



Anekant Education Society's
Tuljaram Chaturchand College
of Arts, Science and Commerce, Baramati
(Empowered Autonomous)

Course Structure for T.Y. B.Com. BUSINESS STATISTICS (2022 Pattern)

Name of the Programme	: B.Com.
Program Code	: UCBS
Class	: T.Y. B.Com.
Semester	: VI

Paper Code	Title of Paper	No. of Credits
UCBS361(D)	Business Statistics-V	3
UCBS362(D)	Business Statistics-VI	3
UCBSSEC9(D)	Business Statistics V(Practical)	2
UCBSSEC10(D)	Project Report in Business Statistics	2

Program Outcomes (POs) For B.Com Programme

PO1	Knowledge and Critical Thinking : Acquire skills in organizing, analyzing, evaluating and presenting information. Able to analysis issues logically, consider different options and viewpoints, make decisions and act with flexibility, adaptability and creativity.
PO2	Communication Skill : Able to communicate effectively, analyze the concepts and participate in healthy arguments and portray skill in communication and in writing. Possess skills related with banking and other business.
PO3	Independent learning : Demonstrate the ability to acquire knowledge and business skills, the capacity for self-directed activity and the ability to work independently.
PO4	Leadership quality : Exhibit qualities associated with leadership such as accountability, integrity, respect, self-reflection
PO5	Teamwork: Able to work constructively, cooperatively, effectively and respectfully as part of a team.

SYLLABUS (CBCS) FOR T.Y.B.Com. (2022 Pattern)
(w. e. from June, 2024)

Name of the Programme	: B.Com
Program Code	: UCBS
Class	: T.Y.B.Com.
Semester	: VI
Course Name	: Business Statistics – V
Course Code	: UCBS361(D)
No. of Lectures	: 48
No. of Credits	: 3

A) Course Objectives:

1. To find various measures of r.v. and probabilities using Normal distribution.
2. To understand concept of Testing of Hypothesis with real life situations.
3. To comprehend and apply the concepts of hypothesis testing for large samples, focusing on population means and proportions.
4. To gain proficiency in conducting hypothesis tests for small samples, including t-tests, chi-square tests, and F-distribution-based tests.
5. To understand non-parametric tests.
6. To explore and understand the basics of non-parametric tests and their applications when traditional parametric assumptions do not hold.
7. Understand Normal distributions with real life situations.

B) Course Outcomes:

Students should be able to:

- CO1. define the normal distribution and its characteristics also can recognize the bell-shaped curve and symmetry of the distribution.
- CO2. apply normal distribution concepts to real-world scenarios, such as height, IQ scores, and test scores.
- CO3. compute probabilities using z-scores and the standard normal distribution.
- CO4. apply testing of hypotheses to real life situations.
- CO5. understand tests for means and proportions based on normal distribution.
- CO6. apply tests for means based on t distribution and paired t-test.

CO7. apply Chi-square, F tests, non-parametric tests.

TOPICS/CONTENTS:

UNIT-1. Normal Distribution:

(12 L)

- 1.1 Definition, p.d.f., properties of normal distribution
- 1.2 mean and variance, standard normal variate,
- 1.3 problems to evaluate probabilities (using statistical table and excel)
- 1.4 additive property for two variables (statement only).
- 1.5 Fitting of normal distribution using Excel.
- 1.6 Examples and problems.

UNIT-2. Large Sample Test

(14 L)

- 2.1 Definitions of Hypothesis, Null hypothesis, Alternative hypothesis, Critical region, Types of Errors, Level of significance, P-value.
- 2.2 Test for Population Mean (for large and exact sample): Describe test procedure for testing.
 - i. $H_0: \mu = \mu_0$ against $H_1: \mu \neq \mu_0$ and
 - ii. $H_0: \mu_1 = \mu_2$ against $H_1: \mu_1 \neq \mu_2$. If population variance is known.
- 2.3 Test for population proportion: Describe test procedures for testing
 - i. $H_0: P = P_0$ against $H_1: P \neq P_0$ and
 - ii. $H_0: P_1 = P_2$ against $H_1: P_1 \neq P_2$.

