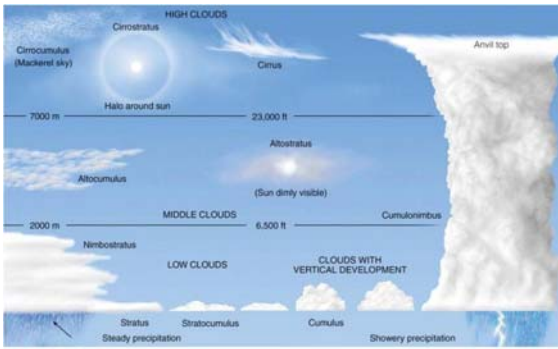




LMAST Master of Science (MSc)

Laurea Magistrale in Atmospheric Science and Technology (LMAST)

Web site: <http://www.dsfc.univaq.it/it/corso-magistrale-lmast.html>
Pre-enrolment site: <http://www2.uniroma1.it/internazionale/incoming>
Enrolment site: <http://www.univaq.it/en/section.php?id=34>
Info request: lmast.univaqsapienza@uniroma1.it



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.**

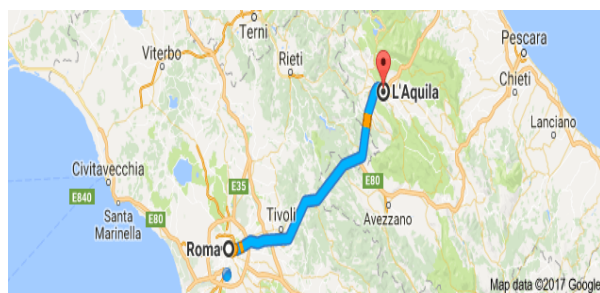
LMAST includes **fundamentals** of fluid mechanics, meteorology, electromagnetics and statistical mechanics as well as satellite Earth observation, radar meteorology, atmospheric remote sensing, dynamical meteorology and climatic modelling, environmental meteorology and monitoring. The course can be 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; iii) 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.

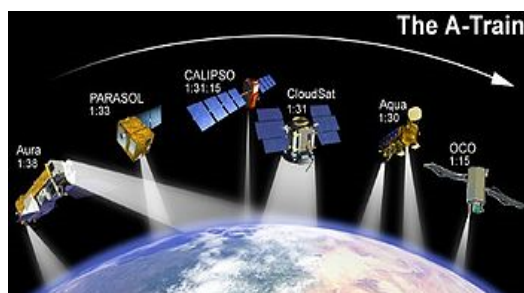
The LMAST graduate can obtain the **Statement of learning curriculum conformity** to the **World Meteorological Organization (WMO) Recommendation 1083 "Guide to the implementation and education and training standards in meteorology and hydrology"**, officially approved by the **WMO National Permanent 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 preferably **certified at 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 number of students per year of LMAST MSc programme is not limited.

LMAST APPLICATION AND ENROLMENT. 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, Transcription 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** at <http://www2.uniroma1.it/internazionale/incoming>.
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 DEADLINES. The pre-selection process follows the following schedule:

NON-EU STUDENTS

- **November 1:** pre-enrolment opens for non-EU students.
Letters of pre-acceptance are sent to the best **Non-EU** candidates within 60 days from the application.
- **April 30:** pre-enrolment for **non-EU** students closes (due to embassy-related **visa** procedures which may take up 3 months).
- **June-August:** calls for scholarships are opened by <http://www.adsuaq.org> or <http://www.laziodisco.it>
- **September 23:** lectures start in Rome and L'Aquila
- **December 20:** last day to officially enrol at LMAST through <http://www.univaq.it/en/section.php?id=34>

EU STUDENTS

- **November 1:** pre-enrolment opens for EU students.
Letters of pre-acceptance are sent to the best **EU** candidates within 60 days from the application.
- **June-August:** call for scholarships at <http://www.adsuaq.org> or <http://www.laziodisco.it>
- **September 15:** pre-enrolment for **EU** students closes (official enrolment can be anyway accomplished till December).
- **September 23:** lectures start in Rome and L'Aquila
- **December 20:** last day to officially enrol at LMAST through <http://www.univaq.it/en/section.php?id=34>

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 Dott. Nicola Argenti (DIET, Rome) +39.06.44585347, nicola.argenti@uniroma1.it



LM AtmoSciTech (LMAST) - DIDACTIC PLAN (2019-2021)

SYLLABUS of the courses available @ https://www.dropbox.com/s/r47e9m0oe5vvrkb/LMAST_Syllabus_2019-21.pdf?dl=0.

