

UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A' GRADE' UNIVERSITY)
(Baba Sahib Ambedkar Road, Jammu-180006 (J&K))

Academic Section

Email: academicsectionju14@gmail.com

NOTIFICATION

(24/August/Adp./75)

In partial modification of this office Notification No. F.Acd/II/23/11749-11764 dated 13.11.2023, 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 amended Syllabus and Courses of Study of the subject of **Statistics** for semester -V, **Course Code UMJSTT-501 (Titled- Design of Experiments), UMJSTT-502 (Titled Statistical Quality Control, UMJSTT-503 (Titled Official Statistics), UMJSTT-504 (Title- Data Analysis Using Excel) and USEGEI-506 (Title- Python for Data Science) under Four Year Undergraduate Programme as per NEP-2020 (as given in the annexure) for the examinations to be held in the years December 2024, 2025 and 2026.**

The Syllabus of the course are also available on the University website: www.jammuuniversity.ac.in.

Sd/-

DEAN ACADEMIC AFFAIRS

No. F. Acd/II/24/ 10019-10030

Dated: 12/9/24

Copy for information and necessary action to:

1. Dean Faculty of Mathematical Science
2. HOD/Convener, Board of Studies **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. Director, Computer Centre, University of Jammu
7. Deputy Registrar/Asstt. Registrar (Conf. /Exams. UG)
8. Incharge University Website for necessary action please

Sumitasharma
Deputy Registrar (Academic)
10/9/24 11/9/24

FYUP SEMESTER-WISE TIMELINE/ SCHEME

SEMESTER	COURSES	COURSE CODE	TITLE	CREDITS Theory + Practical
I	MAJOR	UMJSTT101	DESCRIPTIVE STATISTICS	3+1
	MINOR	UMISTT102	DESCRIPTIVE STATISTICS	3+1
	SEC	USESTT103	COMPUTATIONAL STATISTICS USING EXCEL	0+2
	MDC	UMDSTT104	STATISTICS FOR RESEARCHERS	3+0
II	MAJOR	UMJSTT201	PROBABILITY THEORY	3+1
	MINOR	UMISTT202	PROBABILITY THEORY	3+1
	SEC	USESTT203	DATA ANALYSIS USING R	0+2
	MDC	UMDSTT204	STATISTICAL TECHNIQUES FOR RESEARCHERS	3+0
III	MAJOR	UMJSTT301	PROBABILITY DISTRIBUTIONS	3+1
		UMJSTT302	STATISTICAL INFERENCE	3+1
	MINOR	UMISTT303	PROBABILITY DISTRIBUTIONS	3+1
	SEC	USESTT304	ADVANCE ANALYTICS IN R FOR DATA SCIENCE	0+2
	MDC	UMDSTT305	ADVANCED STATISTICS FOR RESEARCHERS	3+0
IV	MAJOR	UMJSTT401	THEORY OF SAMPLE SURVEYS	3+1
		UMJSTT402	DEMOGRAPHY AND VITAL STATISTICS	3+1
		UMJSTT403	SAMPLING DISTRIBUTIONS	3+1
		UMJSTT404	OPERATIONS RESEARCH	3+1
	MINOR	UMISTT405	STATISTICAL INFERENCE AND TESTING OF HYPOTHESIS	4+0
V	MAJOR	UMJSTT501	DESIGN OF EXPERIMENTS	3+1
		UMJSTT502	STATISTICAL QUALITY CONTROL	3+1
		UMJSTT503	OFFICIAL STATISTICS	2+0
		UMJSTT504	DATA ANALYSIS USING EXCEL	3+1
	MINOR	UMISTT505	DESIGN OF EXPERIMENTS	3+1
	SEC	USESTT506	PYTHON FOR DATA SCIENCE	0+2
			(Summer Internship)	



