



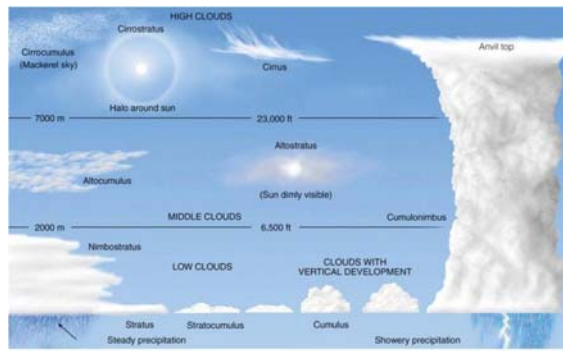
LMAST Master of Science (MSc)

Laurea Magistrale in Atmospheric Science and Technology (LMAST)

Official site: <http://www.dsfc.univaq.it/it/magistrale-atmospheric-science-and-technology.html>

Pre-selection: <http://en.uniroma1.it/study-us/courses-and-programmes/second-single-cycle-programmes/english/atmospheric-science>

LMAST PROGRAMME. The **Laurea Magistrale in Atmospheric Science and Technology (LMAST)** is a Master of Science (MSc)



degree in the Physics class (LM-17), organized as an international inter-university programme, jointly proposed by the **Sapienza University of Rome** and **University of L'Aquila**. The unique feature of LMAST programme is to educate **master students with solid knowledge and specific skills in the domain of atmospheric science from a physics and an engineering perspective.**

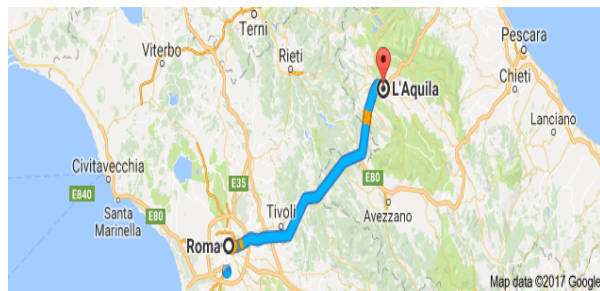
LMAST includes **fundamentals** of fluid mechanics, meteorology, electromagnetics and statistical mechanics as well as satellite Earth observation, radar meteorology, atmospheric remote sensing, dynamical meteorology and climatic modelling, environmental meteorology and monitoring. The course can be completed by choosing among a **wide choice of interdisciplinary subjects** such as: i) urban climatology, satellite geodesy and geomatics, advanced fluid mechanics, hydroclimatology, hydrological modelling; ii) advanced electromagnetics and scattering, optoelectronic sensors, machine learning, radar image processing,

engineering electromagnetics, robust statistical data analysis and modelling; ii) atmospheric sounding, lidar remote sensing, radiative transfer in atmosphere, physics of non-linear systems, space weather, hydrometeorological physics, atmospheric chemistry.

Stages for carrying out the **master thesis** are also foreseen through agreements with **regional and national meteorological services as well research institutes and companies.** The program emphasizes system-related and interdisciplinary aspects aiming at **forming professional expertise** as meteorologist, climatologist, forecaster, atmospheric scientist, remote sensing scientist, and environmental physicist LMAST is closely linked with research and innovation activities in the Italian and international job-market context related to agrometeorology, risk management, transport, climate adaptation, civil protection, renewable energy, energy management.

The LMAST graduate can obtain the **Statement of learning curriculum conformity** to the **World Meteorological Organization (WMO) Recommendation 1083 "Guide to the implementation and education and training standards in meteorology and hydrology"**, officially released by the WMO National Permanent Representative.

LMAST ORGANIZATION. The **Laurea Magistrale in Atmospheric Science and Technology (LMAST)** is held entirely in English and provides students with advanced concepts, professional training and specific physics and engineering skills, enabling them to address complex issues requiring analysis, development, simulation and application in a wide range of atmospheric science topics.



The inter-university **LMAST** programme foresees the following 2-year schedule and logistics:

1. LMAST first year is organized in Rome and students acquire a basic knowledge related to major areas of fluid mechanics, meteorology, electromagnetics, statistical mechanics as well as complementary subjects on advanced and applied topics.

2. LMAST second year is organized in L'Aquila (90 km far from Rome, about 1-hour trip) and students are introduced to atmospheric dynamics, climate modelling and environmental meteorology as well as to several complementary subjects on atmospheric physics.



The **mandatory subjects** of LMAST are the following (60 credits, 600 hours of lectures, exercises and laboratories):

1. Fundamentals of fluid mechanics (6 credits)
2. Foundations of meteorology (9 credits)
3. Electromagnetics and radar meteorology (6 credits)
4. Statistical mechanics (6 credits)
5. Satellite Earth observation (6 credits)
6. Laboratory of atmospheric remote sensing (6 credits)
7. Atmospheric dynamics: meteorological and climate modeling (12 credits)
8. Environmental meteorology (9 credits)

Other **24 credits** can be chosen by the student within a wide offer of subjects in LMAST together with a **stage** of 3 credits (75 hours). A **final Master thesis** of 27 credits (675 hours of work), to be presented and discussed, concludes the LMAST programme (the final grade is expressed in 110 with possible laude).