UNIT-3. Small Sample Test

(14 L)

- 3.1 Test for Population Mean: Describe test procedure for testing
 - i. $H_0: \mu = \mu_0$ against $H_1: \mu \neq \mu_0$ and
 - ii. $H_0: \mu_1 = \mu_2$ against $H_1: \mu_1 \neq \mu_2$. If population variance is unknown
- 3.2 Describe the test procedure for paired t-test.
- 3.3 Describe Chi-square test for testing
 - i. Goodness of fit.
 - ii. Independence of attributes.
- 3.4 Describe test procedure for testing $H_0: \sigma_1^2 = \sigma_2^2$ against $H_1: \sigma_1^2 \neq \sigma_2^2$ (test based on F-distribution)

UNIT-4. Non-parametric Test

(8 L)

- 4.1 Introduction to Non-Parametric tests
- 4.2 sign test
- 4.3 run test

4.4 Kolmogrove – Smirnov test

4.5 Mann whitney test

Books Recommended:

1. Parimal Mukhopadhyaya: An Introduction to the Theory of Probability. World Scientific Publishing.
2. S. C. Gupta.: Fundamentals of Statistics (Third edition), Sultan Chand & Sons, New Delhi.
3. Gupta S. C. & Kapoor V. K.: Fundamentals of Mathematical Statistics. (Eleventh Edition), Sultan Chand and Sons, 23, Daryaganj, New Delhi, 110002.
4. Goon A. M., Gupta, M. K. and Dasgupta, B. (1986), Fundamentals of Statistics, Vol. 2, World Press, Kolkata.

Programme Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes				
	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	1	1
CO2	3	2	3	1	1
CO3	3	2	3	1	1
CO4	3	2	3	1	1
CO5	3	2	3	1	1
CO6	3	2	3	1	1
CO7	2	2	3	1	1

Weight: 1 - Partially related 2 - Moderately Related 3 - Strongly related

Justification:

PO1 Knowledge and Critical Thinking:

CO1: Define the normal distribution and its characteristics; also, recognize the bell-shaped curve and symmetry of the distribution.

Weightage: 3 (Strongly Related)

Justification: Defining the normal distribution and understanding its characteristics requires knowledge and critical thinking about statistical concepts, making it strongly related.

CO2: Apply normal distribution concepts to real-world scenarios, such as height, IQ scores, and test scores.

Weightage: 3 (Strongly Related)

Justification: Applying normal distribution to real-world scenarios involves critical thinking to relate theoretical concepts to practical situations, making it strongly related.

CO3: Compute probabilities using z-scores and the standard normal distribution.

Weightage: 3 (Strongly Related)

Justification: Computing probabilities using z-scores involves applying critical thinking skills to

statistical concepts, establishing a strong connection with knowledge.

CO4: Apply testing of hypotheses to real-life situations.

Weightage: 3 (Strongly Related)

Justification: Applying hypothesis testing to real-life situations involves critical thinking and knowledge of statistical methodologies, making it strongly related.

CO5: Understand tests for means and proportions based on the normal distribution.

Weightage: 3 (Strongly Related)

Justification: Understanding tests for means and proportions based on normal distribution requires critical thinking about statistical inference, aligning closely with knowledge.

CO6: Apply tests for means based on t distribution and paired t-test.

Weightage: 3 (Strongly Related)

Justification: Applying tests for means using t distribution involves critical thinking in choosing appropriate statistical tests, establishing a strong connection with knowledge.

CO7: Apply Chi-square, F tests, non-parametric tests.

Weightage: 2 (Moderately Related)

Justification: Applying Chi-square, F tests, and non-parametric tests involves knowledge and critical thinking, but it's more specialized and, therefore, moderately related.

PO2 Communication Skill:

All COs (CO1 to CO7):

Weightage: 2 (Moderately Related)

Justification: Effectively communicating statistical concepts, applications, and results requires clear communication skills, making all COs moderately related to communication skills.