VI	MAJOR	UMJSTT601	APPLIED STATISTICS	3+1	
		UMJSTT602	STATISTICAL COMPUTING USING C++PROGRAMMING	3+1	
		UMJSTT603	ECONOMETRICS	3+1	
		UMJSTT604	STATISTICS FOR ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	3+1	
	MINOR	UMISTT605	APPLIED STATISTICS	3+1	
VII	MAJOR	UMJSTT701	ADVANCED PROBABILITY THEORY	4+0	
		UMJSTT702	MULTIVARIATE ANALYSIS	3+1	
		UMJSTT703	ADVANCED RESEARCH METHODS AND TECHNIQUES	3+1	
		UMJSTT704	FINANCIAL STATISTICS	3+1	
	MINOR	UMISTT705	ADVANCED PROBABILITY THEORY	4+0	
VIII	4 YRS UG Honors	MAJOR	UMJSTT801	ADVANCED LINEAR MODELS	3+1
			UMJSTT802	ADVANCED STATISTICAL INFERENCE	4+0
			UMJSTT803	SURVIVAL ANALYSIS AND BIOSTATISTICS	4+0
			UMJSTT804	ADVANCE PYTHON FOR DATA HANDLING	3+1
		MINOR	UMISTT805	SURVIVAL ANALYSIS AND BIOSTATISTICS	4+0
	4 YRS UG Honors with Research	MAJOR	UMJSTT806	LINEAR MODELS	3+1
		MINOR	UMISTT807	LINEAR MODELS	3+1
		SEC	USESTT808	RESEARCH PROJECT/ DISSERTATION	0+12

Abbreviations Used:
SEC: Skill Enhancement Course
MDC: Multidisciplinary Course

SEMESTER-5

UMJSTT501 DESIGN OF EXPERIMENTS

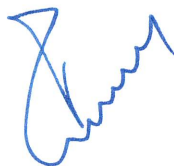
UMJSTT502 STATISTICAL QUALITY CONTROL

UMJSTT503 OFFICIAL STATISTICS

UMJSTT504 DATA ANALYSIS USING EXCEL

UMISTT505 DESIGN OF EXPERIMENTS (Minor)

USEGEI -506 PYTHON FOR DATA SCIENCE
(Summer Internship)



Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT501

Course Title: Design of Experiments

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 design and conduct experiments.
- To analyze and interpret data.

Course Learning Outcomes:

After completing this course, students should have developed a clear understanding of:

- The fundamental concepts of design of experiments.
- Introduction to planning valid and economical experiments within given resources.
- Completely randomized design.
- Randomized block design.
- Latin square design.
- Balanced incomplete block design.
- Fractional factorial designs with two levels.

UNIT I

Definition of Analysis of Variance, Assumptions and Limitations of ANOVA, One way classification. Two-way classification with one observation per cell. Principles of Design of Experiment: Randomization, Replication and Local Control, Choice of size and type of a plot using uniformity trials.

UNIT II


Basic designs: Completely Randomized Design (CRD), Randomized Block Design (RBD), Latin Square Design (LSD) -layout, model and statistical analysis, relative efficiency, analysis with missing observations. Multiple comparison tests using critical difference criteria.

UNIT III

Factorial experiments: Concepts, notations and advantages, 2^2 , $2^3 \dots 2^n$ and 3^2 factorial experiments, design and analysis, Total and Partial confounding for 2^2 ($n \leq 5$), Concept of Factorial experiments in a single replicate.

UNIT IV

Incomplete Block Designs: Balanced Incomplete Block Design (BIBD)-parameters, relationships among its parameters, incidence matrix and its properties, Symmetric BIBD, Resolvable BIBD, Affine Resolvable IBD



Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT501

Course Title: Design of Experiments

Credits: 03+01

Duration of examination: 03 hours

Max. Marks: 100

Mid-Term:15

End-term:60

Practical Internal :10

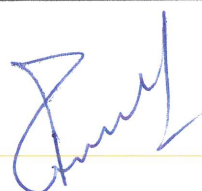
Practical External :15

Books Recommended:

1. Cochran, W.G. and Cox, G.M. (1959). Experimental Design. AsiaPublishing House.
2. Das., M.N. and Giri, N.C. (1986). Design and Analysis of Experiments. Wiley Eastern
3. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2005). Fundamentals of Statistics. Vol. II, 8thEd. World Press, Kolkata.
4. Kempthorne, O. (1965). The Design and Analysis of Experiments. John Wiley.
5. Montgomery, D. C. (2008). Design and Analysis of Experiments. John Wiley.

