MIT-ADT UNIVERSITY
PUNE, INDIA
A Leap Towards World Class Education

SCHOOL OF ENGINEERING AND SCIENCES PUNE

STRUCTURE & SYLLABUS

FOR

M. Sc. Applied Statistics

UNDER FACULTY OF ENGINEERING AND SCIENCES

2 Year Postgraduate Course sanctioned by AC & BoS

(Pattern 2023 w.e.f. 2023-2024)

Department of Applied Science and Humanities

MIT Art, Design and Technology University

School of Engineering and Sciences

Department of Applied Science and Humanities

VISION

Laying a solid scientific and technological foundation while adopting a proactive multidisciplinary approach and upholding ethical principles for the holistic development of the students as torchbearers for advancement.

MISSION

Facilitating all-around development of students in a conducive environment through a scientific attitude, technical skills and design thinking for solution-based approach.

Program Outcomes (PO)

Post Graduate students will be able to:

1. **PO1**- Gain sound knowledge in theoretical and practical aspects of Statistics.
2. **PO2-** Describe complex statistical ideas to non-statisticians.
3. **PO3-** Handle and analyze large databases with computer skills and use their results and interpretations to make practical suggestions for improvement.
4. **PO4-** To develop analytical and research skills to comprehend, analyze and design solutions of complex problems in Statistics.
5. **PO5-** Get a wide range of job opportunities in industry as well as in government sector.
6. **PO6-** To understand ethical principles, responsibility and norms for excellence in academics and research.
7. **PO7-** To successfully compete at national and international level competitive examinations.

Program Educational Objectives (PEO):

The program is expected to enable the students:

1. **PEO-1:** To adapt to the changes in technology, holistic and professional requirements with an understanding of societal and ecological issues
2. **PEO-2:** To inculcate the sense of ethics, professionalism and effective communication skills within realistic constraints of society and environment for sustainable development.
3. **PEO-3:** To incorporate with the knowledge of data impurity and handling them with statistical techniques and well known with the automation of building a new statistical model with the criteria, assumptions and appropriateness.
4. **PEO-4:** To pursue higher studies in related fields of research, industries and management.
5. **PEO-5:** To successfully compete in competitive examinations and pursue career in academics, research or entrepreneurship.
6. **PEO-6:** To synthesize statistical expertise in medical research, Finance and can work as a prominent part in the medical survey, research analytics.

Program Specific Outcomes (PSO):

The program is expected to deliver at the time of Post graduation:

1. **PSO-1:** To get enriched with technical skills used in data science, data analytics through projects including big data.

2. **PSO-2:** To get enhanced with the skills of creating taxonomy of cognitive domain in Statistics (Knowledge, Comprehension, Application, Analysis, Synthesis, evaluation)

3. **PSO-3:** To get stimulated with self-learning skills that help them in research work in future and also to perform in NET, SLET and GATE.

4. **PSO-4:** To be groomed up with the present and advanced analytical skills that help them to be an entrepreneur or advisor in Data analytics and Predictive Modeler domain.

5. **PSO**-5: To utilize their statistical skills, computation and comprehensive knowledge in other disciplinary courses and projects.

6. **PSO**-6: To increase their competency and perform well in government and Central government jobs for statistics like ISS, UPSC.

7. **PSO**-7: Students can synthesize their statistical expertise in medical research, Finance and can work as a prominent part in the medical survey, research analytics.

8. **PSO**-8: Students will be incorporated with the knowledge of data impurity and handling them with statistical techniques and well known with the automation of building a new statistical model with the criteria, assumptions and appropriateness

MIT ART, DESIGN AND TECHNOLOGY UNIVERSITY,
LONI KALBHOR PUNE
SCHOOL OF ENGINEERING AND SCIENCE
DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES
Program Structure for M.Sc. Applied Statistics (Data Science)
Revised with effect from Academic Year 2023-24

Sr. No.	Name of the Program	Duration of the Program	Total Semesters	Intake Capacity
1	M.Sc. Applied Statistics	2 Years	4	30

Course Design for M.Sc. Applied Statistics

S.N.	Type of Courses	Sem-I	Sem-II	Sem-III	Sem-IV	**Total**
1	C	24	24	14	14	76
2	GE	-	-	04	04	08
3	DSE	-	-	04	04	08
4	AEC	02	-	-	-	02
5	SEC	-	-	04	-	04
6	UC	-	02	-	-	02
	Total Credits	26	26	26	22	100
	Total Marks	**650**	**650**	**650**	**550**	**2500**

Note: C- Core Course, GE- General Elective, DSE- Discipline Specific Elective, AEC-Ability Enhancement Course, SEC-Skill Enhancement Course, UC- University Credits