PO3 Independent Learning:All COs (CO1 to CO7):

Weightage: 3 (Strongly Related)

Justification: All outcomes involve complex statistical concepts, necessitating independent learning for understanding and application.

PO4 Leadership Quality:

All COs (CO1 to CO7): Weightage: 1 (Partially Related)

Justification: Statistical concepts are more directly related to individual understanding and problem-solving than leadership qualities. However, the ability to apply these concepts in leadership decisions may still be relevant.

PO5 Teamwork:

All COs (CO1 to CO7): Weightage: 1 (Partially Related)

Justification: Statistical analyses are more individually focused, with limited direct relevance to teamwork.

SYLLABUS (CBCS) FOR T.Y.B.Com.(2022 Pattern)

(w. e. from June, 2024)

Name of the Programme	: B.Com
Program Code	: UCBS
Class	: T.Y.B.Com.
Semester	: VI
Course Name	: Business Statistics – VI
Course Code	: UCBS362(D)
No. of Lectures	: 48
No. of Credits	: 3

A) Course Objectives:

1. To understand and apply CPM/PERT techniques for effective project planning and scheduling.
2. To explore the use of simulation methods for modeling and analyzing complex systems in uncertain environments.
3. To analyze and optimize service systems using queuing theory models and techniques.
4. To learn and implement various inventory control strategies for efficient stock management and cost reduction.
5. To understand and solve sequencing and scheduling problems to improve operational efficiency.
6. To gain insights into the role of simulation in solving operations research problems and making informed decisions.
7. To integrate queuing theory, simulation, and inventory control for designing and optimizing system performance.

B) Course Outcomes:

Students should be able to

- CO1.** study different types of optimization techniques.
- CO2.** use of statistical tools in business.
- CO3.** develop the abilities in project evaluation techniques like PERT, CPM etc.
- CO4.** generate random numbers and random variates using different techniques.
- CO5.** draw the model samples from different standard distributions.
- CO6.** apply of queuing models in real life problem.
- CO7.** understand deterministic and probabilistic inventory control models.
- CO8.** find optimal sequence of jobs which minimizes the total elapsed time also their

applications of real life.

TOPICS/CONTENTS:

UNIT 1 CPM/PERT: (16L)

Meaning and scope, activity, event, node, network, path, critical path, slack, float (total, free, independent), forward pass and backward pass methods. Pessimistic, most likely and Optimistic times in PERT, mean and variance for each activity, expected duration of project, probability of completion of project, Examples and problems.

UNIT 2 Simulation: (12L)

Meaning and scope, Advantages and disadvantages of simulations, Examples and problems, step wise procedure of drawing model sample using EXCEL from uniform distribution, normal distribution using Box-Muller transformation and Monte Carlo simulation.

Simulation business Processes: case study on Inventory management simulation and customer services simulation.

UNIT 3 Queuing Theory: (10L)

Meaning, calling population, queue discipline, inter arrival rate, service rate, traffic intensity, single channel Poisson arrival with exponential service rate, average waiting time in i) queue and ii) system, average length of i) queue and ii) system. Examples and problems.

UNIT 4 Inventory Control: (10L)

Meaning and necessity of inventory control. Deterministic inventory Model: Economic order quantity for instantaneous replenishment with uniform demand and a) shortages not allowed, b) shortages allowed, Lead time, Re – order level and Buffer stock, Probabilistic Inventory Model: Single period probabilistic model without set up costs.

Books Recommended:

1. Operations Research : Harndy, Taha
2. Operations Research: Kantiswroop, Gupta
3. Business Mathematics : J. K. Sharma
4. Statistical Quality Control: Montgomery
5. Fundamentals of Mathematical Statistics: Gupta, Kapoor V.K
6. Fundamentals of Statistics: S.C. Gupta

Programme Outcomes and Course Outcomes Mapping:

Course Outcomes	Programme Outcomes (POs)				
	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	1	1
CO2	3	2	3	1	1
CO3	3	2	3	1	1
CO4	3	2	3	1	1
CO5	3	2	3	1	1
CO6	3	2	3	1	1
CO7	3	2	3	1	1
CO8	3	2	3	1	1

Weight: 1 - Partially related 2 - Moderately Related 3 - Strongly related

Justification:

PO1 Knowledge and Critical Thinking:

CO1: Study different types of optimization techniques.