The **LMAST Master thesis** score is up to 10 points (over 110 available) where: i) for requests of points ≥ 6 a reviewer is needed; ii) 2 points are attributed for academic time-efficiency; iii) to obtain *cum laude*, the overall points should be equal or larger than 113/110.



LMAST MANAGEMENT. LMAST is managed in **L'Aquila** by the Department of physical and chemical sciences (**DSFC**, <http://www.dsfc.univaq.it/en/>). Univaq student welcome services can be visited at <http://www.univaq.it/en/>.

LMAST is managed in **Rome** by the Department of Information engineering (DIET, https://web.uniroma1.it/dip_diet/en) at Sapienza University of Rome together with the Department of Civil, Environmental and Construction Engineering (**DICEA**) and **Department of Physics (DF)**. Sapienza student welcome services can be visited at <http://en.uniroma1.it/Hello>.

LMAST ADMISSION. Candidates, wishing to apply to LMAST, are required to have a Bachelor degree and curriculum background with the following **requirements**:

- **Italian candidates** should exhibit a **Laurea in Physics (L-30)** or a **Laurea with at least 24 credits in MAT and 24 credits in FIS** as well as (preferably) 6 credits in INF and 6 credits in CHIM.
- **Foreign candidates from EU and non-EU countries** should hold a **BSc in Physics or a degree in a technical-scientific subject** with a **list of exams** showing a strong background in mathematics (calculus, algebra, analysis, numerics) and physics (classical and modern) as well as in chemistry and computer programming.
- **All students** must have a good knowledge of the English language **certified at a minimum level B2 (within Common European Framework of Reference for Languages)**. IELTS (International English Language Testing System) or TOEFL (Test of English as a Foreign Language) proficiency certification are welcome.

The submission of the **following documents** is **strongly recommended** and will constitute a positive element in the LMAST evaluation:

- Grade Point Average (GPA) and Cumulative-weighted Grade Point Average (CGPA) *larger than 75% of its maximum.*
- GRE (Graduate Record Examinations) General test, or Subject Tests in Math/Physics *larger than 75% of its maximum.*
- Admission test grades either general or specific for physics and engineering, as for instance GATP (Graduate Aptitude Test in Physics) or GATE (Graduate Aptitude Test in Engineering) *larger than 75% of its maximum.*

The **LMAST Admission Committee** may request an **interview with the prospective students** via Skype or other services.

The LMAST MSc programme is limited to **30 available positions per year**.

LMAST PRE-SELECTION APPLICATION. All students applying for admission to LMAST MSc degree programme, that accept pre-selection applications, should complete the **pre-selection process** which foresees:

1. The **student prepares all his/her documentation** (including passport, Transcript of records of his/her university BSc career, English proficiency certification, letter of motivation and at least 2 letters of recommendation from 2 different university professors).
2. The **student submits his/her application to the pre-selection platform**, accessible at <http://en.uniroma1.it/node/13540>.
3. The Admission Committee evaluate the pre-selection application form and send, within the deadlines foreseen by the 3 pre-selection stages (see later on), an official letter of pre-acceptance, an official message of delay to next stage or an official letter of refusal.
4. If the **accepted student is non-EU citizen**, the student presents his/her application to the local Italian embassy/consulate since the pre-application process does NOT replace or substitute the **embassy-based pre-enrolment process** for non-EU students.
5. If the **accepted student is a EU citizen**, the student is automatically pre-enrolled.
6. All accepted students can proceed to the **final enrolment** via **procedures and tuition fees** described at <http://www.univaq.it/en/>.

LMAST PRE-SELECTION PHASES. The pre-selection process is formed by three phases with the following schedule:

1st selection phase

- November 1, 2017: pre-enrolment opens for EU and non-EU students.
- **April 1-15, 2018: first selection phase notification.** Letters of pre-acceptance are sent to the best candidates who have applied till 31 March 2018. Unselected applicants will be considered for the second selection phase.

2nd selection phase

- April 30, 2018: pre-enrolment for non-EU students closes (due to embassy-related procedures which may take up 3 months).
- **May 1-15, 2018: second selection phase notification.** Letters of pre-acceptance are sent to the best candidates who have applied till 30 April or who have not been selected in the first phase.

3rd selection phase

- **June 16-30, 2018: third selection phase notification.** Letters of pre-acceptance are sent to the best candidates who have applied till May 31 or who have not been selected in the first and second phase.
- June 30, 2018: pre-enrolment for EU students closes.
- **July 1-15, 2018:** Letters of pre-acceptance are sent to the best EU candidates who have applied till 30 June.
- **September 1-15, 2018:** Letters of pre-acceptance are sent to EU candidates who have applied till 31 August.

