

School of Mathematics and Statistics University of Hyderabad

Academics Programmes offered by the School along with Vision Statement, Mission Statements and Descriptors

Vision Statement

To be a center of excellence of international standards in teaching, research and training in Mathematics, Applied Mathematics and Statistics, to produce human resources at post graduate and doctoral levels, and to contribute to new knowledge in different fields of Mathematical Sciences.

Mission Statements

MS-1 To strengthen research programs and execute research projects in different fields of Mathematics, Applied Mathematics and Statistics in order to publish original contributions in reputed international and national journals with high impact factors.

MS-2 To produce human resources of greater competence and employable skills in Mathematics, Applied Mathematics, and Statistics by recruiting eminent faculty, designing learner- centered curriculum of international standards, and providing the required infra structural facilities.

MS-3 To collaborate with the premier institutions in India and abroad by having MoUs with them, in order to achieve excellence in both teaching and research.

MS-4 To execute sponsored research projects with funding from both international and national funding agencies in different fields of Mathematics, Applied Mathematics and Statistics.

1 B.Sc in Mathematical Sciences (with Mathematics)

1.1 Qualitative Descriptors (QDs)

After completion of this academic program, the students will be able to:

QD-1 Demonstrate comprehensive knowledge and skills in Mathematics at undergraduate level.

QD-2. Use knowledge and skills required for identifying problems and issues.

QD-3. Apply knowledge and transferable skills in Mathematics.

QD-4. Demonstrate knowledge and transferable skills in Mathematics such as Differential equations, Analysis, Algebra that are relevant in employment opportunities in teaching organizations.

1.2 Mapping of QDs with MS's

	MS-1	MS-2	MS-3	MS-4
QD-1	3	2	3	3
QD-2	3	3	3	2
QD-3	2	3	3	
QD-4	3	3	2	

Here, '1', '2' and '3' represent for 'Low-level', 'Medium level' and 'High-level' mapping.

1.3 Program Learning Outcomes (PLOs)

After completion of the B.Sc. Program in Mathematics/Applied Mathematics, the students will be able to

PLO1 Demonstrate logical thinking and the ability to identify, formulate and solve problems in Mathematics.

PLO2 Present the results of studies undertaken in Mathematics clearly and precisely, communicate ideas from multiple perspectives and explain the concepts of mathematics to non-mathematicians.

PLO3 Demonstrate knowledge in usage of numerical methods to find approximate solutions to various problems using softwares like MATLAB, SciLab, etc., and to display programming skills in computer languages like C.

PLO4 Demonstrate competencies and confidence to succeed in competitive examinations.

1.4 Programme Specific Objectives (PSOs)

PSO1: Demonstrate the comprehensive knowledge and skills in different areas of Mathematics such as Algebra, Analysis, Ordinary Differential Equations, etc.

PSO2: Demonstrate the skills required for pursuing their masters degree in Mathematics or Statistics

1.5 Mapping of PLOs and PSOs with QDs

	QD-1	QD-2	QD-3	QD-4
PLO1	3	3	3	3
PLO2	3	3	3	3
PLO3	3	3	3	3
PLO4	3	3	3	3
PSO1	3	3	3	3
PSO2	3	3	3	3

2 B.Sc in Mathematical Sciences (with Statistics)

2.1 Qualitative Descriptors (QDs)

After completion of this academic program, the students will be able to

QD-1 Demonstrate basic knowledge and skills in the areas related to Theoretical and Applied Statistics.

QD-2 Use basic knowledge and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data, analysis and evaluation using methodologies as appropriate to the subjects for formulating the evidence based solutions.

QD-3 Apply disciplinary knowledge and transferable skills in areas related to Theoretical and Applied Statistics to new/unfamiliar contexts in order to solve basic problems with well - defined solutions.

QD-4 Communicate the results of studies undertaken in the field of Statistics to different fields of data-sciences, accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s).

QD-5 Demonstrate knowledge and transferable skills in the fields of different branches of Statistics such as Probability Theory, Statistical Distributions, Statistical Methods, Regression Analysis, etc that are relevant in employment opportunities in industries.

2.2 Mapping of QDs with MSs

	MS-1	MS-2	MS-3	MS-4
QD-1	2	2	2	2
QD-2	2	2	2	2
QD-3	2	2	2	2
QD-4	2	2	2	2
QD-5	2	2	2	2

2.3 Program Learning Outcomes (PLOs)

After completion of the B.Sc. Program in Statistics, the students will be able to

PLO-1 Demonstrate comprehensive knowledge and skills in different areas of Theoretical and Applied Statistics.

