Sapienza University of Rome

Faculty of Civil and Industrial Engineering	Faculty of Information Engineering, Informatics and Statistics
Call for applications to the Higher Education training segments of the two-year Master's Degrees in Engineering called MINOR for Transition Engineering	
GREEN TECHNOLOGIES and SMART INFRASTRUCTURES	

Students enrolled, for the 2023-2024 Academic Year, in the first and the second year of the Master's Degree Courses listed in the following Table (and in the fourth year for the single-cycle Master Degree course) can plan an integrated training course equal to 132 credits (312 credits for the single-cycle Master Degree course) for the achievement, in addition to the Master Degree, also of the MINOR Degree in Green Technologies or in Smart Infrastructures.

The acquisition of the MINOR will be certified by an Academic certification, with the issue of an Open Badge. Furthermore, the supplementary credits can be obtained concurrently the graduation or within six months from the same, without any additional costs for the student. If the qualification is acquired at the same time as the graduation, this will be attested in the Diploma Supplement, which is an additional document to the Degree certificate.

For each Degree Program, particular rules, in order to structure an inclusive training course of the Higher Education segment, are specified in Annex 1, together with the list of courses with which the student can settle the individual training course. For some Degree Programs only one of the two segments in Green Technologies or Smart Infrastructures is activated.

The student who intends to undertake an integrated training course must fill in the reservation form available from February 26th, 2024 at the link indicated in the Table.
The form will remain open until the maximum number of acceptable requests for each Degree Program is reached, and in any case no later than March 20th, 2024. On March 26th, 2024 each Study Board will publish the list of admitted students who will have to fill in the new training course to be submitted for approval by their own Study Board.

CLASS	MASTER DEGREE	MINOR TRAINING SEGMENTS	AVAILABLE SEATS	APPLICATION LINK
LM-4 single cycle	Ingegneria Edile-Architettura	GREEN TECHNOLOGIES	8	Registration form link
LM-20	Aeronautical Engineering	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	8	Registration form link
LM-20	Space and Astronautical Engineering	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	12	Registration form link

LM-22	**Chemical Engineering**	GREEN TECHNOLOGIES	9	Registration form link
LM-23	**Ingegneria Civile**	SMART INFRASTRUCTURES	8	Registration form link
LM-23	**Transport Systems Engineering**	SMART INFRASTRUCTURES	9	Registration form link
LM-24	**Environmental and Sustainable Building Engineering (Rieti campus)**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	8	Registration form link
LM-25	**Control Engineering**	SMART INFRASTRUCTURES	8	Registration form link
LM-26	**Safety and Civil Protection Engineering**	SMART INFRASTRUCTURES	8	Registration form link
LM-27	**Ingegneria delle Comunicazioni**	SMART INFRASTRUCTURES	8	Registration form link
LM-28	**Electrical Engineering**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	8	Registration form link
LM-29	**Electronics Engineering**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	8	Registration form link
LM-30	**Energy Engineering**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	14	Registration form link
LM-31	**Management Engineering**	GREEN TECHNOLOGIES	12	Registration form link
LM-33	**Mechanical Engineering**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	19	Registration form link

LM-35	**Environmental Engineering for Sustainable Development (Latina campus)**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	8	Registration form link
LM-35	**Environmental Engineering**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	8	Registration form link
LM-53	**Nanotechnolo y Engineering;**	GREEN TECHNOLOGIES SMART INFRASTRUCTURES	8	Registration form link

For information about the courses belonging to the **Faculty of Civil and Industrial Engineering**, please contact: minor.ingegneria-1@uniroma1.it

For information about the courses belonging to **the Faculty of Information Engineering, Informatics and Statistics** please contact: minor.ingegneria-2@uniroma1.it

