



SARDAR PATEL UNIVERSITY

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

Vallabh Vidyanagar

Gujarat

Academic Program Structure

&

Curriculum

(Aligned with NEP-2020)

Master of Applied Statistics and Predictive Data Science

NHEQF Level: 6.5

Entry NHEQF Level	:	6
Duration	:	Two Years (Four Semesters)
Total Courses	:	20
Total Learning Hours	:	2640
Total Credits	:	88
Total Marks	:	2200



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Graduate Attributes (GAs)

Upon successful completion of the M.Sc. programme, graduates are expected to attain the following Graduate Attributes:

GA1. Advanced Data Science discipline knowledge

Demonstrate and apply multivariate statistical methods and machine learning methods effectively.

GA2. Data driven thinking and problem-solving adaptability

Competence in selecting, applying, and interpreting suitable statistical techniques to solve real-world problems.

GA3. Teamwork and communication skills

Work effectively in multidisciplinary teams and communicate statistical findings clearly.

GA4. Computational Proficiency

Expertise in using statistical software and machine learning tools to analyse data, develop models, and interpret results effectively.

GA5. Analytical & Critical Thinking

Ability to independently evaluate, synthesize, and interpret data from diverse sources.

GA6. Uncertainty Quantification

Skill in using statistical reasoning to estimate outcomes and quantify uncertainty in decision-making processes.

GA7. Industry, corporate and government data analytics

Implement statistical learning, and reinforcement learning, enabling the adaptation of models to solve non-standard problems in industry, corporate and governance.

GA8. Communication and Visualization

Translating intricate data results into clear, actionable insights for non-technical stakeholders using data storytelling and visualization tools.

GA9. Ethical Professionalism

Demonstrated awareness of ethical issues in data collection, analysis, and interpretation, including data privacy and integrity.

GA10. Research and Application

Ability to design, implement, and report on independent research or projects, including predictive modeling and data mining.

GA11. Collaboration & Teamwork

Ability to work effectively in multi-disciplinary teams to collaborate for writing result and discussion part of project paper and presentation.

GA12. Professionalism and project lead

Demonstrate professionalism, accountability, and integrity in statistical practice, along with readiness for leadership roles.



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Program Educational Objectives (PEOs):

Within 3-5 years of completing the M.Sc. programme, graduates will be able to:

- PEO1. Apply advanced statistical methodologies and machine learning techniques to analyze complex datasets and solve real-world problems.
- PEO2. Develop competence to lead a team and accomplished multi-faceted data analysis projects of corporate.
- PEO3. Adapt to updated versions of statistical software and machine learning techniques in various data environment and practice them time-efficiently.
- PEO4. Demonstrate proficiency in using modern statistical software to model data, identify patterns, make predictions and visualize results to aid organizational strategies.
- PEO5. Operate with high ethical standards, ensuring data privacy, responsible data management, and the professional dissemination of statistical findings.
- PEO6. Become effective communicators and collaborators, capable of leading cross-functional teams and committing to continuous professional development to adapt to emerging technologies.



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Program Learning Outcomes (PLOs):

Upon successful completion of the M. Sc. Programme learners will be able to:

- PLO1. Apply core theoretical concepts and modern statistical methods to solve real-world problems, with special emphasis on Multivariate techniques and Pattern Recognition.
- PLO2. Implement specialized statistical techniques in Market Research and industry to aid business and scientific decision-making.
- PLO3. Develop and validate advanced predictive models, utilizing classification and clustering techniques to extract insights from complex datasets structured, unstructured, and directional data.
- PLO4. Demonstrate proficiency in using programming languages and numerical techniques R, Python, SQL and numerical techniques to process and analyze large data sets.
- PLO5. Plan, execute, and analyze statistically designed experiments (DOE) to optimize process, improve product quality and determine optimum operating conditions.
- PLO6. Adhere to ethical guidelines in data collection, analysis, and reporting, ensuring privacy, confidentiality, and integrity in all professional work.
- PLO7. Evaluate and interpret results honestly and objectively, identifying potential biases and ethical implications arising from statistical analyses, text mining and image processing.
- PLO8: Effectively communicate complex statistical findings and actionable insights to both technical and non-technical stakeholders in industry or research settings.
- PLO9. Work collaboratively in multidisciplinary teams to solve problems, displaying leadership and professional responsibility.
- PLO10. Undertake independent research and data-driven projects, applying appropriate research methodologies to address new challenges.
- PLO11. Exhibit the capacity for independent, lifelong learning to stay updated with emerging techniques in machine learning and advanced multivariate analysis.



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Master of Applied Statistics and Predictive Data Science

Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits /hour/ week	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2S01CASP01	Data Wrangling and Exploratory Analysis	4-0-0	120	4/4	25	25	50	50	100
DSC	P2S01CASP02	Probability and Distribution Theory	4-0-0	120	4/4	25	25	50	50	100
DSE (Any one out of two)	P2S01EASP01	Operations Research	4-0-0	120	4/4	25	25	50	50	100
	P2S01EASP02	Reinforcement Learning and Optimization								
DSC	P2S01CASP03	Database Management and SQL Analytics	0-4-0	120	4/8	25	25	50	50	100
DSC	P2S01CASP04	Statistical Computing through Python	0-4-0	120	4/8	25	25	50	50	100
DSC	P2S01CASP05	Communication Skills	2-0-0	60	2/2	25	25	25	-	50
				660	22			300	250	550

DSC: Discipline Specific Core **DSE:** Discipline Specific Elective **L:** Lecture **P:** Practical **T:** Tutorial

FA: Formative Assessment **SA:** Summative Assessment



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Semester-II

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits /hour/ week	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2S02CASP01	Regression Modelling	4-0-0	120	4/4	25	25	50	50	100
DSC	P2S02CASP02	Market Research	4-0-0	120	4/4	25	25	50	50	100
DSE (Any one out of two)	P2S02EASP01	Time Series Analysis	4-0-0	120	4/4	25	25	50	50	100
	P2S02EASP02	Clinical Trials								
DSC	P2S02CASP03	Bayesian Statistics and Probabilistic Programming	0-4-0	120	4/8	25	25	50	50	100
DSC	P2S02CASP04	Natural Language Processing and Text Analytics	0-4-0	120	4/8	25	25	50	50	100
DSC	P2S02CASP05	Google Data Analytics	0-2-0	60	2/4	25	25	25	-	50
				660	22			300	250	550

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