PLO-2 Demonstrate critical thinking and ability to identify, formulate and solve problems in different areas of Theoretical and Applied Statistics.

PLO-3 Demonstrate an ability to visualize and work in computational laboratory, and interdisciplinary and multidisciplinary areas of Statistics.

PLO-4 Demonstrate skills to use statistics tools, techniques and software to analyze and solve problems.

PLO-5 Demonstrate the ability to logically question assertions, to recognize patterns and distinguish essential and irrelevant aspects of problems, analyze and synthesize data from a variety of sources and draw valid conclusions.

PLO-6 Demonstrate competencies and confidence to succeed in competitive examinations, which include ISI, IIT and all such others.

2.4 Programme Specific Objectives (PSOs)

PSO-1 Demonstrate the comprehensive knowledge and skills in different areas of Applied Statistics such as Regression Analysis, Multivariate Analysis, Time Series Analysis.

PSO-2 Demonstrate the competencies and skills required for carrying out research in modern and thrust areas in Statistics in order to contribute original knowledge in the chosen field(s) and provide innovative solutions to problems.

2.5 Mapping of PLOs with QDs

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO-1	3	2	2	2	2
PLO-2	2	3	2	2	2
PLO-3	2	3	2	2	
PLO-4	2	2	2	3	
PLO-5	3	2	2	3	
PLO-6			3		
PSO-1					3
PSO-2					3

3 M.Sc. in Mathematics/Applied Mathematics and I.M.Sc. in Mathematical Sciences (with Mathematics/Applied Mathematics Streams)

3.1 Qualitative Descriptors (QDs)

After completion of this academic program, the students will be able to

QD-1 Demonstrate comprehensive knowledge and skills in areas related to Mathematics and Applied Mathematics.

QD-2. Use knowledge and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data, analysis and evaluation using methodologies as appropriate to the subjects for formulating the evidence based solutions.

QD-3. Apply disciplinary knowledge and transferable skills in areas related to Mathematics and Applied Mathematics to new/unfamiliar contexts in order to solve complex problems with well - defined solutions.

QD-4. Communicate the results of studies undertaken in the field of Mathematics and Applied Mathematics applied to different fields of Science, Engineering and Technology, accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s).

QD-5. Demonstrate knowledge and transferable skills in the fields of different branches of Mathematics that are relevant in employment opportunities and research careers in Mathematics/Applied Mathematics.

3.2 Mapping of QDs with MS's

	MS-1	MS-2	MS-3	MS-4
QD-1	3	3	3	3
QD-2	3	3	3	
QD-3	3	3	3	
QD-4	3	3	3	
QD-5	3	3	3	3

3.3 Program Learning Outcomes (PLOs)

After completion of the M.Sc Program in Mathematics/Applied Mathematics, the students will be able to

PLO1 Demonstrate critical thinking and ability to identify, formulate and solve problems in different areas of Mathematics and Applied Mathematics.

PLO2 Demonstrate an ability to visualize and work in computational laboratories, and in interdisciplinary and multidisciplinary areas of research.

PLO3 Demonstrate skills to use mathematical tools, techniques and softwares to analyze and solve problems.

PLO4 Demonstrate the ability to logically question assertions, to recognize patterns and distinguish essential and irrelevant aspects of problems, analyze and synthesize data from a variety of sources and draw valid conclusions.

PLO5 Present the results of studies undertaken in Mathematics clearly and precisely, communicate ideas from multiple perspectives and explain concepts of mathematics to non-Mathematicians.

PLO6 Demonstrate competencies and confidence to succeed in competitive examinations, which include NBHM,GATE,UGC NET, CSIR NET and all such others.

3.4 Programme Specific Objectives (PSOs)

PSO1: Demonstrate the comprehensive knowledge and skills in different areas of Mathematics and Applied Mathematics such as Algebra, Number Theory, Analysis, Ordinary Differential Equations, Partial Differential Equations, Fluid Dynamics, Complex Analysis etc.

PSO2: Demonstrate the competencies and skills required for carrying out research in modern and thrust areas in Mathematics, and Applied Mathematics in order to contribute to original knowledge in the chosen field(s) and provide innovative solutions to problems.