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LM AtmoSciTech (LMAST) - DIDACTIC PLAN (2018-2020)

LMAST SUBJECT	Year Semester	CFU ECTS	SSD Discipline	Type	Site	Department	Subject mode and number
1st year - Semester 1 (site of Rome)							
Fundamentals of fluid mechanics	I / 1	6	ICAR/01	B*	Rome	DICEA	Mandatory course n. 1
Foundations of meteorology	I / 1	9			Rome		Mandatory course n. 2
Part 1: Physical meteorology		(6)	FIS/06	B		DF	
Part 2: Synoptic meteorology		(3)	GEO/12	B		DSFC	
Electromagnetics and radar meteorology	I / 1	6	ING-INF/02	B	Rome	DIET/CNR	Mandatory course n. 3
Statistical mechanics	I / 1	6	FIS/02	B	Rome	DF/CNR	Mandatory course n. 5
Total CFU Semester 1		27					
1st year - Semester 2 (site of Rome)							
Satellite Earth observation	I / 2	6	ING-INF/02	B*	Rome	DIET	Mandatory course n. 4
Laboratory of atmospheric physics	I / 2	6	FIS/06	B	Rome	DF	Mandatory course n. 7
<i>1 Choice course among:</i>	I / 2	6			Rome		Optional course n. 6
Advanced fluid mechanics			ICAR/01	C		DICEA	<i>Available</i>
Hydroclimatology			ICAR/01	C		DICEA	<i>Available</i>
Hydrological modeling			ICAR/02	C		DICEA	<i>Available</i>
Satellite geodesy and geomatics			ICAR/06	C		DICEA	<i>Not available 2018-19</i>
Urban climatology			ICAR/01	C		DICEA	<i>Not available 2018-19</i>
<i>1 Choice course among:</i>	I / 2	6			Rome		Optional course n. 8
Advanced electromagnetics and scattering			ING-INF/02	C		DIET	<i>Available</i>
Engineering electromagnetics			ING-INF/02	C		DIET	<i>Available</i>
Machine learning			ING-IND/31	C		DIET	<i>Available</i>
Optoelectronic sensors			ING-INF/01	C		DIET	<i>Available</i>
Radar image processing			ING-INF/03	C		DIET	<i>Not available 2018-19</i>
Robust statistical data analysis and modeling			ING-IND/31	C		DIET	<i>Available</i>
<i>Free-choice exam within university offer</i>	I / 2	6		D	Rome/L'Aquila		Choice course n. 12a
Total CFU Semester 2		30					
LMAST SUBJECT	Year Semester	CFU ECTS	SSD Discipline	Type	Site	Department	Subject mode and number
2nd year - Semester 3 (site of L'Aquila)							
Atmospheric dynamics	II / 3	12		B	L'Aquila		Mandatory course n. 9
Mod. 1: Meteorological modeling		(6)	GEO/12			DSFC	
Mod. 2: Climate modeling		(6)	GEO/12			DSFC	
Environmental meteorology	II / 3	9		B	L'Aquila		Mandatory course n. 10
Part 1: Environmental modeling		(6)	FIS/06			DSFC	
Part 2: Environmental monitoring techniques		(3)	FIS/06			DSFC	
<i>1 Choice course among:</i>	II / 3	6			L'Aquila		Optional course n. 11
Atmospheric sounding		6	FIS/06	C		DSFC/CNR	<i>Available</i>
Hydrometeorological physics		6	FIS/06	C		DSFC	<i>Available</i>
Lidar remote sensing		6	FIS/01	C		DSFC	<i>Available</i>
Radiative transfer in atmosphere		6	FIS/06	C		DSFC	<i>Available</i>
Physics of non-linear systems		6	FIS/06	C		DSFC/CNR	<i>Available</i>
Space weather		6	FIS/06	C		DSFC	<i>Available</i>
<i>Free-choice exam within university offer</i>	II / 3	6		D	Rome/L'Aquila		Choice course n. 12b
Total CFU Semester 3		33					
2nd year - Semester 4 (site of L'Aquila or Rome)							
Stage	II / 4	3		F	Rome/L'Aquila		
Master Thesis	II / 4	27		E	Rome/L'Aquila		
Total CFU Semester 4		30					
Total CFU LMAST		120					

Legend

- 1 CFU = 1 ECTS (European Credit Transfer System) = 25 hours of student work with 8 h. of lectures or 12 h. laboratory/exercise
- CFU type: B (mandatory), C (complementary/optional), D (free choice selection), E (thesis), F (professional)
- D-Type subjects can be **freely chosen** by the student within the LMAST offer or within Sapienza and Univaq overall offer.