NOTIFICATION
(23/June/Adp./4 2)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the Syllabi and Courses of Studies in the subject of **Statistics** of Semester **IVth** for **Four Year Under Graduate Programme (FYUGP)** under the **Choice Based Credit System** as per **NEP-2020 (as given in the annexure)** for the examinations to be held in the years as per the details given below:

Subject	Semester	For the examinations to be held in the year
Statistics	Semester-IV	May 2024 , 2025 and 2026

The Syllabi of the courses is also available on the University website: **www.jammuuniversity.ac.in**.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/23/3905 - 3915
Dated: 5-6-2023

Copy for information and necessary action to:

1. Dean, Faculty of Mathematical Sciences
2. Convener, Board of Studies in **Statistics**
3. Sr. P.A.to the Controller of Examinations
4. All members of the Board of Studies
5. Confidential Assistant to the Controller of Examinations
6. I/C Director, Computer Centre, University of Jammu
7. Deputy Registrar/Asst. Registrar (Conf. /Exams. UG)
8. Incharge, University Website for Uploading of the notification.

Deputy Registrar (Academic)

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)
Major

Course Code: UMJSTT401   **Course Title: Theory of Sample Surveys**

Credits: 03+01
Duration of examination: 03 hours   **Max. Marks: 100**
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

Course Prerequisites:

To study this subject a student must have knowledge of basic concepts of Mathematics.

Course Learning Outcomes:
The learning objectives include:
- To provide tools and techniques for selecting a sample of elements from a target population keeping in mind the objectives to be fulfilled and nature of population.
- To obtain estimator of the population parameter on the basis of selected sample and study its properties.

UNIT I
Complete enumeration Vs sample enumeration; advantages and disadvantages of sample survey, objectives of sampling, principal steps in a sample survey, limitations of sampling, sampling and non-sampling errors, types of sampling, probability sampling purposive sampling and mixed sampling, random numbers. Simple random sample from finite
population, S.R.S. with & without replacement, estimation of mean and variance and their unbiasedness, merits and demerits of SRS.

UNIT II
Meaning of Stratification, Method of Stratified sampling and its advantages and disadvantages. Mean and Variance of Stratified sampling, Method of allocation: equal allocation, Proportional allocation, optimum allocation/ Neyman allocation, comparison of stratified random sampling with SRS

UNIT III
Systematic Sampling: Technique, estimates of population mean and total, variances of these estimates ($N = nk$). Comparison of systematic sampling with SRS and stratified sampling in the presence of linear trend and corrections. Circular systematic sampling.

UNIT IV
Cluster sampling (equal clusters only) estimation of population mean and its variance, comparison (with and without randomly formed clusters). Relative efficiency of cluster sampling with SRS in terms of intra class correlation. Concept of sub-sampling.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT401   **Course Title: Theory of Sample Surveys**

Credits: 03+01
Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

Books Recommended

1. Choudhary, F. S and Singh, Daroga (2020): Theory and Analysis of sample Survey Designs, New Age International Private Limited

2. Cochran, W.J. (1991) : Sampling Technique. Wiley Series in Probability and Statistics.

3. Sukhatme, P.V. and Sukhatme B.V.(1984): Sampling theory survey with applications. Iowa State University Press; 3rd Revised edition

4. Murty, M.N.(1969): Sampling theory and methods. Statistical Publishing Society,Kolkatta.

5. Chaudhari , A and Pal, S.(2023) : A Comprehensive Textbook on Sample Surveys. Springer Verlag, Singapore; 1st ed.

6. Gupta, S.C and Kapoor, V.K.(2014); Fundamental of applied Statistics. Sultan Chand & Sons; Fourth edition

7. Changbao, Wu and Thompson, Mary E.(2020) : Sampling Theory and Practice Springer Nature Switzerland AG; 1st ed.

8. Panse,V.G. and Sukhatme P.V.(1985): Statistical methods of agricultural workers. Indian Council of Agricultural Research Publication.