Weightage: 3 (Strongly Related)

Justification: Studying optimization techniques requires critical thinking and a deep understanding of various methods, aligning strongly with knowledge and critical thinking skills.

CO2: Use statistical tools in business.

Weightage: 3 (Strongly Related)

Justification: Applying statistical tools in business involves critical thinking and a strong knowledge base in both statistics and business, making it strongly related.

CO3: Develop abilities in project evaluation techniques like PERT, CPM, etc.

Weightage: 3 (Strongly Related)

Justification: Project evaluation techniques demand critical thinking and a comprehensive understanding of methods like PERT and CPM, demonstrating a strong connection with knowledge.

CO4: Generate random numbers and random variates using different techniques.

Weightage: 3 (Strongly Related)

Justification: Generating random numbers requires knowledge of different techniques and critical thinking to apply them appropriately, making it strongly related.

CO5: Draw model samples from different standard distributions.

Weightage: 3 (Strongly Related)

Justification: Drawing model samples involves critical thinking in selecting appropriate distributions and applying knowledge of statistical concepts.

CO6: Apply queuing models in real-life problems.

Weightage: 3 (Strongly Related)

Justification: Applying queuing models requires critical thinking and knowledge of modeling real-life systems, aligning closely with knowledge and critical thinking skills.

CO7: Understand deterministic and probabilistic inventory control models.

Weightage: 3 (Strongly Related)

Justification: Understanding inventory control models involves critical thinking and a solid knowledge base in both deterministic and probabilistic scenarios.

CO8: Find optimal sequence of jobs that minimizes the total elapsed time and their applications in real life.

Weightage: 3 (Strongly Related)

Justification: Finding optimal job sequences requires critical thinking and knowledge of optimization techniques, closely aligning with knowledge and critical thinking skills.

PO2 Communication Skill:

All COs (CO1 to CO8):

Weightage: 2 (Moderately Related)

Justification: Effectively communicating optimization techniques, statistical analyses, and modeling concepts is essential, contributing to moderately related communication skills.

PO3 Independent Learning:

All COs (CO1 to CO8):

Weightage: 3 (Strongly Related)

Justification: All outcomes involve complex concepts that necessitate independent learning for understanding and application.

PO4 Leadership Quality:

All COs (CO1 to CO8):

Weightage: 1 (Partially Related)

Justification: While optimization and project management skills may be relevant to leadership, the direct connection to leadership qualities is less pronounced.

PO5 Teamwork:

All COs (CO1 to CO8):

Weightage: 1 (Partially Related)

Justification: These outcomes, while involving problem-solving, are more individually focused and have limited direct relevance to teamwork.

SYLLABUS (CBCS) FOR T.Y.B.Com.(2022 Pattern) **(w. e. from June, 2024)**

Name of the Programme	: B.Com
Program Code	: UCBS
Class	: T.Y.B.Com.
Semester	: VI
Course Name	: Business Statistics – V(Practical)
Course Code	: UCBSSEC9(D)
No. of Lectures	: 30
No. of Credits	: 2

A) Course Objectives:

1. To explore and apply the normal distribution in solving real-world problems, particularly in the areas of probability and statistical inference.
2. To understand and conduct hypothesis tests for population means and proportions, enabling data-driven decision-making.
3. Chi-square and F Distribution Tests: To develop proficiency in applying chi-square and F distribution tests for assessing goodness-of-fit, independence, and variance analysis.
4. CPM/PERT Using Tora: To learn and utilize CPM/PERT techniques within the Tora software for effective project management and scheduling.
5. Simulation Using Excel: To master the use of Excel for building and analyzing simulation models that aid in decision-making under uncertainty.
6. Queuing Theory: To understand and apply queuing theory models for optimizing service systems and minimizing waiting times.
7. Advanced Statistical Methods: To integrate and apply advanced statistical methods, including chi-square, F distributions, and simulation, to complex operational problems.