3.5 Mapping of PLOs and PSOs with QDs

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO1	3	3	3	3	3
PLO2	3	3	3	3	3
PLO3	3	3	3	3	3
PLO4	3	3	3	3	3
PLO5	3	3	3	2	3
PLO6	3	3	3	3	3
PSO1	3	3	3	3	3
PSO2	3	3	3	3	3

4 M.Sc. in Statistics-OR and I.M.Sc. in Mathematical Sciences (with Statistics Stream)

4.1 Qualitative Descriptors (QDs)

After completion of this academic program, the students will be able to

QD-1 Demonstrate comprehensive knowledge and skills in areas related to Theoretical and Applied Statistics.

QD-2 Use knowledge and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data, analysis and evaluation using methodologies as appropriate to the subjects for formulating the evidence based solutions.

QD-3 Apply disciplinary knowledge and transferable skills in areas related to Theoretical and Applied Statistics to new/unfamiliar contexts in order to solve complex problems with well - defined solutions.

QD-4 Communicate the results of studies undertaken in the field of Statistics to different fields of data-sciences, accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s).

QD-5 Demonstrate knowledge and transferable skills in the fields of different branches of Statistics such as Regression Analysis, Design and Analysis of Experiments, Statistical Inference, Multivariate Analysis, Time Series, etc. that are relevant in employment.

QD-6 Be academically adequately trained to pursue research in Theoretical and/or Applied Statistics in good institutes in the country and abroad.

4.2 Mapping of QDs with MSs

	MS-1	MS-2	MS-3	MS-4
QD-1	3	3	2	2
QD-2	3	3	2	2
QD-3	3	3	2	2
QD-4	2	2	3	3
QD-5	2	2	3	3

4.3 Program Learning Outcomes (PLOs)

After completion of the M.Sc Program in Statistics-OR, the students will be able to

PLO-1 Demonstrate comprehensive knowledge and skills in different areas of Theoretical, Applied Statistics and Mathematics required for deriving results in Theoretical and Applied Statistics.

PLO-2 Demonstrate critical thinking and ability to identify, formulate and solve problems in different areas of Theoretical and Applied Statistics.

PLO-3 Demonstrate an ability to visualize and work in computational laboratories, and in interdisciplinary and multidisciplinary areas of research.

PLO-4 Demonstrate skills to use tools of Statistics, techniques and softwares to analyze and solve problems.

PLO-5 Inculcate the 'Statistical Thinking' mind set essential to logically question assertions, to recognize patterns and distinguish essential and irrelevant aspects of problems, analyze and synthesize data from a variety of sources and make sound inferences.

PLO-6 Demonstrate the ability to work effectively with diverse teams, facilitate cooperative or coordinated effort on the part of a team in the interest of a common cause.

PLO-7 Present the results of studies undertaken in Statistics clearly and precisely, communicate ideas from multiple perspectives and explain concepts of Statistics to non-Statisticians.

PLO-8 Demonstrate competencies and confidence to succeed in competitive examinations like CSIR, ISI, ISS, RBI.

PLO-9 Demonstrate capability to read a research paper based on the subjects taught and explain it.

PLO-10 Demonstrate the ability for life- long learning in order to meet the needs of changing trades and demands of work place.

4.4 Programme Specific Objectives (PSOs)

PS-1 Demonstrate understanding of theoretical concepts in Probability Theory, Statistical Decision making and Statistical Modelling

PSO-2 Demonstrate comprehensive knowledge and skills in different areas of Statistics. such as Machine Learning, Artificial Intelligence, Big-Data, high-dimensional analysis.

PSO-3 Demonstrate the competencies and skills required for carrying out research in different areas of Statistics as well as in modern areas in Statistics that include topics like Big Data, Machine Learning, Artificial Intelligence in order to contribute original knowledge in the chosen field(s) and provide innovative solutions to problems.

4.5 Mapping of PLOs and PSOs with QDs

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO-1	3	2	2	2	2
PLO-2	2	3	2	2	2
PLO-3	3	2	2	2	2
PLO-4	2	3	2	2	2
PLO-5	3	2	2	2	2
PLO-6	2	2	2	2	2
PLO-7	2	2	2	3	2
PLO-8	2	2	2	2	3
PLO-9	2	2	2	2	2
PLO-10	2	2	2	2	2
PSO-1	3	2	2	2	2
PSO-2	3	2	2	2	2
PSO-3	3	2	2	2	2

5 Ph.D in Mathematics/Applied Mathematics

5.1 Qualitative Descriptors (QDs)

After completion of this academic program, the students will be able to

QD-1 Analyze subtle technical issues involved in the proofs of the results in relevant research areas and apply them whenever necessary besides being creative.