CVs of all LMAST teachers available @ https://www.dropbox.com/s/6wuxga9d9dqyz0/LMAST_TeacherCV_2018-20.pdf?dl=0.

LMAST SUBJECT	Year	CFU	SSD	Type	Site	Department	Subject mode and number
	Semester	ECTS	Discipline				
1st year - Semester 1 (site of Rome)							
Fundamentals of fluid mechanics	I / 1	6	ICAR/01	B*	Rome	DICEA-Sapienza	Monica Moroni
Foundations of meteorology	I / 1	9			Rome		
Part 1: Physical meteorology		(6)	FIS/06	B		DF-Sapienza	Annamaria Siani
Part 2: Synoptic meteorology		(3)	GEO/12	B		DSFC-Univaq	Rossella Ferretti
Electromagnetics and radar meteorology	I / 1	6	ING-INF/02	B	Rome	DIET-Sapienza	Frank S. Marzano
			ING-INF/02			CNR-ISAC	Mario Montopoli
Statistical mechanics	I / 1	6	FIS/02	B	Rome	DF-Sapienza	Simone Paganelli
						CNR-ISMAR	Guglielmo Lacorata
Total CFU Semester 1		27					
1st year - Semester 2 (site of Rome)							
Satellite Earth observation	I / 2	6	ING-INF/02	B*	Rome	DIET-Sapienza	Nazzareno Pierdicca
Laboratory of atmospheric physics	I / 2	6	FIS/06	B	Rome	DF-Sapienza	Marco Cacciani
<i>1 Choice course among:</i>	I / 2	6			Rome		Optional course n. 5
Advanced fluid mechanics			ICAR/01	C		DICEA-Sapienza	S. Espa, G. Leuzzi
Hydroclimatology			ICAR/01	C		DICEA-Sapienza	F. Cioffi
Hydrological modeling			ICAR/02	C		DICEA-Sapienza	F. Napolitano, F. Russo
Satellite geodesy and geomatics			ICAR/06	C		DICEA-Sapienza	Not available 2019-20
Urban climatology			ICAR/01	C		DICEA-Sapienza	Not available 2019-20
<i>1 Choice course among:</i>	I / 2	6			Rome		Optional course n. 6
Advanced electromagnetics and scattering			ING-INF/02	C		DIET-Sapienza	F. Frezza
Engineering electromagnetics			ING-INF/02	C		DIET-Sapienza	A. Galli, M. Cavagnaro
Machine learning			ING-IND/31	C		DIET-Sapienza	M. Panella, A. Rizzi
Optoelectronic sensors			ING-INF/01	C		DIET-Sapienza	A. d'Alessandro, R. Asquini
Radar image processing			ING-INF/03	C		DIET-Sapienza	Not available 2019-20
Robust statistical data analysis and modeling			ING-IND/31	C		DIET-Sapienza	E. Di Claudio
<i>Free-choice exam within university offer</i>	I / 2	6		D	RM/AQ		Choice course n. 12a
Total CFU Semester 2		30					
2nd year - Semester 3 (site of L'Aquila)							
Atmospheric dynamics	II / 3	12		B	L'Aquila		
Mod. 1: Meteorological modeling		(6)	GEO/12			DSFC-Univaq	Rossella Ferretti
Mod. 2: Climate modeling		(6)	GEO/12			DSFC-Univaq	Gianluca Redaelli
Environmental meteorology	II / 3	9		B	L'Aquila		
Part 1: Environmental modeling		(6)	FIS/06			DSFC-Univaq	Gabriele Curci
Part 2: Environmental monitoring techniques		(3)	FIS/06			DSFC-Univaq	Giovanni Pitari
<i>1 Choice course among:</i>	II / 3	6			L'Aquila		Optional course n. 11
Atmospheric chemistry		6	CHIM/02	C		DSFC	G. Meloni
Atmospheric sounding		6	FIS/06	C		CNR-IMAA	D. Cimini
Hydrometeorological physics		6	FIS/06	C		DSFC-Univaq	B. Tomassetti
Lidar remote sensing		6	FIS/01	C		DSFC-Univaq	V. Rizzi, M. Iarlori
Radiative transfer in atmosphere		6	FIS/06	C		DSFC-Univaq	G. Pitari, V. Rizzi
Physics of non-linear systems		6	FIS/06	C		CNR-ISMAR	G. Lacorata
Space weather		6	FIS/06	C		DSFC-Univaq	P. Francia, M. Vellante
<i>Free-choice exam within university offer</i>	II / 3	6		D	RM/AQ		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.