PRACTICAL/LAB WORK

1. Problems based on Selection of Sample using Random number Tables
2. Problems based on Estimation of Mean and Variance of SRSWOR and SRSWR & their Comparison.
3. Problems based on Stratified Random sampling and Comparison with SRS.
4. Problems based on Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR
5. Problems based on Systematic sampling with N = nk. Comparison of Systematic sampling with Stratified and SRSWOR.
6. Problems based on Circular systematic Sampling.
7. Problems based on Cluster Sampling.
8. Problems based on Relative efficiency of Cluster Sampling with SRS.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT401　　　**Course Title: Theory of Sample Surveys**

Credits: 03+01
Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

SCHEME OF EXAMINATIONS

THEORY	Syllabus to be covered in the examination	Time allotted	% Weightage (Marks)
Mid-Semester Assessment Test shall be conducted by the course coordinator. **Pattern:** One long answer type question of 10 marks and Five short answer type questions of 01 mark each.	Up to 50%	$1\frac{1}{2}$ hours	15
External End Semester University Exam Pattern: As proposed by the BOS and approved by Academic Council	Up to 100%	03 hours	60
Total			75

PRACTICAL		
Internal: Daily evaluation of practical records/Viva voce/attendance etc.	10 (50% day to day performance and 50% for internal test)	
External: Final Practical Performance + viva voce	100% Syllabus	15 = 10 Exam 05 viva-voce
Total		25

NOTE FOR PAPER SETTING: End Semester External University Examination

The question paper will contain **TWO** Sections.

Section-A will consist of **FOUR COMPULSORY** short answer type questions (to be answered in 70-80 words) i.e., one question from each unit. Each question shall carry 3 marks.

Section -B will contain **EIGHT** long answer type questions (to be answered in 500-600 words), Two questions from each unit and the student has to attempt **FOUR** questions selecting one question from each unit. Each question shall carry 12 marks.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)
Major

Course Code: UMJSTT402   **Course Title: Demography and Vital Statistics**

Credits: 03+01
Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

Course Objectives:
The learning objectives include: To collect valid Demographic data using different methods. To learn basic measures of Mortality, Fertility and Population Growth. To construct life tables.

UNIT I
Population Theories: Coverage and content errors in demographic data, use of balancing equations and Chandrasekaran-Deming formula to check completeness of registration data.
Adjustment of age data, use of Myer and UN indices, Population composition, dependency ratio.

UNIT II
Introduction and sources of collecting data on vital statistics, errors in census and registration data. Measurement of population, rate and ratio of vital events. Measurements of Mortality: Crude Death Rate (CDR), Specific Death Rate (SDR), Infant Mortality Rate (IMR) and Standardized Death Rates.

UNIT III
Stationary and Stable population, Central Mortality Rates and Force of Mortality. Life (Mortality) Tables: Assumption, description, construction of Life Tables and Uses of Life Tables.

UNIT IV
Abridged Life Tables; Concept and construction of abridged life tables by Reed-Merrell method, Greville's method and King's Method. Measurements of Fertility: Crude Birth
Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate (SFR) and Total Fertility Rate (TFR). Measurement of Population Growth: Crude rates of natural increase, Pearl's Vital Index, Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR).

Books Recommended:
1. Biswas, S. (1988). Stochastic Processes in Demography & Application, Wiley Eastern Ltd.
2. Croxton, Fredrick, E. Cowden, Dudley J. and Klein, S. (1973). Applied General Statistics, 3rd Ed., Prentice Hall of India Pvt. Ltd.
3. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2008). Fundamentals of Statistics, Vol. II, 9th Ed. World Press.
4. Sharma, R. (2022). Demography and Population Problems. Atlantic Publishers and Distributors (P) Ltd.
5. Larry, D. B. (2021). Demography and the Anthropocene, Springer.
6. Keyfitz, N. and Beekman, J.A. (1985). *Demography through Problems*. S-Verlag, New York.
7. Mukhopadhyay, P. (1999). *Applied Statistics*, Books and Allied (P) Ltd.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT402   Course Title: Demography and Vital Statistics

Credits: 03+01
Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

PRACTICAL/LAB WORK

1. To calculate CDR and Age Specific death rate for a given set of data.
2. To find standardized death rate by: (i) Direct method (ii) Indirect method.
3. To construct a complete life table.
4. To fill in the missing entries in a life table.
5. To calculate probabilities of death at pivotal ages and use it construct abridged life table using:
   (i) Reed-Merrell Method, (ii) Greville's Method and (iii) King's Method.
6. To calculate CBR, GFR, SFR, TFR for a given set of data.
7. To calculate Crude rate of Natural Increase and Pearle's Vital Index for a given set of data.
8. Calculate GRR and NRR for a given set of data and compare them.