Rome 21/02/2024

The Dean of the Faculty of   **The Dean of the Faculty of Information**

Civil and Industrial Engineering   **Engineering, Informatics and Statistics**

Prof. Carlo Massimo Casciola   **Prof. Marco Schaerf**

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Deadline: 20/03/2024

ANNEX 1

The acquisition of the MINOR Degree requires the student to acquire a total of 132 credits for the two-year Master Degrees or 312 credits for the single-cycle Master Degree, and among them the last 30 credits must be chosen according to the composition in modules specified by the Sapienza Academic Senate:

❖ module 1 - from 6 to 9 credits - as curricular credits valid on transversal educational activities of the specific area of the MINOR, borrowed from the activities present in the Study Course's educational offer of the context in which the student is enrolled among the characterizing activities or similar;

❖ module 2 - from 9 to 12 credits - as curricular credits valid on transversal training activities of the specific area of the MINOR, borrowed from the activities present in the Study Course's educational offer other than that the student is enrolled in, related to Scientific Subject Sector (SSD) not characterizing the class of the student and recognizable among the activities chosen by the student;

❖ module 3 - 12 credits - which can be acquired as extra-curricular credits for both transversal training activities of the specific MINOR area, borrowed from the activities present in the Study Course's educational offer, related to Scientific Subjects Sector (SSD) not characterizing the class of the Course of Study to which the student is enrolled, and for training activities related to transversal skills, including "digital skills" and "design thinking", availed by the University educational offer or developed *ad hoc* for the MINOR. These credits can be obtained concurrently the graduation or within six months from the same, without any additional costs for the student.

The Master's Degree final projects, of an interdisciplinary nature, must concern a topic consistent with the chosen MINOR.

Below there are the tables with the subjects to be used for the compilation of the MINOR individual educational training course, which can be presented on the University IT <u>only by those who will be included in the list of admitted students published on the website of each Study Board</u>. Following there are some practical tips for the correct use of the tables.

0. Choose which MINOR to follow, if the Degree Program admits both Green Technologies and Smart Infrastructures. Take into consideration only the two tables of the said course.

1. Start to fill in the training course according to the regular indications provided by the selected curriculum of the Course of Study, making sure to include one of the courses indicated in the row of Table I reserved for each course of study, third column. Often its inclusion is also mandatory for a specific curriculum or, in any case, it is to be chosen in limited choice packages. This insertion constitutes module 1 of the MINOR course.

2. Insert as free choice one or more of the subjects listed in the various rows of Tables I and II of the chosen MINOR Degree, with the exception of those present in the row of the own Course of Study, third column, used in the previous point. Each subject is characterized by the initials of a Scientific Subject Sector, called SSD. Check that that SSD is not included among those characterizing the class to which the own Course of Study belongs, which is listed in the same row of the own Course of Study, but in the second column. If it is so, discard that subject and choose another one. The two chosen subjects then constitute module 2 of the MINOR course.

3. Insert, as additional subjects of the MINOR course, one or more of the subjects provided in the various rows of Tables I and II of the chosen MINOR Degree, including those present in the row of the own Course of Study, third column, used in the previous point. Each subject is characterized by the initials of a Scientific Subject Sector, called SSD. Check that this SSD is not included among those characterizing the class to which the own Course of Study belongs, which is listed in the line of the own Course of Study in the second column. If it is so, discard that subject and choose another one. The two chosen subjects then constitute module 3 of the MINOR course.

4. If some training activities relating to transversal skills, including "digital skills" and "design thinking", are activated and/or recognized by the Degree Course Council, one or both of the courses in module 3 can be replaced by these activities.