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



Syllabus of Statistics at FYUP under CBCS as per NEP-2020

Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT501

Course Title: Design of Experiments

Credits: 03+01

Duration of examination: 03 hours

Max. Marks: 100

Mid-Term:15

End-term:60

Practical Internal :10

Practical External :15


RACTICAL		
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-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT502

Course Title: STATISTICAL QUALITY CONTROL

Credits: 03+01

Duration of examination: 03hours

Max. Marks: 100

Mid-Term:15

End-term:60

Practical Internal :10

Practical External :15

Course Objectives:

The learning objectives include:

- This course will help students to learn techniques and approach of SQC being used in industry to manufacture goods and services of high quality at low cost.
- This course will also give exposure to Six sigma and Index Numbers.

Course Learning Outcomes:

- Statistical process control tools- Control charts for variables, attributes.
- Statistical product control tools- Sampling inspection plans.
- Overview of Six sigma- Lean manufacturing, TQM.
- Overview of Six sigma training plans, VOC, CTQ.

UNIT I

Quality: Definition, dimensions of quality, its concept, application and importance. Introduction to Process and Product Controls. Statistical Process Control - Seven tools of SPC, chance and assignable Causes of quality variation. Specification limits and Tolerance limits, 3-sigma limits.

UNIT II

Statistical Control Charts- Construction and Statistical basis of 3- σ Control charts, Control charts for variables: \bar{X} & R-chart, \bar{X} & s-chart. Control charts for attributes: np-chart, p-chart, c-chart and u-chart. Rational Sub-grouping. Comparison between control charts for variables and control charts for attributes. Analysis of patterns on control chart, estimation of process capability.

UNIT III

Acceptance sampling plan: Principle of acceptance sampling plans. Single and Double sampling plan their OC, AQL, LTPD, AOQ, AOQL, ASN, ATI functions with graphical interpretation, use and interpretation of Dodge and Roming's sampling inspection plan tables.

UNIT IV

Introduction to Six-Sigma: Overview of Six Sigma, Lean Manufacturing and Total Quality Management (TQM). Organizational Structure and Six Sigma training plans- Selection Criteria for Six-Sigma roles and training plans. Voice of customers (VOC): Importance and VOC data collection. Critical to Quality (CTQ).

Introduction to DMAIC (using one case study: Define Phase, Measure Phase, Analyze Phase, Improve Phase and Control Phase.

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

Major

Course Code: UMJSTT502

Course Title: STATISTICAL QUALITY CONTROL

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. Ehrlich, H. B. (2002). Transactional Six Sigma and Lean Servicing, 2nd Ed., St. Lucie Press.
2. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2002). Fundamentals of Statistics, Vol. I & II, 8th Ed., The World Press, Kolkata.
3. Gupta, S.C. and Kapoor, V.K. (2014). Fundamentals of Mathematical Statistics, 11th Ed., Saitan Chand.
4. David, H. (1995). ISO Quality Systems Handbook, 2nd Ed., Butterworth Heinemann Publication.
5. Montgomery, D. C. (2009). Introduction to Statistical Quality Control, 6th Ed., Wiley India Pvt. Ltd.

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 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



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

Major

Course Code: UMJSTT502

**Course Title: STATISTICAL QUALITY
CONTROL**

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-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT503

Course Title: OFFICIAL STATISTICS

Credits: 02+00

Duration of examination: 02 hours 30 mins

Max. Marks: 50

Mid-Term:10

End-term:40

Course Objectives:

The learning objectives include:

- This course will help students to learn about the Statistical System of country

Course Learning Outcomes:

- Statistical Offices working knowledge
- Role and importance of various Statistical agencies of country

UNIT I

Present official statistical system in India, Methods of collection of official statistics, their reliability and limitations. Role of Ministry of Statistics & Program Implementation (MoSPI), National Statistical Commission: Need, Constitution, its role, functions etc; Legal Acts/ Provisions/ Support for Official Statistics; Important Acts.

UNIT II

National Statistical Office: Vision and Mission, NSO, CSO and RGI; roles and responsibilities; Important activities, Publications etc. Government of India's Principal publications containing data on the topics such as population, industry and finance.