SCHEME OF EXAMINATIONS

THEORY	Syllabus to be covered in the examination	Time allotted	% Weightage (Marks)
Mid-Semester Assessment Test shall be conducted by the course coordinator. **Pattern:** One long answer type question of 10 marks and Five short answer type questions of 01 mark each.	Up to 50%	$1\frac{1}{2}$ hours	15
External End Semester University Exam Pattern: As proposed by the BOS and approved by Academic Council	Up to 100%	03 hours	60
Total			75

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)
Major

Course Code: UMJSTT402

Course Title: Demography and Vital Statistics

Credits: 03+01

Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

PRACTICAL		
Internal: Daily evaluation of practical records/Viva voce/attendance etc.	10 (50% day to day performance and 50% for internal test)	
External: Final Practical Performance viva voce	100% Syllabus	15 = 10 Exam 05 viva-voce
Total		25

NOTE FOR PAPER SETTING: End Semester External University Examination

The question paper will contain **TWO** Sections.

Section-A will consist of **FOUR COMPULSORY** short answer type questions (to be answered in 70-80 words) i.e., one question from each unit. Each question shall carry **3 marks.**

Section -B will contain **EIGHT** long answer type questions (to be answered in 500-600 words), Two questions from each unit and the student has to attempt FOUR questions selecting one question from each unit. Each question shall carry 12 marks.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT403   **Course Title:** Sampling Distributions
Credits: 03+01
Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

Course prerequisites: To study this course, a student must have opted/passed the UMISTT303.

Course Objectives:

The learning objectives include:

- To understand the concept of sampling distributions and their applications in statistical inference.
- To understand the process of hypothesis testing.
- To have a clear understanding of when to apply various tests of hypothesis about population parameters using sample statistics and draw appropriate conclusions from the analysis.

Course Learning Outcomes:

- Large Sample Tests
- Chi square distribution with applications.
- t and F distributions and their applications.
- Small sample tests based on t, F and Chi-Square Distribution

Unit I

Definitions of random sample, parameter and statistic, sampling distribution of a statistic, sampling distribution of sample mean, standard errors of sample mean, sample variance and sample proportion. Null and alternative hypotheses, level of significance, Type I and Type II errors, their probabilities and critical region. Large sample tests: Role of CLT in Large Sample Tests, Large Sample tests for testing single proportion, difference of two proportions, single mean, difference of two means, standard deviation and difference of standard deviations by classical and p-value approaches.

UNIT II

Exact sampling distribution: Definition and derivation of pdf of χ^2 with n degrees of freedom (d.f.) using mgf, nature of pdf curve for different degrees of freedom, mean, variance, mgf, mode, additive property and limiting form of χ^2 distribution. Tests of Significance and confidence intervals based on the distribution.

UNIT III

Exact sampling distributions: Student's and Fishers t-distribution, Derivation of its pdf, nature of probability curve with different degrees of freedom, mean, variance, moments and limiting form of t distribution. Tests of Significance and confidence intervals based on the distribution.

Unit IV

Snedecore's F Distribution: Derivation of pdf, nature of pdf nature of pdf curve with different degrees of freedom, mean, variance and mode. Distribution of $1/F(n_1,n_2)$ and various other properties. Relationship between t, F and χ^2 distributions. Test of significance and confidence Intervals based on F Distribution.

