



Decree Index no. 4755 Prot. no. 100890
Date 08/07/2020
Title III Class V
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HAVING REGARD TO the Politecnico di Milano's Articles of Association;
HAVING REGARD TO Ministerial Decree no. 509 of 3.11.1999;
HAVING REGARD TO Ministerial Decree no. 270 of 22.10.2004;
HAVING REGARD TO Legislative Decree 81/2015;
HAVING REGARD TO the University's Educational Rules - Regulations;
HAVING REGARD TO the Regulations for Specializing Masters of the Politecnico di Milano issued with Rectoral Decree no. 2235 of 05.08.2013;
HAVING REGARD TO the agreement signed between the Politecnico di Milano and Enel on 03/07/2020 – Index no. 4309 of 06/07/2020 - for the second-level Specializing Master “SMART GRIDS”;
HAVING ACQUIRED the favourable opinion of the Academic Senate during the 20/04/2020 meeting on the establishment and activation of proposals for Specializing Masters, including the second-level Specializing Master “SMART GRIDS”;

HEREBY DECREES

That the second-level Specializing Master “SMART GRIDS” is established and activated for 2021/2022.

ART. 1

Administrative features of the Master

The second-level Specializing Master “SMART GRIDS” is established and activated at the Energy Department.

The Specializing Master's administrative office is situated c/o the Energy Department (Managing Authority). The reference school is the School of Industrial and Information Engineering.

The Specializing Master's Coordinator is Professor Marco Merlo, and the Vice Coordinator is Prof. Maurizio Delfanti.

The Master's commission (hereinafter the “Commission”) is made up of the professors Marco Merlo, Maurizio Delfanti, Davide Falabretti, Alberto Berizzi, Dario Zaninelli, Simone Franzò and Giacomo Verticale on behalf of Politecnico di Milano and of Messrs Lorenzo Farsi, Giovanni Valtorta, Gianluca Spapientza and Elena Annunziata on behalf of Enel.

ART. 2

Educational objective and employment opportunities

The Master aims to provide students with in-depth information on the evolution of electric power systems so as to promote significant penetration of generators from Renewable Energy. With this in mind, the Master focuses on assessing the impact of renewable sources on the electricity system, both at the grid and at the market level. In particular, with respect to the regulatory context, this must be structured so as to allow the correct operation of generators from traditional sources also in scenarios characterised by a strong penetration of renewable sources. With respect to the distribution grid, both at average and at low voltage, the Master will highlight how the current system's monitoring and operating structures do not allow full integration of generation from renewable sources. In view of a significant evolution of distributed generation, these limitations motivate the Smart Grid architectures currently being developed. Particular attention will be paid to the issue of innovative technological solutions, with ICT technologies playing the role of enabling evolution. Finally, students will be given a series of case studies relating to solutions implemented on the

public distribution grid and to innovations being developed within national and European research projects, detailing both their technical and their economic aspects.

The course is addressed to new graduates to be hired by Enel under a Higher Education and Research Apprenticeship contract (art. 45, Leg. Decree 81/2015).

The programme will be provided in English.

ART. 3 Teaching content and organization

The Specializing Master will start in **April 2021** and end in **April 2022**.

The training course, delivered at ENEL's request, is a customised programme structured in intensive weekly training modules held in English.

The study plan, requiring the achievement of **60 ECTS credits**, is structured as follows:

SSD	INSEGNAMENTO	ECTS
<u>Energy Outlook</u>		
ING-IND/10	Energy outlook	1
ING-IND/10	Industrial ecology	0.5
ING-IND/09	Introduction to power systems & Evolution and decarbonization of power generation (including Carbon Sequestration, Cogeneration, Trigenation and Hydrogen technology)	1
ING-IND/11	National and EU energy outlooks and planning actions (Policy) - PNIEC - LTS (2050)	0.5
ING-IND/33	Power distribution networks. Grid's technical constraints. International framework, focus on the Italian power system	1
ING-IND/35	Dispersed generation: impact on electrical grids of RES penetration, electrification of final energy uses and new actors (e-mobility)	1
ING-IND/11	Energy efficiency in the final uses of energy (storage, district heating, energy impact of EV recharging processes etc.)	0.5
ING-IND/33	Electrical network modeling - short circuit analysis	1
ING-IND/33	Electricity market. Fundamentals on the international context and Focus on the Italian scenario	1.5
ING-IND/33	Electricity market. Regulatory framework and quality of services (introduction)	1.5
ING-IND/32 ING-IND/31	Power electronics, theoretical notions, evaluation of the impact on the grid	1
ING-INF/07	Electrical measurements and signal elaboration (review)	1
ING-INF/03	Power systems digitalization: IT System, Networks & Architecture (Basics, IP networks, IT system etc.); Cyber Security & Interoperability Standards (normative framework and focus on electrical sector/critical assets); Integrated Communications Protocols & Technologies	2
		13.5