Table I a

Courses offered by Context Master Degrees – Faculty of Civil and Industrial Engineering and Faculty of Information Engineering, Infomatics and Statistics

MINOR DEGREE IN GREEN TECHNOLOGIES

CONTEXT MASTER DEGREES		FUNCTIONAL SUBJECTS IN GREEN TECHNOLOGIES			
DEGREE	**CLASS AND RELATED CHARACTERIZING SSD**	**SUBJECT**	**SSD**	**CREDITS**	**CODE**
Ingegneria Edile-Erchitettura	**LM-04 c.u.** ICAR/14; ICAR/08; ICAR/09; ICAR/22; ICAR/20; ICAR/21; ICAR/19; ICAR/10; ICAR/12; IUS/10.	Architettura tecnica e sostenibilità ambientale	ICAR/10	9	1047245
		Progettazione urbanistica	ICAR/21	9	1023225
		Impianti termo-tecnici per l'edilizia	ING-IND/11	9	1047193
		Costruzioni idrauliche urbane	ICAR/02	6	1047196
		Elementi di Elettrotecnica ed impianti elettrici	ING-IND/33	6	10589903
Aeronautical Engineering	**LM-20** ING-IND/03; ING IND/04; ING-IND/05; ING-IND/06; ING-IND/07; ING-IND/15.	Aeroacoustics	ING-IND/06	6	1055722
		Aerospace materials	ING-IND/22	6	1041541
		Controllo delle vibrazioni e del rumore	ING-IND/13	6	1021759
		Gas turbine combustors	ING-IND/07	6	10592716
		Guida e navigazione aerea	ING-IND/03	6	1021800
Space and Astronautical Engineering	**LM-20** ING-IND/03; ING IND/04; ING-IND/05; ING-IND/06; ING-IND/07; ING-IND/15	Space Structures	ING-IND/04	9	10606119
		Space geodesy and geomatics	ICAR/06	6	10595976
		Space Guidance and Tracking Systems	ING-IND/05	6	10606307
		Technology of Aerospace Materials	ING-IND/04	6	10606310
		Combustion	ING-IND/07	6	1041538
Chemical Engineering	**LM-22** ING-IND/21; ING-IND/22; ING-IND/24; ING-IND/25; ING-IND/26; ING-IND/27.	Green chemistry and process engineering	ING-IND/27	6	10592821
		Sustainable design of materials	ING-IND/22	6	10592817
		Catalisi per l'industria e per l'ambiente	ING.IND/27	6	10600081
		Nano bio technology	ING IND/25	6	10592628
		Green and Sustainable Hydrogen Production	ING-IND 24 ING-IND 25	6	10606369
		Impianti di trattamento degli effluenti gassosi	ING IND/25	6	1019252

Environmental and Sustainable Building Engineering (Rieti campus)	**LM-24** ICAR/01; ICAR/02; ICAR/03; ICAR/04; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/10; ICAR/11; ICAR/12; ICAR/14; ICAR/15; ICAR/17; ICAR/19; ICAR/20; ICAR/21; ICAR/22; ING-IND/10; ING-IND/11; ING-IND/31; ING-IND/33; IUS/10; SECS-P/02; SECS-P/06.	Urban health	MED/42	9	10595658
		Groundwater management	GEO/05	9	10595651
		Advanced processes and technologies for water sustainability	ICAR/03	6	10595654
		Environmental Hydraulics	ICAR/01	6	10595657
		Advanced design for sustainable building components	ICAR/10	6	10595665
Electrical Engineering	**LM-28** ING-IND/31; ING-IND/32; ING-IND/33; ING-INF/07.	Compatibilità elettromagnetica	ING-IND/31	9	1016430
		Sistemi elettrici per la mobilità	ING-IND/33	9	1019456
		Produzione combinata dell'energia da fonti rinnovabili	ING-IND/32	9	1021990
		Electromagnetic compatibility	ING-IND/31	6	10596201
		Power systems for electrical transportation and e-mobility lab	ING-IND/33	9	10599904
		Renewables	ING-IND/32	6	10596198
Electronics Engineering	**LM-29** ING-INF/01; ING-INF/02; ING-INF/07.	Optoelectronics	ING-INF/01	6	1041744
		Elettronica per l'ambiente	ING-INF/01	6	1021782
		Telerilevamento a microonde	ING-INF/02	6	1038110
		Machine Learning per i sistemi elettrici ed elettronici	ING-IND/31	6	10600479
Energy Engineering	**LM-30** ING-IND/08; ING-IND/09; ING-IND/10; ING-IND/11; ING-IND/15; ING-IND/18; ING-IND/19; ING-IND/20; ING-IND/25; ING-IND/32; ING-IND/33	Sostenibilità energetica e ambientale	ING-IND/11	6	10600100
		Advanced energy conversion systems	ING-IND/09	9	1051502
		Tecnologie dell'idrogeno e dello storage elettrochimico	ING-IND/09	6	10600057
		Modelli di analisi dei sistemi energetici	ING-IND/19	6	10600083
		L'ingresso nel mondo del lavoro: strumenti, scenari e strategie		3	AAF1841
Management Engineering	**LM-31** ING-IND/35; ING-IND/16; ING-IND/17; ING-INF/04.	Economia e gestione delle fonti e dei servizi energetici	ING-IND/35	6	1017639
		Environmental economics and management	ING-IND/35	6	10600246
		Tecnologie di additive manufacturing	ING-IND/16	6	10589713
		Marketing and innovation management	ING-IND/35	6	1041411
Mechanical Engineering	**LM-33** ING-IND/08; ING-IND/09; ING-IND/12; ING-IND/13; ING-IND/14; ING-IND/15; ING-IND/16; ING-IND/17.	Fluid Machinery in Energy Conversion Systems	ING-IND/08	9	1044458
		Advanced Energy Conversion Systems	ING-IND/09	9	1051502
		Interazione Macchine/Ambiente	ING-IND/09	6	1021816
		Centrali Termiche	ING-IND/09	6	1017832
		Advanced Methods in Mechanical Design	ING-IND/15	6	1047501