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Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT403   **Course Title:** Sampling Distributions

Credits: 03+01

Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

Books Recommended:

1. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2003). *An Outline of Statistical Theory,*Vol. I, 4th Ed., World Press, Kolkata.
2. Hogg, R.V. and Tanis, E.A. (2009). *A Brief Course in Mathematical Statistics.* Pearson Education.
3. Johnson, R.A. and Bhattacharya, G.K. (2001). *Statistics-Principles and Methods*, 4th Ed., John Wiley and Sons.
4. Mood, M.A., Graybill, F.A. and Boes, C.D. (2007). *Introduction to the Theory of Statistics*, 3rd Ed., (Reprint). Tata McGraw-Hill Pub. Co. Ltd.
5. Rohatgi, V. K. and Saleh, A.K. Md. E. (2009). *An Introduction to Probability and Statistics*, 2nd Ed., (Reprint) John Wiley and Sons.
6. Chougule, S, P.(2022) .Statistical Inference: Testing of Hypothesis. Bluerose Publishers Pvt. Ltd.; First edition
7. Michael, C. A. (2021). The Myth of Statistical Inference. Springer Nature Switzerland AG; 1st ed. 2021 edition.

PRACTICAL/LAB WORK:

1. Testing of significance and confidence intervals for single proportion and difference of two proportions
2. Testing of significance and confidence intervals for single mean and difference of two means and paired tests.
3. Testing of significance and confidence intervals for difference of two standard deviations.
4. Exact Sample Tests based on Chi-Square Distribution.
5. Testing if the population variance has a specific value and its confidence intervals.
6. Testing of goodness of fit.
7. Testing and confidence intervals of equality of two population variances

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT403   **Course Title: Sampling Distributions**
Credits: 03+01
Duration of examination: 03 hours   **Max. Marks: 100**
                                                    Mid-Term:15
                                                    End-term:60
                                                    Practical Internal :10
                                                    Practical External :15

SCHEME OF EXAMINATIONS

THEORY	Syllabus to be covered in the examination	Time allotted	% Weightage (Marks)
Mid-Semester Assessment Test shall be conducted by the course coordinator. **Pattern**: One long answer type question of 10 marks and Five short answer type questions of 01 marks each.	Up to 50%	$1\frac{1}{2}$ hours	15
External End Semester University Exam Pattern: As proposed by the BOS and approved by Academic Council	Up to 100%	03 hours	60
Total			**75**

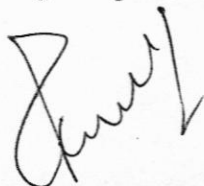| PRACTICAL		
Internal: Daily evaluation of practical records/Viva voce/attendance etc.	10 (50% day to day performance and 50% for internal test)	
External: Final Practical Performance + viva voce	100% Syllabus	15 = 10 Exam 05 viva-voce
Total		**25**

NOTE FOR PAPER SETTING: End Semester External University Examination

The question paper will contain **TWO** Sections.

Section-A will consist of **FOUR COMPULSORY** short answer type questions (to be answered in 70-80 words) i.e., one question from each unit. Each question shall carry 3 **marks.**

Section -B will contain **EIGHT** long answer type questions (to be answered in 500-600 words), Two questions from each unit and the student has to attempt **FOUR** questions selecting one question from each unit. Each question shall carry 12 marks.

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Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT404 **Course Title: Operations Research**
Credits: 03+01
Duration of examination: 03 hours   Max. Marks: 100
                                               Mid-Term:15
                                               End-term:60
                                               Practical Internal :10
                                               Practical External :15

Course Objectives:
- To study various Operational Research Techniques and Models.

Course Learning Outcomes:
After completing this course, students should have developed a clear understanding of:
- The fundamental concepts of Operational Research Techniques
- Linear Programming.
- Transportation and assignment problems
- Game Theory
- Inventory Models

UNIT I
Introduction to Operations Research (O.R.): Definition and phases of O.R. Model building, various types of O.R. problems. Linear Programming Problem (L.P.P.): Mathematical formulation of the L.P.P, graphical solutions of L.P.P. Simplex method for solving L.P.P.

UNIT II
Charne's M-technique for solving L.P.P. involving artificial variables. Special cases of L.P.P. Concept of Duality in L.P.P: Dual simplex method. Economic interpretation of Duality.