<u>Smart Grid</u>		
ING-IND/33	New power system actors (aggregators, enhanced users, RES)	0.5
ING-IND/33	Traditional and innovative network components	1
ING-IND/33	Advanced management of power distribution systems: technical connection rules; DERs integration; grid protection, automation and control; power flow optimization	3.5
ING-IND/33	Storage: technologies, services, performance, modeling	1.5
ING-IND/33	Advanced flexibility management (EV smart EV charging, demand response, DER ancillary services)	1.5
ING-IND/33	Quality of service: continuity, power quality and technical solutions for QoS improvement	0.5
ING-IND/33	Smart Metering features	1
ING-IND/33	Power systems resilience: impact of climate changes on network operation (case studies analysis)	1
ING-IND/33	Evolution of the role of Distribution System Operators (possible regulatory and market future scenarios, TSO/DSO coordination)	1.5
ING-IND/33	Network planning and operation: from the fit&forget approach to the flexibility management	0.5
ING-IND/33	Smart City	0.5
		13
<u>Health & safety</u>		
ING-IND/33	Introduction to Health & safety	0.5
ING-IND/33	Management systems for the H&S	0.5
ING-IND/33	H&S in the ENEL group	0.5
ING-IND/33	Accident prevention: the main action tools	2.5
ING-IND/33	Role of DSO operation centers	0.5
ING-IND/33	Accidents to third parties: a phenomenon to be countered	0.5
ING-IND/33	Design and safety: normative references and points of attention	0.5
		5.5
<u>ENELab (Smart Grid experimental lab)</u>		
ING-IND/33	RTDS: dynamic simulation of protection and control systems (models, signals and quantities evaluation, etc.)	5
ING-IND/33	Fault selection techniques (smart fault selection and further logics)	1
ING-IND/33	Identification and isolation of the faulted line section	1
ING-IND/33	IEC 61850 protocol	3.5
ING-IND/33	Intelligent distributed devices for remote control, automation and MV/LV protections	1.5
ING-IND/33	Digital (primary & secondary) substations	1
ING-IND/33	Power Quality	1
		14

Soft Skills & Innovation lab		
ING-IND/35 ING-IND/17	Project Management	0.5
ING-IND/35 ING-IND/17	Negotiation, stakeholder management, communication, relationship with Public Institutions	1
ING-IND/35 ING-IND/17	Leadership	0.5
ING-IND/35 ING-IND/17	Guidance to the results	0.5
ING-IND/35 ING-IND/17	Innovative Thinking	0.5
ING-IND/31	Visit to the Prophet Lab	0.5
ING-IND/33	Visit to the Microgrid in Leonardo Campus	0.5
ING-IND/31	Drone technology for the inspection of the electrical network and power plants monitoring	0.5
ING-IND/33	GIS tools for the planning and operation of distribution networks	0.5
ING-INF/05	Big Data analytics and Models and systems for integrating and storing Big Data	1
		6
	Project Work	8
	Total	60

ART. 4 **Admission requirements**

The Specializing Master is reserved for applicants having a **Laurea Magistrale/Specialistica (equivalent to a Master of Science)** in:

- CLASSE LM17 Lauree Magistrali in Physics
- CLASSE LM25 Lauree Magistrali in Automation Engineering
- CLASSE LM27 Lauree Magistrali in Telecommunications engineering
- CLASSE LM28 Lauree Magistrali in Electrical Engineering
- CLASSE LM29 Lauree Magistrali in Electronic Engineering
- CLASSE LM30 Lauree Magistrali in Energy and Nuclear Engineering
- CLASSE LM31 Lauree Magistrali in Management Engineering
- CLASSE LM32 Lauree Magistrali in Computer Engineering
- CLASSE LM33 Lauree Magistrali in Mechanical Engineering
- CLASSE LM40 Lauree Magistrali in Mathematics
- CLASSE LM82 Lauree Magistrali in Statistical Sciences

For foreign applicants, equivalent qualifications in the relevant university systems will be considered valid.