Environmental Engineering for Sustainable Development (Latina campus)	**LM-35** BIO/07; CHIM/12; GEO/02; GEO/03; GEO/05; GEO/11; ICAR/01; ICAR/02; ICAR/03; ICAR/05; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/20; ING-IND/24; ING-IND/25; ING-IND/27; ING-IND/28; ING-IND/29; ING-IND/30.	Scienze della sostenibilità in ingegneria (I livello)	ING-IND/11; ING-IND/29; ICAR/01; ICAR/05; IUS/10; BIO/07.	6	10596228
		Principi di chimica ambientale e dei processi chimici sostenibili	CHIM/07	6	10600270
		Valutazione geochimica della qualità ambientale	GEO/08	6	1035574
		LCA e uso sostenibile delle risorse ambientali	GEO/09	9	10592968
		Sistemi energetici a fonti convenzionali e rinnovabili	ING-IND/09	6	1018593
		Nonrenewable resources and urban mining	ING-IND/29	9	10600473
		Environmental Fluid Mechanics	ICAR/01	9	10600476
Environmental Engineering	**LM-35** BIO/07; CHIM/12; GEO/02; GEO/03; GEO/05; GEO/11; ICAR/01; ICAR/02; ICAR/03; ICAR/05; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/20; ING-IND/24; ING-IND/25; ING-IND/27; ING-IND/28; ING-IND/29; ING-IND/30.	Bonifica, ripristino e riqualificazione dei suoli contaminati	ICAR/03	9	1017281
		Modelling of environmental pollution	ICAR/03; ICAR/01	6	10600009
		Waste management and role in climate change	ICAR/03	9	10599938
		Urban mining and recycling of materials	ING-IND/29	9	10599947
		Renewable energy	ING-IND/31	6	10599943
		Environmental geophysics	GEO/11	9	10599941
		Fondamenti di chimica ambientale	CHIM/07	6	1021791
		Assessment and sustainable use of environmental resources	GEO/09	6	10599950
Nanotechnoloy Engineering	**LM-53** CHIM/02; CHIM/03; CHIM/04; CHIM/05; CHIM/06; FIS/01; FIS/02; FIS/03; FIS/07; GEO/06; CHIM/07; ICAR/08; ING-IND/21; ING-IND/22; ING-IND/27.	Fabbricazione e caratterizzazione di nanostrutture e sistemi a bassa dimensionalità	FIS/03	9	10610449
		Sintesi e caratterizzazione di bio-nano-materiali	ING-IND/26	6	10589367
		Optics	FIS/01	6	1042012
		Nanobiotechnology	ING-IND/25	6	10592628
		Microsistemi Fotonici	ING-INF/01	6	1021841