UNIT III
Transportation Problem: Initial solution by North West corner rule, Least cost method and Vogel's approximation method (VAM), MODI's method to find the optimal solution, special cases of transportation problem.
Assignment problem: Hungarian method to find optimal assignment, special cases of assignment problem.
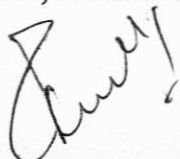
UNIT IV
Introduction to Decision Analysis: Pay-off table for one-off decisions and discussion of Decision criteria, Decision trees.
Quadratic programming: Beale's and Wolfe's methods.
Network Scheduling: CPM, PERT.

Books Recommended:

1. Taha, H. A. (2007). *Operations Research: An Introduction*, 8thEd., Prentice Hall of India.
2. Swarup, K., Gupta, P.K. and Man Mohan (2017). *Operations Research*, 13th Ed., Sultan Chand and Sons.
3. H.A. Taha (2014) : Operations Research, Pearson Education India.
4. S.S. Rao (1984) : Optimization: Theory and applications, John Wiley.
5. S.D. Sharma (2017) : Operations Research, Kedar Nath Ram Nath & Sons.
6. Harris and Gross (2008) : Fundamental of Queueing Theory, Wiley

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT404　　　　**Course Title: Operations Research**
Credits: 03+01
Duration of examination: 03 hours

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

PRACTICAL/LAB WORK:

1. Solution of L.P. problem by Graphical method.
2. Solution of L.P. problem by simplex method.
3. Problems based on Charne's M-technique for solving L.P.P. involving artificial variables.
4. IBFS for a transportation problem by North-West corner rule, least cost method and Vogel's approximation method.
5. Optimum solution to transportation problem by MODI method.
6. Problems based on Hungarian method to find optimal assignment.
7. Problems based on Concept of Decision trees.
8. Problems based on Quadratic programming (Beale's and Wolfe's methods) .

SCHEME OF EXAMINATIONS

THEORY	Syllabus to be covered in the examination	Time allotted	% Weightage (Marks)
Mid-Semester Assessment Test shall be conducted by the course coordinator. **Pattern**: One long answer type question of 10 marks and Five short answer type questions of 01 mark each.	Up to 50%	$1\frac{1}{2}$ hours	15
External End Semester University Exam **Pattern**: As proposed by the BOS and approved by Academic Council	Up to 100%	03 hours	60
Total			75
PRACTICAL			
Internal: Daily evaluation of practical records/Viva voce/attendance etc.	10 (50% day to day performance and 50% for internal test)		
External: Final Practical Performance viva voce	100% Syllabus	15 =10 Exam 05 viva-voce	
Total			25

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Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)

Major

Course Code: UMJSTT404　　　**Course Title: Operations Research**

Credits: 03+01

Duration of examination: 03 hours　　　Max. Marks: 100

Mid-Term:15

End-term:60

Practical Internal :10

Practical External :15

NOTE FOR PAPER SETTING: End Semester External University Examination

The question paper will contain **TWO** Sections.

Section-A will consist of **FOUR COMPULSORY** short answer type questions (to be answered in 70-80 words) i.e., one question from each unit. Each question shall carry3 **marks.**

Section -B will contain **EIGHT** long answer type questions (to be answered in 500-600 words), Two questions from each unit and the student has to attempt FOUR questions selecting one question from each unit. Each question shall carry 12 marks.

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Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)
Minor

Course Code: UMISTT405

Credits:(03+01)
Duration of examination: 03 hours

Course Title: Statistical Inference and Testing of Hypothesis

Max. Marks: 100
    Mid-Term:15
    End-term:60
    Practical Internal :10
    Practical External :15

Course Prerequisites: To study this course, a student must have opted/passed the UMISTT303.

Course Outcomes: After completing this course, a student will have:

- Ability to understand the Estimation and criteria for a good estimator,
- Ability to understand the concept of methods of estimation like method of moments and maximum likelihood
- Ability to understand the concept of testing of hypothesis, null and alternative hypotheses, Type-I and Type-II errors, critical region, level of significance.
- Ability to deal with non-parametric tests.