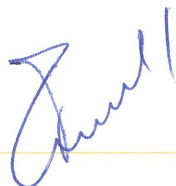
National and International official statistical system: Official Statistics (a) Need, Uses, Users, Reliability, Relevance, Limitations, Transparency, its visibility (b) Compilation, Collection, Processing, Analysis and Dissemination, Agencies Involved.

UNIT III

Sector Wise Statistics: Agriculture, Health, Education, Women and Child etc. Important Surveys & Census, Indicators, Agencies and Usages etc. National Accounts: Definition, Basic Concepts; issues; the Strategy, Collection of Data and Release. Population Census: Need, Data Collected, Periodicity, Methods of data collection, dissemination, Agencies involved.

Books Recommended:

1. M. R. Saluja: Indian Official Statistical Systems.
2. CSO (MOSPI) Publication: Statistical System in India.
3. United Nations publications
4. RBI: Handbook of Statistics for the Indian Economy (various years)
5. Economic Survey, Govt. of India, Ministry of Finance (various years)
6. Guide to current Indian Official Statistics, Central Statistical Office, GOI, New Delhi.
7. <http://mospi.nic.in/>
8. Goon A.M., Gupta M.K. and Dasgupta B. (2001): Fundamentals of Statistics (Vol.2), World Press.



Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT503

Course Title: OFFICIAL STATISTICS

Credits: 02+00

Duration of examination: 02 hours 30 mins

Max. Marks: 50

Mid-Term:10

End-term:40

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 05 marks and Five short answer type questions of One marks each.	Up to 50%	1 $\frac{1}{2}$ hours	10
External End Semester University Exam Pattern: As proposed by the BOS and approved by Academic Council	Up to 100%	2 $\frac{1}{2}$ hours	40
Total			50

NOTE FOR PAPER SETTING: End Semester External University Examination

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

Section-A shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 2½ Marks.

Section -B shall consist Six (6) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 10 Marks.



Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT504

Course Title: Data Analysis Using Excel

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 introduce students to the basic concepts and techniques of Excel

- To develop basic computational thinking
- To Understand and use data types
- To appreciate the use of Excel in solution of problems

Course Learning Outcomes:

- To develop skills of using Excel solving practical problems.
- To gain experience in doing independent study and research.

UNIT I

Basics of Computer: Operations of a computer, Different units of a computer system like central processing unit, memory unit, arithmetic and logical unit, input unit, output unit etc., Hardware including different types of input, output and peripheral devices. Basics of Programming: Algorithm, Flowchart, Data, Information, Database, overview of different programming languages

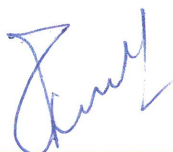
UNIT II

Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document.

About Excel & Microsoft, Uses of Excel, Excel software, Spreadsheet window pane, Title Bar, Menu Bar, Standard Toolbar, Formatting Toolbar, the Ribbon, File Tab and Backstage View, Formula Bar, Workbook Window, Status Bar, Task Pane, Workbook & sheets, Creating a Table. Selecting Columns & Rows, Changing Column Width & Row Height, Autofitting Columns & Rows, Hiding/Unhiding Columns & Rows, Inserting & Deleting Columns & Rows, Cell, Address of a cell, Components of a cell – Format, value, formula, Use of paste and paste special.

UNIT III

Creating Formulas. Using Formulas, Formula Functions – Sum, Average, if, Count, max, min, Proper, Upper, Lower, Using AutoSum. Counting Things, counting numbers, counting nonempty cells, counting empty cells, counting cells that match criteria, counting cells that match multiple criteria, counting permutations, Counting combination.



Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Major

Course Code: UMJSTT504

Course Title: Data Analysis Using Excel

Credits: 03+01

Duration of examination: 03 hours

Max. Marks: 100

Mid-Term:15

End-term:60

Practical Internal : 10

Practical External :15

Introduction to Statistical Functions: Averaging Things, calculating an average, calculating a conditional average, Calculating an average based on multiple conditions, calculating the median, Calculating the mode, Finding the Rank, Determining the Nth Largest or Smallest Value, Calculating the nth highest value, Calculating the nth smallest value, Creating a Grouped Frequency Distribution, Calculating the Variance, Calculating the Standard Deviation, Finding the Correlation etc

