expectation of life. Example, and problems.

UNIT-4: Demography **(15L)**

- Demography: Definition, nature and scope, its relation with other disciplines. Techniques of Analysis-Crude birth rate and death rate, Age specific birth rate and death rate, standardized birth rate and death rate.
- Study of fertility – total fertility rate, gross reproduction rate and net reproduction rate. Measurement of population growth rate – simple growth rate and compound growth rate.

Unit-5 National Economy **(10L)**

- Definition of National Income by (a) Marshall (b) Pigou (c) Fisher. Different concept of National Income (a) Gross National Product (GNP) (b) Net National Product (NNP), Personal income, disposable income, per capita income, Gross Domestic Product (GDP), National Income at market price, National Income at factor cost, National Income at current prices, National Income at constant prices.
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Programme Outcomes and Course Outcomes Mapping:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO15
CO1	3	2	3	2	3	2	1	1	2	1	1	2	1	1
CO2	3	2	3	2	3	2	2	1	2	1	2	3	1	1
CO3	3	2	3	2	3	2	2	2	2	1	1	3	1	2
CO4	3	3	3	2	3	2	3	2	2	2	2	3	1	3
CO5	3	3	3	2	3	3	3	2	2	2	2	3	1	2
CO6	3	3	3	2	3	3	3	2	2	2	2	3	1	2
CO7	3	3	3	2	3	3	3	3	2	2	2	3	2	2
CO8	3	3	3	3	3	3	3	3	3	2	3	3	2	3

Justification:

PO1: Fundamental Knowledge and Coherent Understanding

Covers fundamental statistical concepts and their applications in demography and economy.

PO2: Procedural Knowledge for Skill Enhancement

Practical applications in demography, economy, and interdisciplinary studies enhance procedural knowledge.

PO3: Critical Thinking and Problem-Solving Skills

All statistical concepts require problem-solving skills to analyze and interpret data effectively.

PO4: Communication Skills

Effective communication is needed to present statistical findings and economic interpretations.

PO5: Analytical Reasoning Skills

Students develop analytical reasoning through statistical analysis and demographic interpretation.

PO6: Innovation, Employability, and Entrepreneurial Skills

Understanding national economy and statistical tools enhances employability and decision-making skills.

PO7: Multidisciplinary Competence

Statistics, demography, and economics intersect with various disciplines.

PO8: Value Inculcation through Community Engagement

Statistical and demographic studies contribute to social and economic awareness.

PO9: Traditional Knowledge into Modern Application

Many demographic and economic measures have evolved from traditional knowledge.

PO10: Design and Development of System

Concepts can be used to develop models for population studies and economic forecasting.

PO11: Ethical and Social Responsibility

Ethical considerations in data collection, economic policies, and demographic analysis.

PO12: Research-Related Skills

Research skills are essential for statistical data analysis and policy formulation.

PO13: Teamwork

Some aspects of statistical analysis may involve collaborative efforts.

PO15: Environmental Awareness

Demographic studies often include population-environment interactions.

CBCS Syllabus as per NEP 2.0 for S.Y.B.Com. (2024 Pattern)

Name of the Programme	**:** B.Com.
Program Code	**:** UCOM
Class	**:** S.Y.B.Com
Semester	**:** III
Course Type	**:** Major Theory
Course Code	**:** COM-202-MRM(E)
Course Title	**:** Statistics Learning with Software
No. of Credits	**:** 2 credits
No. of Teaching Hours	**:** 30

Course Objectives:

1) Develop an understanding of attributes, classification, association, and consistency of data.
2) Explain the concept, construction, and interpretation of life tables for demographic analysis.
3) Understand various demographic measures such as birth rates, fertility rates, and population growth.
4) Explain National Income concepts, estimation methods, and challenges in economic assessment.
5) Equip students with the ability to solve problems related to real-life applications in demography and economics.
6) Enhance students' ability to interpret statistical results and apply them in social and economic contexts.
7) Lay a strong foundation for further studies in statistics, economics, and data analysis.

Course Outcome:

By the end of the course, students should be able to:

CO1. Understand and apply concepts of attributes, their classification, and relationships, including Yule’s coefficient of association.

CO2. Construct and interpret life tables, including functions such as lx, dx, px, qx, and their implications on life expectancy.

CO3. Apply demographic analysis techniques, including crude birth and death rates, fertility rates, and population growth measures.

CO4. Explain and compute different measures of National Income such as GDP, NNP, personal income, and per capita income.

CO5. Utilize various methods (output, income, and expenditure) for estimating National Income and discuss associated challenges.

CO6. Solve real-world problems using statistical and demographic techniques, developing data-driven decision-making skills.

CO7. Demonstrate an understanding of statistical concepts and their interdisciplinary applications in economics and demography.

Topics and Learning Points

Sr. No.	Title of the Experiment
1	**Analysis of Attributes – I** Calculation of Class Frequencies and Consistency of Data for Two Attributes
2	**Analysis of Attributes – II** Computation of Yule's Coefficient of Association (Q) Between Two Attributes
3	**Computation of Crude Birth Rate and Death Rate** – Analysis of age-specific birth and death rates, standardized birth and death rates
4	**Fertility and Population Growth Rate Analysis** – Calculation of Total Fertility Rate, Gross Reproduction Rate, Net Reproduction Rate, and measurement of simple and compound population growth rates.
5	**Construction and Interpretation of Life Tables** – Computing life table functions (lx, dx, px, qx, Lx, Tx, ex) and expectation of life.
6	**Computation and Comparison of National Income Indicators** – Calculation of GDP, NNP, Per Capita Income, and Disposable Income at current and constant prices.
7	**Application of Demographic and Economic Statistics in Real-World Scenarios** – Case studies or projects on statistical analysis of population data and economic indicators.(Equivalent to 2 Practicals)

References:

1. Gass, S. L. (1997). Linear programming methods and applications, Narosa Publishing House, New Delhi.
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CO4	3	3	3	2	3	3	3	2	2	2	2	3	1	2
CO5	3	3	3	2	3	3	3	2	2	2	2	3	1	2
CO6	3	3	3	2	3	3	3	3	2	2	2	3	2	2
CO7	3	3	3	3	3	3	3	3	3	2	3	3	2	3

Justification of PO-CO Mapping

PO1: Fundamental Knowledge and Coherent Understanding

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