QD-2 Use state-of-the-art knowledge to identify, solve problems and develop theory.

QD-3 Communicate the results proved by them to experts and design collaborative research programs so that they can establish themselves as independent researchers.

QD-4 Communicate the impact and importance of their research to non-mathematicians.

QD-5 Collaborate with other mathematicians and those who use mathematics in their research. In particular, they will be open to carry out multidisciplinary research.

5.2 Mapping of QDs with MSs

	MS-1	MS-2	MS-3	MS-4
QD-1	3	2	3	3
QD-2	3	2	3	3
QD-3	3	2	3	3
QD-4	2	2	2	3
QD-5	3	2	3	3

5.3 Program Learning Outcomes (PLOs)

After completion of the Ph.D in Mathematics/Applied Mathematics, the students will be able to

PLO-1 Demonstrate ability to pose and solve research problems in Mathematics and Applied Mathematics.

PLO-2 Demonstrate ability to collaborate with mathematicians across the globe. Moreover the students will be able to demonstrate their competency to work with scientists, engineers, economists etc. in various public/private organizations.

PLO-3 Write the proofs of the results they have proposed and present subtle technical aspects of the subject that are used lucidly and precisely to communicate with experts.

PLO-4 Demonstrate ability to upgrade their knowledge from time to time in order to continue further research.

PLO-5 Develop teaching skills and display command over most of the topics at undergraduate, postgraduate level so that they are ready to be teaching faculty in reputed institutes.

5.4 Programme Specific Objectives (PSOs)

PSO-1 Demonstrate comprehensive understanding of their research area and allied areas in Mathematics and Applied Mathematics.

PSO-2 Apply cutting edge techniques to build theory in Mathematics and solve problems in Applied Mathematics.

5.5 Mapping of PLOs and PSOs with QDs

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO-1	3	2	2	2	2
PLO-2	3	2	2	2	2
PLO-3	2	2	3	2	2
PLO-4	2	2	2	3	2
PLO-5	2	2	2	2	3
PSO-1	3	2	2	2	2
PSO-2	2	2	2	2	2

6 PhD in Statistics

6.1 Qualitative Descriptors (QDs)

After completion of this academic program, the students will be able to

QD-1 Demonstrate comprehensive knowledge and skills in relevant research areas.

QD-2 Use knowledge and skills required for identifying problems and evaluation using methodologies as appropriate to the subjects for formulating the evidence based solutions.

QD-3 Communicate the results of studies undertaken in the field of research to different fields of data-sciences, accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s).

QD-4 Demonstrate knowledge and transferable skills in the fields of different branches of Statistics. Meet one's own learning needs, based on research and development work and professional materials.

6.2 Mapping of QDs with MSs

	MS-1	MS-2	MS-3	MS-4
QD-1	3	2	2	2
QD-2	3	2	2	2
QD-3	2	3	2	2
QD-4	2	2	3	3

6.3 Program Learning Outcomes (PLOs)

After completion of the Ph.D in Statistics, the students will be able to

PLO-1 Demonstrate critical thinking and ability to identify, formulate and solve problems in the research area of Statistics.

PLO-2 Demonstrate an ability to visualize and work in computational laboratories, and in interdisciplinary and multidisciplinary areas of research.

PLO-3 Demonstrate skills to use Statistics tools, techniques and softwares to analyze and solve problems. and synthesize data from a variety of sources and draw valid conclusions.

PLO-4 Present the results of studies undertaken in Statistics clearly and precisely, communicate ideas from multiple perspectives and explain concepts of Statistics to non-Statisticians.

PLO-5 Demonstrate the ability for life- long learning in order to meet the needs of changing trades and demands of work place.

6.4 Programme Specific Objectives (PSOs)

PSO-1 Demonstrate the comprehensive knowledge and skills in the research area of Statistics.

PSO-2 Demonstrate the competencies and skills required for carrying out research in modern and thrust areas in Statistics in order to contribute original knowledge in the chosen field(s) and provide innovative solutions to problems.

6.5 Mapping of PLOs and PSOs with QDs

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO-1	3	2	2	2	2
PLO-2	3	2	2	2	2
PLO-3	2	2	3	2	2
PLO-4	2	2	2	3	2
PLO-5	2	2	2	2	3
PSO-1	3	2	2	2	2
PSO-2	2	2	2	2	2