Spreadsheet Charts: Creating Charts, Different types of charts, Formatting Chart Objects, Changing the Chart Type, Showing and Hiding the Legend, Showing and Hiding the Data Table

UNIT IV

Loading the Analysis Tool Pak, Generating Descriptive Statistics, calculating a Moving Average, Determining Rank and Percentile, Generating Random Numbers, Creating a Frequency Distribution. Sampling Data, Using the t-Test Tools, performing a z-Test, Determining the Regression, Calculating the Correlation, Calculating the Covariance, Using the ANOVA Tools, Performing an f-test

Probability Distributions: Uniform distribution, Binomial, Poisson and Normal distribution, Skewness and Kurtosis: Describe a Probability Distribution's Shape.

Books Recommended:

1. Beverly, J. D. (1998). Statistics with Microsoft Excel 2008. Prentice Hall Press, US
2. Brend Held (2007), Microsoft Excel Functions and Formulas. Wordware Publishing. Inc.
3. D. Remenyi, G. Onofre. J. English (2011), An introduction Statistics Using Microsoft Excel. Academic Publishing Limited.
4. Dan, R., George, O. and Joseph, E. (2011). An Introduction to Statistics using Microsoft Excel. 2nd ed., Academic Conferences Limited.
5. David, S., David, S. and Kathryn, A. S. (2016). Statistics for Manager Using Microsoft Excel 8th Ed., Pearson.
6. Gupta V., Bhatia S.S, Thakur P.S., Sharma V. (2018). Computer Fundamentals and IT Tools. Kalyani Publishers
7. Gupta, S.C. and Kapoor, V.K. (2020). Fundamentals of Mathematical Statistics, 12th Ed., Sultan Chand and Sons.
8. Rajaraman, V. (2014). Fundamentals of Computers, 6th Ed. PHI.
9. Stephanie, G. (2014). Excel Statistics: Step by Step. CreateSpace Independent Pub.



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

Major

Course Code: UMJSTT504

Course Title: Data Analysis Using Excel

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 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 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

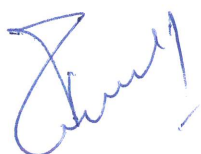
PRACTICAL		
Internal: Daily evaluation of practical records/Viva voce/attendance etc.	10 (50% day to day performance and 50% for internal test)	
External: Final Practical Performance + viva voce	100% Syllabus	15 =10 Exam 05 viva-voce
Total		25

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.



Syllabus of Statistics at FYUP under CBCS as per NEP-2020

Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Minor

Course Code: UMISTT505

Course Title: Design of Experiments

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 design and conduct experiments.
- To analyze and interpret data.

Course Learning Outcomes:

After completing this course, students should have developed a clear understanding of:

- The fundamental concepts of design of experiments.
- Introduction to planning valid and economical experiments within given resources.
- Completely randomized design.
- Randomized block design.
- Latin square design.
- Balanced incomplete block design.
- Fractional factorial designs with two levels.

UNIT I

Definition of Analysis of Variance, Assumptions and Limitations of ANOVA, One way classification. Two-way classification with one observation per cell. Principles of Design of Experiment; Randomization, Replication and Local Control, Choice of size and type of a plot using uniformity trials.

UNIT II

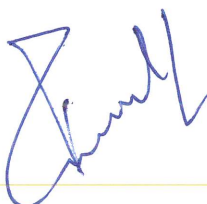
Basic designs: Completely Randomized Design (CRD), Randomized Block Design (RBD), Latin Square Design (LSD) -layout, model and statistical analysis, relative efficiency, analysis with missing observations. Multiple comparison tests using critical difference criteria.

UNIT III

Factorial experiments: Concepts, notations and advantages, 2^2 , $2^3 \dots 2^n$ and 3^2 factorial experiments, design and analysis, Total and Partial confounding for 2^2 ($n \leq 5$), Concept of Factorial experiments in a single replicate.