Semester I

Sr. No.	Course code	Type of Course	Course	L	T	P	Credits	Scheme of Examination		Total Marks
								CA	FE	
1	23MSST101	C	Computational Linear Algebra	3	1	0	4	50	50	100
2	23MSST102	C	Advanced Statistical Inference	3	1	0	4	50	50	100
3	23MSST103	C	Distribution Theory	3	1	0	4	50	50	100
4	23MSST104	C	Design and Analysis of Experiments	3	1	0	4	50	50	100
5	23MSST105	C	Fundamentals of Data Analytics	3	1	0	4	50	50	100
6	23MSST111	C	Practical using Computational Tools-I	0	0	8	4	50	50	100
7	22MSEC001	AEC	Communicative English	1	1	0	2	50	-	50
			Total	16	6	8	**26**	350	300	**650**

***Non-CGPA mandatory course**

Total Credits	C	GE	DSE	AEC	SEC
26	**24**	**-**	**-**	**2**	**--**

Semester II

Sr. No.	Course code	Type of Course	Course	L	T	P	Credits	Scheme of Examination		Total Marks
								CA	FE	
1	23MSST201	C	Computational Numerical Analysis	3	1	0	4	50	50	100
2	23MSST202	C	Stochastic Process	3	1	0	4	50	50	100
3	23MSST203	C	Multivariate Analysis-I	3	1	0	4	50	50	100
4	23MSST204	C	Applied Cryptography	3	1	0	4	50	50	100
5	23MSST205	C	Applied Regression Analysis	3	1	0	4	50	50	100
6	23MSST212	C	Practical using Computational Tools-II	0	0	8	4	50	50	100
7	20APT0202	UC	Professional and Aptitude skills Training-II	1	0	2	2	50	-	50
			Total	16	5	10	**26**	350	300	**650**

Total Credits	C	GE	DSE	AEC	SEC	UC
26	**24**	**-**	**--**	**-**	**-**	**2**

Semester III

S.No.	Course code	Type of Course	Course	L	T	P	Credits	Scheme of Examination		Total Marks
								CA	FE	
1	23MSST301	C	Multivariate Analysis-II	3	1	0	4	50	50	100
2	23MSST302	C	Survival Analysis	3	1	0	4	50	50	100
3	23MSST303	C	Time Series Analytics	3	1	0	4	50	50	100
4	23MSST331 23MSST332 23MSST333	GE	Elective-I	3	1	0	4	50	50	100
5	23MSST334 23MSST335	DSE	Elective-II	3	1	0	4	50	50	100
6	23MSST313	SEC	Practical using Computational Tools-III	0	0	8	4	50	50	100
7	23MSST321	C	Capstone Mini Project	0	0	4	2	25	25	50
			Total	15	5	12	**26**	325	325	**650**

Total Credits	C	GE	DSE	AEC	SEC
26	**14**	**4**	**4**	**-**	**4**

Semester IV

Sr. No.	Course code	Type of Course	Course	L	T	P	Credits	Scheme of Examination		Total Marks
								CA	FE	
1	23MSST401	C	Bayesian Analysis	3	1	0	4	50	50	100
2	23MSST402	C	Application of Statistics in Clinical Trials	3	1	0	4	50	50	100
3	23MSST436/ 23MSST437/ 23MSST438	GE	Elective-III	3	1	0	4	50	50	100
4	23MSST439/ 23MSST440	DSE	Elective-IV	3	1	0	4	50	50	100
5	23MSST422	C	Capstone Major Project	0	0	12	6	75	75	150
			Total	12	4	12	**22**	275	275	**550**

Total Credits	**C**	**GE**	**DSE**	**AEC**	**SEC**
22	**14**	**04**	**04**	**-**	**--**

CA = Continuous Assessment, FE= Final Examination,

****Final Lab exam will be conducted with viva-voce of the respective practical (50 exam +10 viva = 60)**

Coding for course/ subject: 23MSST101, Where; **23** = Year of BOS, **MSST** = Programme Code (MS for Master of Science, ST for Statistics), **1**= Semester No.,
01 to N = Sequence No of Course (01-10 for Theory, 11-20 for Practicals, 21-30 for Technical Seminar/ Mini Project/ Major Project, 31-40 for Electives with/ without Practicals.

LIST OF ELECTIVES

Elective	Course Code	**Course Name**
Elective I *(Students can choose any one of the two electives)*	23MSST331	Mathematical Modelling
	23MSST332	Categorical Analysis
	23MSST333	Data Handling and Visualization
Elective II *(Students can choose any one of the two electives)*	23MSST334	Machine Learning
	23MSST335	Business Analytics
Elective III *(Students can choose any one of the two electives)*	23MSST436	Social Media Analytics
	23MSST437	Image and Video Processing
	23MSST438	Big data Analytics
Elective IV *(Students can choose any one of the two electives)*	23MSST439	Deep learning
	23MSST440	Predictive Analytics using Graph Databases