B) Course Outcomes:

Students should be able to

CO1. Ability to apply normal distribution concepts to solve practical problems in probability and

- statistics.
- CO2. Competence in performing and interpreting hypothesis tests for population means and proportions in various contexts.
 - CO3. Proficiency in using chi-square and F distribution tests to evaluate goodness-of-fit, test independence, and compare variances.
 - CO4. Capability to effectively use CPM/PERT techniques in Tora software for project planning, scheduling, and time management.
 - CO5. Skill in creating and analyzing simulation models in Excel to support decision-making under uncertain conditions.
 - CO6. Expertise in applying queuing theory to optimize service systems, reduce wait times, and improve operational efficiency.
 - CO7. Ability to integrate statistical methods such as normal distribution, hypothesis testing, and simulation for comprehensive data analysis and problem-solving.

List of Practical for Business Statistics for Sem-VI

Practical No.	Name of Practical
1	Applications of Normal distribution.
2	Testing of population means and proportions.
3	Test based on Chi-square and F distributions.
4	CPM/PERT (Using Tora)
5.	Simulation Using Excel
6.	Queuing Theory

Programme Outcomes and Course Outcomes Mapping:

Course Outcomes	Programme Outcomes (POs)				
	PO1	PO2	PO3	PO4	PO5
CO1	3	1	2	1	1
CO2	3	1	2	1	1
CO3	3	1	2	1	1
CO4	2	2	2	2	3
CO5	2	2	2	2	2
CO6	2	2	2	2	2
CO7	3	2	3	2	2

Weight: 1 - Partially related 2 - Moderately Related 3 - Strongly related

Justification:

PO1: Knowledge and Critical Thinking

CO1: Ability to apply normal distribution concepts to solve practical problems in probability and statistics.

Weightage: 3 (Strongly Related)

Justification: Applying normal distribution requires organizing and analyzing statistical data, which directly involves critical thinking and evaluation skills.

CO2: Competence in performing and interpreting hypothesis tests for population means and proportions in various contexts.

Weightage: 3 (Strongly Related)

Justification: Hypothesis testing requires a high level of analysis, evaluation, and logical thinking, aligning closely with critical thinking skills.

CO3: Proficiency in using chi-square and F distribution tests to evaluate goodness-of-fit, test independence, and compare variances.

Weightage: 3 (Strongly Related)

Justification: Utilizing chi-square and F tests involves organizing and evaluating statistical data, which fits well with critical thinking and analysis.

CO4: Capability to effectively use CPM/PERT techniques in Tora software for project planning, scheduling, and time management.

Weightage: 2 (Moderately Related)

Justification: While CPM/PERT techniques involve some degree of analytical thinking, they are more focused on project management rather than in-depth critical analysis.

CO5: Skill in creating and analyzing simulation models in Excel to support decision-making under uncertain conditions.

Weightage: 2 (Moderately Related)

Justification: Creating and analyzing simulation models requires analytical skills but is more related to practical problem-solving rather than pure critical thinking.

CO6: Expertise in applying queuing theory to optimize service systems, reduce wait times, and improve operational efficiency.

Weightage: 2 (Moderately Related)

Justification: Applying queuing theory involves problem-solving and analysis, but it's more application-oriented rather than theoretical critical thinking.

CO7: Ability to integrate statistical methods such as normal distribution, hypothesis testing, and simulation for comprehensive data analysis and problem-solving.

Weightage: 3 (Strongly Related)

Justification: Integrating multiple statistical methods involves complex analysis and critical thinking, directly related to evaluating and presenting information.

PO2: Communication Skill

CO1: Ability to apply normal distribution concepts to solve practical problems in probability and

statistics.