UNIT IV

Incomplete Block Designs: Balanced Incomplete Block Design (BIBD)-parameters, relationships among its parameters, incidence matrix and its properties, Symmetric BIBD, Resolvable BIBD, Affine Resolvable IBD



Syllabus of Statistics at FYUP under CBCS as per NEP-2020
Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Minor

Course Code: UMISTT505

Course Title: Design of Experiments

Credits: 03+01

Duration of examination: 03 hours

Max. Marks: 100

Mid-Term:15

End-term:60

Practical Internal :10

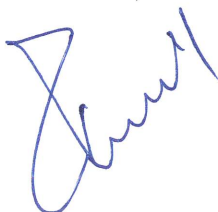
Practical External :15

Books Recommended:

1. Cochran, W.G. and Cox, G.M. (1959). Experimental Design. Asia Publishing House.
2. Das., M.N. and Giri, N.C. (1986). Design and Analysis of Experiments. Wiley Eastern
3. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2005). Fundamentals of Statistics. Vol. II, 8thEd. World Press, Kolkata.
4. Kempthorne, O. (1965). The Design and Analysis of Experiments. John Wiley.
5. Montgomery, D. C. (2008). Design and Analysis of Experiments. John Wiley.

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



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

Minor

Course Code: UMISTT505

Course Title: Design of Experiments

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



Syllabus of Statistics at FYUP under CBCS as per NEP-2020

Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Summer Internship

Course Code: USEGEI-506

Course Title: PYTHON FOR DATA SCIENCE

Credits: 00+02

Max. Marks: 50

Course Objectives:

- To introduce students to the basic concepts and techniques of Data Science and Machine Learning.
- To develop basic computational thinking
- To Understand and use data types
- To appreciate the notion of algorithm

Course Learning Outcomes:

- To develop skills of using recent machine learning software for solving practical problems.
- To gain experience in doing independent study and research.

Internship Focus Points

Familiarization with the basics of Python programming: a simple “hello world” program, process of writing a program, running it, and print statements; simple data-types: integer, float, string.

Introduce the notion of a variable, and methods to manipulate it (concept of L-value and Rvalue even if not taught explicitly), Knowledge of data types and operators: accepting input from the console, assignment statement, expressions, operators and their precedence.

Conditional statements: if, if-else, if-elif-else; simple programs: e.g.: absolute value, sort 3 numbers, and divisibility

Notion of iterative computation and control flow: for, while, flowcharts, decision trees and pseudo code; write a lot of programs: interest calculation, primarily testing, and factorials.

Idea of debugging: errors and exceptions; debugging: pdb, break points.

Sequence datatype: Lists, tuples and dictionary: finding the maximum, minimum, mean; linear search on list/tuple of numbers, and counting the frequency of elements in a list using a dictionary. Introduce the notion of accessing elements in a collection using numbers and names.

Sorting algorithm: bubble and insertion sort; count the number of operations while sorting.

Strings: Strings in Python: compare, concatenate, substring; notion of states and transitions using state transition diagrams.

Syllabus of Statistics at FYUP under CBCS as per NEP-2020

Semester-V

(Examination to be held in Dec. 2024,2025 and 2026)

Summer Internship

Course Code: USEGEI -506 Course Title: PYTHON FOR DATA SCIENCE

Credits: 00+02

Max. Marks: 50

Suggested Practicals

- Simple Programmes involving arithmetic operators
- Computation of factorial of a number
- Write a program to input the value of x and n and print the sum of the logarithmic and trigonometric series
- Input a number and check if the number is a prime number.
- Programme to handle the matrices.
- Count and display the number of vowels, consonants, uppercase, lowercase characters in string.
- Find the largest/smallest number in a list/tuple
- Input a list of numbers and swap elements at the even location with the elements at the odd location.
- Input a list/tuple of elements, search for a given element in the list/tuple.
- Input a list of numbers and find the smallest and largest number from the list.
- Create a dictionary with the roll number, name and marks of n students in a class and display the names of students who have scored marks above 75.

OR

Any Project to be submitted by the student at the end of internship to concerned mentor

Books Recommended:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd.
3. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015.
4. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, "Data Structures and Algorithms in Python", 1st Edition, Wiley India Pvt Ltd, 2016.
5. ReemaThareja, "Python Programming using problem solving approach", Oxford University press, 2017.
6. Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", @nd Edition, Shroff Publishers, 2022.

SCHEME OF EXAMINATION

As per notification of University of Jammu for the summer internship.