UNIT I

Estimation: Problem of estimation, theory of estimation, point estimation, interval estimation, criteria for a good estimator, unbiasedness, consistency, efficiency and sufficiency with examples.

UNIT II

Methods of Estimation: Method of moments and maximum likelihood and application of these method for obtaining estimates of parameters of binomial, Poisson and normal distributions, properties of M.L.E's (without proof), merits and demerits of these methods.

UNIT III

The concept of sampling distribution, Sampling distribution of t, F and Chi-Square with simple properties and applications.

Principles of test of significance: Null and alternative hypotheses (simple and composite), Type-I and Type-II errors, critical region, level of significance, size and power, best critical region. Large Sample Tests.

UNIT IV

Small sample tests based on t, F and Chi-Square: test for significance of single mean, difference between means, paired t-test, test of significance for equality of two variance, Chi-Square test for goodness of fit, significance of population Variance and independence of attributes.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)
Minor

Course Code: UMISTT405

Credits:(03+01)
Duration of examination: 03 hours

Course Title: Statistical Inference and Testing of hypothesis

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

Books Recommended:

1. Gibbons, J.D. and S. Chakraborti (2020). Non-parametric statistical inference, 6th Edn., by Chapman and Hall/CRC.
2. Kendall and Stuart (1983). The advanced theory of statistics Vol-III.
3. Conover W.J. (1999). Practical Non-parametric Inference 3rd Edn., John Wiley and sons.
4. Hogg., R.V. and Craig A.T. (1972): An Introduction of Mathematical Statistics, Amerind publications.
5. Mood, A.M. Graybill, F.A. and Boes, D.C. (1974). Introduction to the Theory of Statistics, 3rd Edn., Tata McGraw-Hill Pub. Co. Ltd.
6. Srivastava and Srivastava (2009): Statistical Inference: Testing of Hypothesis, Prentice-Hall of India Pvt. Limited.
7. Goon, A.M., Gupta, M.K. and Dasgupta, B. (1991): An Outline of Statistics Volume II, The World Press Pvt Ltd.
8. Chougule, S, P.(2022) .Statistical Inference: Testing of Hypothesis. Bluerose Publishers Pvt. Ltd.; First edition
9. Michael, C. A. (2021). The Myth of Statistical Inference. Springer Nature Switzerland AG; 1st ed. 2021 edition.

Practical/Lab Work:

Problems based on

1. Unbiased estimators, Consistent estimators, efficient estimators and relative efficiency of estimators
2. Maximum Likelihood Estimation
3. Problems based on t, F and Chi-Square test and large sample tests.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-IV
(Examination to be held in May 2024,2025 and 2026)
Minor

Course Code: UMISTT405
Credits:(03+01)
Duration of examination: 03 hours

Course Title: Statistical Inference and Testing of Hypothesis

Max. Marks: 100
Mid-Term:15
End-term:60
Practical Internal :10
Practical External :15

SCHEME OF EXAMINATION

THEORY	Syllabus to be covered in the examination	Time allotted	% Weightage (Marks)
Mid-term Assessment Test shall be conducted by the course coordinator. **Pattern**: One long answer type question of 10 marks and Five short answer type questions of 1 mark each.	Up to 50%	$1\frac{1}{2}$ hours	15
External End Semester University Exam **Pattern**: As proposed by the BOS and approved by Academic Council	Up to 100%	03 hours	60
Total			75
PRACTICAL			
Internal: Daily evaluation of practical records / Viva-voce/attendance etc.	10 (50% day to day performance and 50% for internal test)		
External: Final Practical Performance + viva voce	100% Syllabus		15 =10 Exam 05 viva-voce
Total			25

NOTE FOR PAPER SETTING: End Semester External University Examination

The question paper will contain **TWO** Sections.

Section-A will consist of **FOUR COMPULSORY** short answer type questions (to be answered in 70-80 words) i.e., one question from each unit. Each question shall carry **3 marks.**

Section -B will contain **EIGHT** long answer type questions (to be answered in 500-600 words), Two questions from each unit and the student has to attempt FOUR questions selecting one question from each unit. Each question shall carry 12 marks.