Table II a
Courses offered by non-context Bachelor and Master Degrees of the
Faculty of Information Engineering, Informatics and Statistics and the Faculty of Civil and Industrial Engineering
for a Minor Degree in Green Technologies

NON-CONTEXT BACHELOR AND MASTER DEGREES		FUNCTIONAL SUBJECTS IN GREEN TECHNOLOGIES			
DEGREE	CLASS	SUBJECT	SSD	CREDITS	CODE
Ingegneria Biomedica	LM-21	Gestione dei rifiuti sanitari	ICAR/03	6	1035463
		Interazione bioelettromagnetica I	ING-INF/02	6	1023988
		Impianti ospedalieri II	ING-IND/10	9	1044557

Table I b
Courses offered by Context Master Degrees – Faculty of Civil and Industrial Engineering and Faculty of Information Engineering, Informatics and Statistics

MINOR DEGREE IN SMART INFRASTRUCTURES

CONTEXT MASTER DEGREES		FUNCTIONAL SUBJECTS IN SMART INFRASTRUCTURES			
DEGREE	**CLASS AND RELATED CHARACTERIZING SSD**	**SUBJECT**	**SSD**	**CREDITS**	**CODE**
Aeronautical Engineering	**LM-20** ING-IND/03; ING IND/04; ING-IND/05; ING-IND/06; ING-IND/07; ING-IND/15.	Aircraft flight operations and maintenance	ING-IND/03-04	6	10595984
		Air transport systems and airline operations and economics	ING-IND/05-07	6	10595980
		Aviation regulation and safety management	ING-IND/35-17	6	10595983
		Aerospace thermal structures	ING-IND/04	6	10606115
		Infrastrutture aeroportuali	ICAR/04	6	1009408
Space and Astronautical Engineering	**LM-20** ING-IND/03; ING IND/04; ING-IND/05; ING-IND/06; ING-IND/07; ING-IND/15.	Space missions and systems	ING-IND/05	9	1051386
		Fundamentals of earth observation	ING-INF/02	9	10606344
		Electronics	ING-INF/01	6	10606118
		Satellite payloads for communication navigation and radar observation	ING-INF/03	9	10606867
Ingegneria Civile	**LM-23** ICAR/01; ICAR/02; ICAR/04; ICAR/05; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/10; ICAR/11; ICAR/17.	Protezione idraulica del territorio	ICAR/02	6	1005076
		Infrastrutture aeroportuali	ICAR/04	6	1009408
		Scavi e gallerie in area urbana	ICAR/07	6	1021888
		Gestione di ponti e grandi strutture	ICAR/09	6	1005087
Transport Systems Engineering	**LM-23** ICAR/01; ICAR/02; ICAR/04; ICAR/05; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/10; ICAR/11; ICAR/17.	Transport infrastructures	ICAR/04	6	1044040
		Freight transport and logistics	ICAR/05	6	1044041
		Geolocation and Navigation	ICAR/06	6	10599811
		Transport policies	ICAR/05	6	10589585

