DEPARTMENT OF ATMOSPHERIC SCIENCE
SCHOOL OF EARTH SCIENCES

M.Sc. Atmospheric Science
(Course Structure and Syllabus)
2025-2026
(As per National Education Policy 2020)

Central University of Rajasthan

2025

DEPARTMENT OF ATMOSPHERIC SCIENCE
SCHOOL OF EARTH SCIENCES

M.Sc. Atmospheric Science

(2-Years M.Sc. Programme)

Atmospheric Science is an umbrella term for the study of the Earth's atmosphere, its processes, the effects other systems have on the atmosphere, and the effects of the atmosphere on these other systems. This programme includes meteorology, atmospheric physics, chemistry and dynamics, aeronomy and climatology. The design of the Master programme in Atmospheric Science is aimed at imbibing the students with fundamental scientific methodology in mathematics, physics and chemistry to enable them to appreciate, understand and investigate the complex behavior of Earth's atmosphere and climate system using the aforementioned tools. The applications of Atmospheric Science to the study of agriculture, aviation, water resources, disaster mitigation (due to extreme weather, severe storms, cyclone, etc.), air quality and climate prediction harbor immense possibilities which are highly relevant at present and in future, since several facets of the human life are intrinsically impacted by our atmosphere. The curriculum of Masters Programme in Atmospheric Science launched in the University in 2016 adheres to the application of meteorology to the common people needs. The department has identified the thrust areas of research which include:

1. Numerical Modelling of Atmospheric and Oceanic Processes
2. Climate Dynamics and Variability
3. Indian Monsoon Studies
4. Mesoscale Modelling and Data Assimilation
5. Computational Methods in Atmospheric Science
6. Remote Sensing of the Atmosphere
7. Severe Convective Storms and Extreme Weather System
8. Desert Meteorology
9. Atmospheric Chemistry and Air Quality
10. Climate Change Impacts

Program: Intake and Eligibility

S. No	Program	Seat Intake	Eligibility
1	M.Sc. Atmospheric Science	20	*Bachelor's degree from a recognized University in any discipline of science /Engineering (Physics or Mathematics as one of the subject) with minimum of 50% marks or equivalent grade in aggregate for general category and 45% or equivalent grade in aggregate for SC/ST/OBC/PWD/EWS candidates.*

Admission Process: Through Central University Entrance Test (CUET), Conducted by National Testing Agency (NTA)

Programme Objectives

1. To impart the basic and advanced knowledge of various processes and phenomena in the field of Atmosphere Science and Meteorology.
2. To provide skills in theory, numerical modelling of Atmospheric processes and their applications in weather forecasting and development of early warning systems for extreme weather events.
3. To train the students with quantitative and scientific reasoning skills for operational organizations, academia, research & development organizations.
4. To produce trained manpower in providing solutions to various challenges and issues related to atmospheric sciences and other interdisciplinary areas.

Programme Outcomes

1. **Knowledge:** Develop deeper insights in multiple aspects of Atmospheric Science for better scientific understanding and interpretation of various atmospheric phenomena.
2. **Modern tool usage:** Apply mathematical and computational tools and techniques to study atmospheric processes
3. **Conduct investigation of complex problems:** Demonstrate quantitative skills for interpreting atmospheric observations to numerical modeling and forecasting of weather systems.
4. **Enhance Instrumentation skill:** Explain the principles behind meteorological instrumentation and create graphical depictions of meteorological information.
5. **Analytical skill:** Demonstrate critical and analytical skills to interpret and predict weather systems using different products (model results, maps, satellite imagery, etc.).
6. **Communication:** Demonstrate skills for communicating their technical knowledge and scientific results.
7. **Research and Jobs:** Building foundation for higher studies and research as well as capability to get science jobs.
8. **Problem Analysis and Project:** Confidence for independent pursuit of projects, research, start-ups and entrepreneurship.
9. **Society and Sustainability:** Understand the impact of optimal solutions in societal and environmental contexts, and demonstrate the knowledge for sustainable development

Department of Atmospheric Science
M.Sc. Atmospheric Science
Credit Summary of Courses Offered by Department of Atmospheric Science
(Academic Session 2025-2026)

	Discipline Specific Core (DSC)	**Skill Enhancement Courses (SEC)**	**Discipline Specific Elective Courses (DSE)**	**Open Elective (OE) course/MOOCs/NPTEL**	**Value Added Course (VAC)**	**AEC**	**Total**
Semester I	14(04)	03(01)	-	-	-	03(01)	20(06)
Semester II	14(04)	03(01)	03(01)	-	-	-	20(06)
Semester III	10(03)	04(01)	03(01)	-	03(01)	-	20(06)
Semester IV	-	12(01)	03(01)	03(01)	-	02(01)	20(04)
Credit	*38(11)*	*22(04)*	*09(03)*	*03(01)*	*03(01)*	*05(02)*	*80(22)*
Percentage	***47.5***	***27.5***	***11***	***4***	***4***	***6***	***100***