Weightage: 1 (Partially Related)

Justification: While understanding and applying normal distribution can be communicated, it's more focused on technical skills rather than communication.

CO2: Competence in performing and interpreting hypothesis tests for population means and proportions in various contexts.

Weightage: 1 (Partially Related)

Justification: Interpreting hypothesis tests involves some communication but is primarily a technical skill.

CO3: Proficiency in using chi-square and F distribution tests to evaluate goodness-of-fit, test independence, and compare variances.

Weightage: 1 (Partially Related)

Justification: Similar to hypothesis tests, this involves technical skills more than communication.

CO4: Capability to effectively use CPM/PERT techniques in Tora software for project planning, scheduling, and time management.

Weightage: 2 (Moderately Related)

Justification: Communicating project plans and schedules involves some communication skills, though the focus is more on technical application.

CO5: Skill in creating and analyzing simulation models in Excel to support decision-making under uncertain conditions.

Weightage: 2 (Moderately Related)

Justification: Communicating the results and insights from simulations involves communication, but it's secondary to the technical aspect.

CO6: Expertise in applying queuing theory to optimize service systems, reduce wait times, and improve operational efficiency.

Weightage: 2 (Moderately Related)

Justification: Explaining the application of queuing theory involves some communication but is largely technical.

CO7: Ability to integrate statistical methods such as normal distribution, hypothesis testing, and simulation for comprehensive data analysis and problem-solving.

Weightage: 2 (Moderately Related)

Justification: Integrating methods involves explaining complex data analysis, which requires communication skills but is not the primary focus.

PO3: Independent Learning

CO1: Ability to apply normal distribution concepts to solve practical problems in probability and

statistics.

Weightage: 2 (Moderately Related)

Justification: Applying statistical concepts independently demonstrates some level of self-directed learning.

CO2: Competence in performing and interpreting hypothesis tests for population means and proportions in various contexts.

Weightage: 2 (Moderately Related)

Justification: Performing hypothesis tests requires self-learning and applying statistical techniques independently.

CO3: Proficiency in using chi-square and F distribution tests to evaluate goodness-of-fit, test independence, and compare variances.

Weightage: 2 (Moderately Related)

Justification: Learning and applying these tests independently shows the capacity for self-directed learning.

CO4: Capability to effectively use CPM/PERT techniques in Tora software for project planning, scheduling, and time management.

Weightage: 2 (Moderately Related)

Justification: Learning and using project management tools independently indicates self-directed activity.

CO5: Skill in creating and analyzing simulation models in Excel to support decision-making under uncertain conditions.

Weightage: 2 (Moderately Related)

Justification: Creating and analyzing models independently demonstrates the ability to learn and apply skills.

CO6: Expertise in applying queuing theory to optimize service systems, reduce wait times, and improve operational efficiency.

Weightage: 2 (Moderately Related)

Justification: Applying queuing theory independently shows the capacity for self-learning and problem-solving.

CO7: Ability to integrate statistical methods such as normal distribution, hypothesis testing, and simulation for comprehensive data analysis and problem-solving.

Weightage: 3 (Strongly Related)

Justification: Integrating various statistical methods independently demonstrates a high level of self-directed learning and application.

PO4: Leadership Quality

CO1: Ability to apply normal distribution concepts to solve practical problems in probability and statistics.

Weightage: 1 (Partially Related)

Justification: Applying normal distribution doesn't directly involve leadership qualities but may contribute to overall problem-solving skills.

CO2: Competence in performing and interpreting hypothesis tests for population means and proportions in various contexts.

Weightage: 1 (Partially Related)

Justification: Hypothesis testing is primarily a technical skill, with less direct connection to leadership qualities.

CO3: Proficiency in using chi-square and F distribution tests to evaluate goodness-of-fit, test independence, and compare variances.

Weightage: 1 (Partially Related)

Justification: This is more focused on technical proficiency rather than leadership qualities.