Environmental and Sustainable Building Engineering *(Rieti campus)*	**LM-24** ICAR/01; ICAR/02; ICAR/03; ICAR/04; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/10; ICAR/11; ICAR/12; ICAR/14; ICAR/15; ICAR/17; ICAR/19; ICAR/20; ICAR/21; ICAR/22; ING-IND/10; ING-IND/11; ING-IND/31; ING-IND/33; IUS/10; SECS-P/02; SECS-P/06.	Urban health	MED/42+ICAR/05	9	10595658
		Remote Sensing and GIS	ICAR/06	9	10595644
		Digital Modeling for Architecture	ICAR/17	9	10595643
Control Engineering	**LM-25** ING-IND/13; ING-IND/32; ING-INF/04.	Nonlinear Systems and Control	ING-INF/04	12	10612312
		Process Automation	ING-INF/04	6	1041422
		Robotics 1	ING-INF/04	6	1023235
		Control of Autonomous multi-agent systems	ING-INF/04	6	1041427
		Control of Communication and Energy Networks	ING-INF/04	6	1041429
Safety and Civil Protection Engineering	**LM-26** ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/11; ICAR/17; ING-IND/31; ING-IND/33; CHIM/12; GEO/05; GEO/11; ICAR/02; ING-IND/11; ING-IND/28; ING-INF/01; ING-INF/02; ING-INF/03; ING-INF/04; ING-INF/05; ING-INF/07; CHIM/04; ING-IND/10; ING-IND/14; ING-IND/16; ING-IND/17; ING-IND/19; ING-IND/22; ING-IND/25; ING-IND/27; ING-IND/35; IUS/01; IUS/07; IUS/10; IUS/14; MED/44; SECS-P/10; SPS/08; SPS/09.	Machine Learning For Safety Systems	ING-IND/31	6	10592896
		Rischio e Resilienza Territoriale	ING-IND/28	6	10596073
		Sicurezza negli impianti per il trattamento dei solidi	ING-IND/29	9	1051991
		Tunnelling and excavation engineering	G-IND/28	9	10596074
		Sustainable Use Of Groundwater Resources	ING-IND/30	6	10600038

Ingegneria delle Comunicazioni	**LM-27** ING-INF/02; ING-INF/03.	Multimedia Systems for 5G	ING-INF/03	6	10596286
		Smart Environments	ING-INF/03	6	1056023
		Machine learning per i sistemi elettrici ed elettronici	ING-IND/31	6	10600479
		Neural networks	ING-IND/31	6	1022870
		Computational Intelligence	ING-IND/31	6	1044577
Electrical Engineering	**LM-28** ING-IND/31; ING-IND/32; ING-IND/33; ING-INF/07.	Smart Grids in Electric Power Systems	ING-IND/33	9	10596195
		Smart grids analysis and design	ING-IND/33	9	10606467
		Sensors and materials for electrical engineering	ING-IND/31	6	10596496
		Smart metering	ING-INF/07	6	10596208
		Mercati - Operation And Planning Di Sistemi Elettrici	ING-IND/33	9	10607114
Electronics Engineering	**LM-29** ING-INF/01; ING-INF/02; ING-INF/07.	Advanced Antenna Engineering	ING-INF/02	6	1042004
		Machine learning for signal processing	ING-IND/31	6	1056158
		Digital System Programming	ING-INF/01	6	1052242
		Pattern recognition	ING-IND/31	6	1044589
		Embedded systems	ING-INF/01	6	1038139
		Artificial Materials – Metamaterials and Plasmonics for Electromagnetic applications	ING-INF/02	6	10589170
Energy Engineering	**LM-30** ING-IND/08; ING-IND/09; ING-IND/10; ING-IND/11; ING-IND/15; ING-IND/18; ING-IND/19; ING-IND/20; ING-IND/25; ING-IND/32; ING-IND/33.	Smart Grids for Power Systems	ING-IND/33	9	10600066
		Electrical Energy Conversion from Renewable Energy Sources	ING-IND/32	6	1052083
		Geothermal energy	ING-IND/30	9	1051397
		L'ingresso nel mondo del lavoro: scenari, strumenti e strategie		3	AAF1841