In addition, the admission requirements are as follows:

- **Age** not exceeding 29 years and 364 days on 30/04/2021.
- **Good knowledge of written and oral English**, preferably proven by a language certification or equivalent self-certification, which will be assessed by Enel during the selection process.

The Master will also be open to applicants who are already Enel employees at the time of submitting the application, and the total number of students admitted, including both Enel employees and external applicants, is 30. The number of participants hired with a Higher Education and Research Apprenticeship contract is **20**.

The selection will be as follows:

PHASE 1: PRE-SELECTION BY THE POLITECNICO DI MILANO.

Upon receipt of the admission applications, the Energy Department will assess the eligibility of each applicant with respect to the aforementioned requirements (except for knowledge of English, which will be assessed by Enel during the selection process). Applicants who pass this phase will move on to phase 2.

PHASE 2: "HARD SKILLS" TEST BY THE POLITECNICO DI MILANO.

An online test will be drawn up, in collaboration with Enel. The Energy Department will send Enel the list of applicants who have passed this test. Enel employees may also sit the online "Hard Skills" test, and Enel will then assess the results for the purpose of being admitted to the Master.

PHASE 3: SELECTION BY ENEL.

Upon receipt of the list referred to in Phase 2, Enel will identify, at its sole discretion, the applicants to be admitted to Phase 3 - Selection. These applicants will be assessed by Enel by means of a selection procedure conducted in line with its recruitment policy.

Selection of applicants is the full responsibility of Enel.

Indications and instructions relating to the selection process will be communicated to applicants in the lead-up to said selection process. Applicants with non-EU citizenship are exclusively responsible for obtaining a personal document such as to legitimise the regular entry and stay in Italy, pursuant to current immigration laws, in time to complete the tests scheduled on the dates and at the locations indicated above, under penalty of exclusion from the application process. Enel accepts no responsibility or liability in this regard.

At the end of Phase 3, Enel will communicate the results of the selection process individually to each applicant involved. Those who pass the selection process will be admitted to the Master and will be hired by Enel with a Higher Education and Research Apprenticeship contract (art. 45, Leg. Decree 81/2015).

ART. 5

Formal requirements

The **admission application** must be submitted starting from the day following the date of publication of this Decree and **by no later than 6 January 2021, under penalty of exclusion from the application process.**

Only applications from those who have correctly followed the instructions set out in this Rectoral Decree will be taken into consideration.

Failure to submit even just one of the documents required in the times and ways set out in this Rectoral Decree may result in the applicant being automatically excluded from the selection process.

If the Administration finds, after proper checks, that the content of the declarations made by the applicant is not truthful, the declarant shall forfeit any benefits obtained by the measure issued based on the untrue declaration, in accordance with art. 75 of Presidential Decree 445/2000.

To apply, applicants should send their application form to Politecnico di Milano - **Energy Department** www.masterenel-smartgrids.polimi.it

Italian/foreign citizens who graduated in Italy

- Self-certification of their personal identity (surname and name, place and date of birth, nationality and residence)
- Copy of the identity document
- Copy of the Diploma Supplement or photocopy of the degree diploma with self-certification indicating the exams taken
- Curriculum Vitae

Italian/EU citizens who graduated abroad

- Self-certification of their personal identity (surname and name, place and date of birth, nationality and residence)
- Copy of the identity document
- Copy of the academic qualification obtained or a Diploma Supplement with indication of the exams taken (during enrolment, the certificate of equivalence issued by the relevant area's Italian Representative abroad or a certificate issued by the Enic/Naric Centres must be submitted)
- Curriculum Vitae

* **Non-EU citizens who graduated abroad**

Non-EU foreign citizens must submit the following documents to the Managing Authority at least 30 days before the enrolment closing date as set out in this article:

- Copy of the degree in the original language and its translation into Italian/English/French or Spanish achieved in Italian/English/French or Spanish
- Copy of the transcripts with the list of exams in the original language and their translation into Italian/English/French or Spanish or Diploma Supplement
- Copy of a valid passport
- Curriculum Vitae

The Managing Authority shall send the documentation listed above to the “Masters and Lifelong Learning Service”, for the evaluation of qualifications and the relating right to participate in the second-level Specializing Master, within the closing date of this call for applications, under part 7 – art. 1 and art. 2 of the MIUR/MAE note “*Procedures for entry, stay and enrolment of students applying for visas in higher education programmes in Italy for the 2019/2020 academic year*”.