CO4: Capability to effectively use CPM/PERT techniques in Tora software for project planning, scheduling, and time management.

Weightage: 2 (Moderately Related)

Justification: Effective project management using CPM/PERT techniques involves some leadership qualities, such as accountability and scheduling.

CO5: Skill in creating and analyzing simulation models in Excel to support decision-making under uncertain conditions.

Weightage: 2 (Moderately Related)

Justification: Creating simulation models supports decision-making, which can be linked to leadership in terms of making informed decisions.

CO6: Expertise in applying queuing theory to optimize service systems, reduce wait times, and improve operational efficiency.

Weightage: 2 (Moderately Related)

Justification: Applying queuing theory can contribute to operational efficiency, which reflects some aspects of leadership in improving systems.

CO7: Ability to integrate statistical methods such as normal distribution, hypothesis testing, and simulation for comprehensive data analysis and problem-solving.

Weightage: 2 (Moderately Related)

Justification: Integrating methods for comprehensive analysis can involve leadership in decision-making and problem-solving.

PO5: Teamwork

CO1: Ability to apply normal distribution concepts to solve practical problems in probability and statistics.

Weightage: 1 (Partially Related)

Justification: This outcome is more focused on individual technical skills rather than teamwork.

CO2: Competence in performing and interpreting hypothesis tests for population means and proportions in various contexts.

Weightage: 1 (Partially Related)

Justification: Similar to CO1, this is primarily an individual technical skill.

CO3: Proficiency in using chi-square and F distribution tests to evaluate goodness-of-fit, test independence, and compare variances.

Weightage: 1 (Partially Related)

Justification: This outcome focuses on individual technical ability rather than teamwork.

CO4: Capability to effectively use CPM/PERT techniques in Tora software for project planning, scheduling, and time management.

Weightage: 3 (Strongly Related)

Justification: Project planning and scheduling using CPM/PERT involve collaboration and teamwork, making it strongly related.

CO5: Skill in creating and analyzing simulation models in Excel to support decision-making under uncertain conditions.

Weightage: 2 (Moderately Related)

Justification: Analyzing simulation models may involve some degree of teamwork in collaborative settings.

CO6: Expertise in applying queuing theory to optimize service systems, reduce wait times, and improve operational efficiency.

Weightage: 2 (Moderately Related)

Justification: Applying queuing theory can involve teamwork in optimizing systems and improving efficiency.

CO7: Ability to integrate statistical methods such as normal distribution, hypothesis testing, and simulation for comprehensive data analysis and problem-solving.

Weightage: 2 (Moderately Related)

Justification: Integrating various methods for analysis can involve teamwork, especially in collaborative problem-solving scenarios.

SYLLABUS (CBCS) FOR T.Y.B.Com.(2022 Pattern)
(w. e. from June, 2024)

Name of the Programme	: B.Com
Program Code	: UCBS
Class	: T.Y.B.Com.
Semester	: VI
Course Name	: UCBSSEC10(D)
Course Code	: Project Report in Business Statistics
No. of Lectures	: 30
No. of Credits	: 2

A) Course Objectives:

1. The student will develop skills for data analysis.
2. Students should be able to identify the statistical tools, models for analyze the data.
3. develop proficiency in using statistical software packages like TORA, Excel for data analysis and visualization.
4. improve the ability to communicate statistical findings effectively through written reports and presentations
5. apply advanced statistical techniques to analyze the research data and draw meaningful conclusions
6. interpret the results of the analysis and discuss their implications in the context of the project questions/objectives.
7. develop the ability to critically evaluate existing statistical literature and research studies in the field.

B) Course outcomes:

- CO1. Student will able to sole real life situation by using statistical techniques.
- CO2. Student will be exploring their algorithmic approaches to problem solving.
- CO3. Adhere to ethical standards in data handling, analysis, and reporting.
- CO4. Reflect on the project experience, including challenges faced and lessons learned.
- CO5. Identify areas for improvement and future directions for the research topic.
- CO6. Contribute to statistical literacy and awareness.
- CO7. Demonstrate a commitment to continuous learning by staying updated on emerging statistical techniques and tools.