COURSE STRUCTURE
First Semester; level-6.0

S. No.	**Course Type**	**Revised Course Code as per NCrf**	**Course Title**	**Contact Hours**			**Credits**
				L	**T**	**P**	
1	DSC	6.0ATS01	Fundamentals of Earth System Sciences	3	1	0	4
2	DSC	6.0ATS02	Tropical Meteorology and Climatology	3	1	0	4
3	DSC	6.0ATS03	Physics of the Atmosphere	3	0	0	3
4	DSC	6.0ATS04	Dynamics of the Atmosphere	3	0	0	3
5	AEC	6.0ATS61	Statistical Methods for Earth Sciences	2	0	2	3
6	SEC	6.0ATS41	Programming Techniques for Atmospheric Sciences	1	0	4	3
	Total Credits						**20**

COURSE STRUCTURE
Second Semester; level-6.0

S. No.	**Course Type**	**Revised Course Code as per NCrf**	**Course Title**	**Contact Hours**			**Credits**
				L	**T**	**P**	**Total**
1	DSC	6.0ATS05	Fundamentals of Atmospheric Modelling	3	0	2	4
2	DSC	6.0ATS06	Physics and Dynamics of the Oceans	3	1	0	4
3	DSC	6.0ATS07	Instrumentations in Atmospheric studies	2	0	2	3
4	DSC	6.0ATS08	Weather Analysis and Visualization Laboratory	2	0	2	3
5	DSE	6.0ATSXX	Discipline Elective from list				3
6	SEC	6.0ATS42	Dissertation-I				3
	Total Credits						**20**

Third Semester (2yr Level 6.5)

S. No.	Course Type	Revised Course Code as per NCrf	Course Title	Contact Hours			Credits
				L	T	P	Total
1	DSC	6.5ATS01	Mesoscale Modelling and Extreme Weather Events	3	0	2	4
2	DSC	6.5ATS02	Remote Sensing and GIS for Atmospheric Science	1	0	4	3
3	DSC	6.5ATS03	Air Quality Modelling and Management	2	0	2	3
4	SEC	6.5ATS41	Internship				4
5	DSE	6.5ATSXX	Discipline Elective from list				3
6	VAC	6.5ATS71	Climate Change and Disaster Management	3	0	0	3
	VAC	UHV-II*	Universal Human Values 2: Understanding Harmony	3	0	0	Audit
	Total Credits						**20**

Fourth Semester (2yr Level 6.5)

S. No.	Course Type	Revised Course Code as per NCrf	Name of the Course	Contact Hours			Credits
				L	T	P	Total
1	SEC	6.5ATS42	Dissertation-II				12
2	DSE	6.5ATSXX	Discipline Elective from list				3
3	AEC	6.5ATS61	Seminar				2
4	GE/MOOC		For MOOC and GE: List will be provided				3
	Total Credits						**20**

* Audit compulsory course

Course code number: DSC from 01-20; DEC from 21-40; SEC from 41-60; AEC from 61-70; VAC from 71-80

Important Note:

a) Total Credits: 80 Credit (20 credits in each semester)
b) A student is required to accumulate a total of 44 credits to take exit after one year with PG Diploma in Atmospheric Science including 4 credits of internship after second semester.
c) A student is required to accumulate a total of 80 credits to fulfil the requirements for a Master of Science degree in Atmospheric Science.
d) Minimum 4 students are required to run elective courses.
e) Open electives can be selected from any department of the University.
f) MOOCs can be selected based on the availability in consultation with the department

Discipline Specific Elective (DSE) Courses

Second Semester

S. No.	Course Type	Revised Course Code as per NCrf	Name of the Course	Contact Hours			Credits
				L	T	P	Total
1	DSE	6.0ATS21	Desert Meteorology and Climate	3	0	0	3
2	DSE	6.0ATS22	Computational Fluid Dynamics	3	0	0	3
3	DSE	6.0ATS23	Atmospheric Chemistry, Air Pollution & Climate	2	0	2	3
4	DSE	6.0ATS24	Simulation of Atmospheric Processes	2	0	2	3

Third Semester

S. No.	Course Type	Revised Course Code as per NCrf	Course Title	Contact Hours			Credits
				L	T	P	Total
1	DSE	6.5ATS21	Cloud Physics and Dynamics	3	0	0	3
2	DSE	6.5ATS22	HPC applications in Atmospheric Sciences	3	0	0	3
3	DSE	6.5ATS23	Boundary Layer Meteorology	3	0	0	3
4	DSE	6.5ATS24	Upper and Middle Atmosphere Dynamics	3	0	0	3
5	DSE	6.5ATS25	Numerical Weather Prediction-Parameterisation and Data Assimilation	2		2	3

Fourth Semester

S. No.	Course Type	Revised Course Code as per NCrf	Name of the Course	Contact Hours			Credits
				L	T	P	Total
1	DSE	6.5ATS26	Climate Change and Crop Modelling	3	0	0	3
2	DSE	6.5ATS27	Hydrometeorology	3	0	0	3
3	DSE	6.5ATS28	Radar Meteorology	3	0	0	3
4	DSE	6.5ATS29	Aviation Meteorology	3	0	0	3
5	DSE	6.5ATS30	Satellite Meteorology	3	0	0	3
6	DSE	6.5ATS31	Ocean Modelling	3	0	0	3