Mechanical Engineering	**LM-33** ING-IND/08; ING-IND/09; ING-IND/10; ING-IND/12; ING-IND/13; ING-IND/14; ING-IND/15; ING-IND/16; ING-IND/17.	Diagnostica delle Macchine e dei Sistemi Energetici	ING-IND/09	6	10592721
		Vehicle system dynamics and mechatronics	ING-IND/13	6	10592761
		Mechatronics and Vibration	ING-IND/13	9	10592758
		Smart factory	ING-IND/17	6	1056573
		Measurements for mechanical systems and industry	ING-IND/12	9	1055977
Environmental Engineering for Sustainable Development (Latina campus)	**LM-35** BIO/07; CHIM/12; GEO/02; GEO/03; GEO/05; GEO/11; ICAR/01; ICAR/02; ICAR/03; ICAR/05; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/20; ING-IND/24; ING-IND/25; ING-IND/27; ING-IND/28; ING-IND/29; ING-IND/30.	Transport economics and policies	ICAR/05	9	10600474
		Pericolosità sismica e difesa del territorio	ING-IND/28	6	10600078
		Geomatica	ICAR/06	6	1018589
		Coastal Engineering	ICAR/02	9	10606608
		Progettazione del territorio	ICAR/20	9	1051669
Environmental Engineering	**LM-35** BIO/07; CHIM/12; GEO/02; GEO/03; GEO/05; GEO/11; ICAR/01; ICAR/02; ICAR/03; ICAR/05; ICAR/06; ICAR/07; ICAR/08; ICAR/09; ICAR/20; ING-IND/24; ING-IND/25; ING-IND/27; ING-IND/28; ING-IND/29; ING-IND/30.	Remote sensing and Geo Big Data	ICAR/06	9	10599940
		Valutazione e mitigazione del rischio geotecnico sismico	ICAR/07	6	1056148
		Geofisica applicata all'ingegneria	GEO/11	9	10599893
Nanotechnology Engineering	**LM-53** CHIM/02; CHIM/03; CHIM/04; CHIM/05; CHIM/06; FIS/01; FIS/02; FIS/03; FIS/07; GEO/06; CHIM/07; ICAR/08; ING-IND/21; ING-IND/22; ING-IND/27.	Sensors and electrical-electromagnetic characterization laboratory	ING-IND/31	6	10589246
		Microsistemi Fotonici	ING-INF/01	6	1021841

NON-CONTEXT BACHELOR AND MASTER DEGREES		FUNCTIONAL SUBJECTS IN SMART INFRASTRUCTURES			
DEGREE	CLASS	SUBJECT	SSD	CREDITS	CODE
Computer Science	LM-18	Big Data Computing	INF/01	6	1041764
		Cloud Computing	INF/01	6	1047205
		Internet of Things	INF/01	6	1047634
		Deep Learning and Applied Artificial Intelligence	INF/01	6	10593236
		Data and Network Security	INF/01	6	1047623
Nanotechnology Engineering	LM-53	Sensors and electrical/ electromanetic characterization laboratory	ING-IND/31	6	10589246
Engineering in Computer Science	LM-32	Big data computing	INF-ING/05	6	1044406
		Internet-Of-Things Algorithms And Services	ING-INF/05	6	10606829
		Internet-Of-Things Networks And Protocols	INF/01	6	10606830
		Artificial intelligence and machine learning	ING-INF/05	9	10599898
Ingegneria Informatica e Automatica	L-8	Fondamenti di Intelligenza Artificiale	INF-ING/05	6	10599901
Ingegneria dell'Informazione	L-8	Tecniche della programmazione	ING-INF/05	9	1035370
		Linguaggi per il web	ING-INF/05	6	1018705
		Reti di Telecomunicazione	ING-INF/03	6	1008745
		Basi di dati	ING-INF/05	9	1052231
		Fondamenti di Automatica	ING-INF/04	12	10596366
Management Engineering	LM-31	Economics and management of networks	SECS-P/06	6	10593266
		Productivity and efficiency analysis	ING-IND/35	6	1041412
		Optimization methods for machine learning	MAT/09	6	1041415
		Smart factory	ING-IND/17	6	1056573
Ingegneria Biomedica	LM-21	Economia e gestione dei sistemi sanitari	ING-IND/35	6	1044424
		Neuroscienze industriali	ING-INF/06	9	1044422
		Impianti ospedalieri II	ING-IND/10	9	1044557