Upon making a selection, the Master and Lifelong Learning Service communicates the student's acceptance and the outcome of any admission tests to the relevant Representatives, for the completion of the degree documentation, which is necessary for issuance of an Entry Visa into Italy pursuant to the applicable legislation. Only following acceptance confirmation by this University can applicants submit their qualifications to the Diplomatic Representatives for consular deeds.

The admission application must state the following declaration:

I authorize this University, under EU Regulation no. 2016/679 on the protection of personal data, to process my personal data solely for purposes related to admission, enrolment and management of the Master and in any case I agree to have my personal information disclosed to third parties, particularly:

- public and private entities interested in possible recruitment;
- academic programme backers; Politecnico Treasurer for services related to tuition fees;
- entities managing unsecured loans, housing, flexible employment contracts, cultural, recreational or sports activities.
- I authorize the use of data for statistical purposes following the procedures and authorizations provided for by the above legislation.

Full information on data processing and data subject rights is available on the website www.polimi.it/privacy.

ENROLMENT METHOD

Students admitted to the Master will have to create credentials to access the online services of Politecnico di Milano on the website www.polimi.it enter their data and create a **personal code**, attach a valid ID (passport in the case of non-EU citizens) and communicate your personal code to the Specializing Master's administrative office. Students already registered will need to update their personal data, if obsolete.

The access credentials to the portal will be kept because they will be necessary to access all the services of Politecnico di Milano. In case of loss will be possible to proceed to the restoration in autonomy or writing to master@polimi.it

Politecnico will create a temporary matriculation, with which the student will be able to pay the tax due for registration through online services.

An Italian degree is self-certified by completing the appropriate space on the enrolment application form that will be provided by the Specializing Master's administrative office, while a degree obtained abroad must be documented by presenting a **certificate of equivalence** issued by the Italian Representative abroad (Italian Embassy or Consulate) on letterhead complete with its original stamp **or a certificate issued by the Enic/Naric Centres.**

Non-EU citizens, in addition to the above documentation, **must also upload a copy of the residence permit on their online service registry.**

ART. 6
Degree and award recognitions

STUDENT OBLIGATIONS: Attendance is compulsory for at least 80 per cent of the programme activities. Cancellation from the programme must be motivated and made in writing. The training period may not be suspended for any reason. The simultaneous enrolment in a Specializing Master and in another academic programme offered by this University or by other Italian Universities or Higher Education Institutes is not allowed.

Students admitted to the final exam of the Master will pay the stamp through the online services of Politecnico di Milano, in order to take the exam.

TESTING METHOD: The final test will consist in the presentation of a Project Work completed during the Master.

ISSUED CERTIFICATION: At the end of the programme, after passing the final test, the student will be awarded an English-language second-level Specializing Master diploma in "Smart Grids".

ART. 7
Tuition fees

The tuition fees will be borne entirely by Enel for all applicants admitted to the Master.

ART. 8
Personal data processing

Under EU Regulation no. 2016/679 on the protection of personal data, the University - acting as Data Controller - will process the personal data provided by applicants and students solely for purposes related to admission, enrolment and management of the Master and in any case may disclose said personal information to third parties without notifying the applicant further, particularly:

- public and private entities interested in possible recruitment;
- academic programme backers;
- Politecnico Treasurer for services related to tuition fees;
- entities managing unsecured loans, housing, flexible employment contracts, cultural, recreational or sports activities.

The University may also use the data for statistical purposes following the procedures and authorizations provided for by the above legislation. Full information on data processing by the University and on data subject rights is available on the website www.polimi.it/privacy.

Under said EU Regulation no. 2016/679, the University - acting as an independent data controller - will also process the personal data provided by applicants and students solely for purposes related to managing the Master, in accordance with the procedures specified in this call.

ART. 9
Publication

This Decree is made public on the Politecnico di Milano's website at <https://www.polimi.it/corsi/master-universitari-e-corsi-post-laurea/>

FOR MORE INFORMATION:

Lifelong Learning Service

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Milan, 8th July 2020

The Rector
(Prof. Ferruccio Resta)
Signed Ferruccio Resta

Digitally signed, according to the law.