Guideline for Project:

1. For project **maximum 5 students are allowed** in a group.
2. Project: Statistical techniques have to use for Data Analysis and make report in dissertation form.
3. Students have to prepare project report and have to submit one copy for the assessment to the examiner.
4. Project Evaluation: 20 Marks
5. In order to acquaint the students with applications of statistical methods in various fields such as industries, agricultural sectors, government institutes, etc. at least one Study Tour for T.Y. B.Com. Statistics students may be arranged.

Programme Outcomes and Course Outcomes Mapping:

Course Outcomes	Programme Outcomes (POs)				
	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	1
CO2	2	2	2	2	2
CO3	1	1	1	2	1
CO4	2	2	3	3	2
CO5	2	2	3	2	2
CO6	2	3	2	2	2
CO7	2	2	3	2	2

Weight: 1 - Partially related 2 - Moderately Related 3 - Strongly related

Justifications:

PO1: Knowledge and Critical Thinking

CO1: Strongly related because solving real-life situations using statistical techniques requires high-level analytical skills.

CO2: Moderately related as exploring algorithmic approaches involves some analytical thinking.

CO3: Partially related because ethical standards are important but not directly tied to critical thinking.

CO4: Moderately related since reflecting on project experience involves evaluation and analysis.

CO5: Moderately related as identifying future directions requires analysis but is more focused on improvement.

CO6: Moderately related because contributing to statistical literacy involves applying knowledge.

CO7: Moderately related as staying updated involves ongoing learning and application of new knowledge.

PO2: Communication Skill

- CO1:** Moderately related as solving real-life problems must be communicated effectively.
- CO2:** Moderately related because exploring algorithmic approaches needs to be communicated clearly.
- CO3:** Partially related since ethical standards involve less direct communication.
- CO4:** Moderately related as reflecting on project experience requires clear communication.
- CO5:** Moderately related due to the need to communicate future directions and areas for improvement.
- CO6:** Strongly related because contributing to statistical literacy involves effectively communicating statistical concepts.
- CO7:** Moderately related since staying updated involves sharing knowledge and tools.

PO3: Independent Learning

- CO1:** Moderately related as solving real-life situations requires self-directed learning.
- CO2:** Moderately related due to the exploration of algorithmic approaches independently.
- CO3:** Partially related since adhering to ethical standards involves less self-directed learning.
- CO4:** Strongly related as reflecting on project experience involves self-assessment and learning.
- CO5:** Strongly related as identifying areas for improvement requires self-directed reflection and planning.
- CO6:** Moderately related due to the contribution to statistical literacy through self-directed learning.
- CO7:** Strongly related as continuous learning involves staying updated and self-directed study.

PO4: Leadership Quality

- CO1:** Partially related as solving problems is less about leadership qualities.
- CO2:** Moderately related as exploring algorithmic approaches may involve leadership in problem-solving.
- CO3:** Moderately related due to the importance of ethical standards in leadership roles.
- CO4:** Strongly related as reflecting on project experience involves leadership in handling challenges and lessons learned.
- CO5:** Moderately related as identifying future research directions can involve leadership in guiding research.
- CO6:** Moderately related due to the role of leadership in promoting statistical literacy.
- CO7:** Moderately related as demonstrating commitment to continuous learning reflects leadership qualities.

PO5: Teamwork

- CO1:** Partially related since solving real-life situations often involves teamwork.
- CO2:** Moderately related as exploring algorithmic approaches can be part of a team effort.
- CO3:** Partially related as adhering to ethical standards is often an individual responsibility but affects team dynamics.
- CO4:** Moderately related due to the importance of reflecting on team projects.
- CO5:** Moderately related as identifying improvements can involve teamwork for future research directions.
- CO6:** Moderately related as contributing to statistical literacy often involves collaborative efforts.
- CO7:** Moderately related as staying updated on techniques can be part of a team-based approach to continuous learning.

