



The Master in Industrial Engineering, designed according to the requirements of the Order CIN / 311/2009, enables for the exercise of the profession regulated in Industrial Engineering. The Masters in Industrial Engineering provides students with a solid scientific background and a wide range of knowledge in various industrial technologies. As a result, they become multidisciplinary professionals to develop their professional work in industries, enterprises, public administration agencies, as well as in consulting engineering firms.

Distribution of credits

Compulsory courses	Optional courses	Master Thesis	Total ECTS Credits
60.00	48.00	12.00	120.00

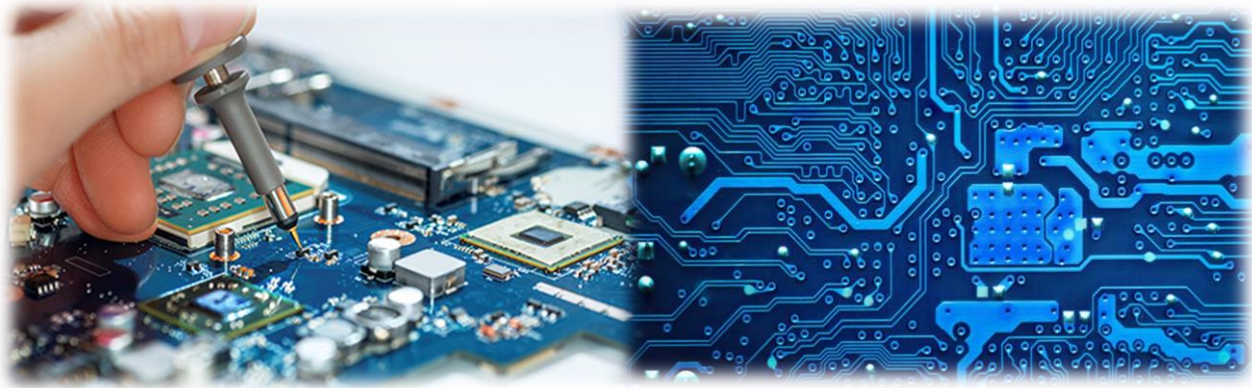
FIRST YEAR

Code	Course Name	Term	ECTS Credits
33805	Business management	A	6
33804	Operations management	A	4.5
33809	Heating, cooling and air conditioning	A	5.25
33810	Fluid systems engineering	A	4.5
33813	Industrial Instrumentation and Control	A	4.5
33812	Chemical technology	A	4.5
33803	Project management	B	4.5
33806	Construction, Architecture and Industrial Urban Planning	B	5.25
33807	Design and application of industrial equipment	B	7.5
33808	Manufacturing Technology	B	4.5
33811	Generation, Transmission and Distribution of Electric Power	B	4.5
33814	Advanced Energy and Thermal Machines	B	4.5
		Total	60

SECOND YEAR

Specialization courses	Optional Courses	Master Thesis	Total 2 nd Year
39 ECTS to choose among one branch	9 ECTS	12 ECTS	60 ECTS

Areas of specialty
Construction and industrial facilities
Process control, automation and robotics
Design and manufacture of product
Use of energy
Electrical engineering
Electronic engineering
Mechanical engineering
Materials and biomaterials
Industrial organization and management
Sustainability and industrial environment
Nuclear energy
Energy generation



The research activity in **Power Electronics** is carried out by the GSEI (<http://www.gsei.upv.es>). The research fields of interest are: power converter modeling and control, switch-mode power supplies, battery chargers, high efficiency soft-switching energy conversion, power factor correction circuits, uninterruptible power supplies, grid-connected inverters, power converters for renewable energy sources (photovoltaics and wind power), power electronics for distributed power generation and microgrids. Some recent research projects are listed below:

- DC HYGRID. Power management at the DC bus and interconnection with AC buses in hybrid microgrids.
- ARQUIMEDES. Power and control architecture of intelligent microgrids for the efficient electric energy management in residential environments.

The research activity in **Advanced Digital Electronics** is carried out by the I3M (<http://www.i3m.upv.es/view.php>). The research fields of interest are: Electronic systems for nuclear medicine and high energy physics, and high speed data acquisition systems. Some recent research projects are listed below:

- Construction, validation and operation of the electronics for the NEXT experiment
- Canfranc Underground Physics.

The research activity in **Instrumentation Electronics and data analysis** is carried out by the Ci2B (<http://ci2b.webs.upv.es>). The research fields of interest are: industrial sensors, industrial instrumentation, sensor networks, machine learning, biomedical instrumentation and biomedical signal processing. Some recent research projects are listed below:

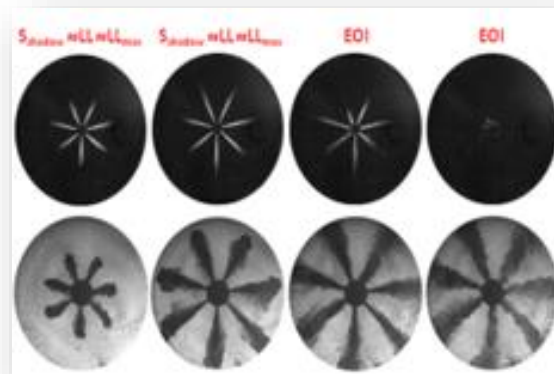
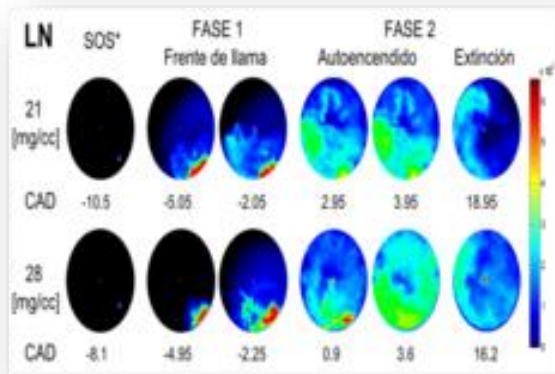
- Electrohysterography, building bridges for clinical use in obstetrics
- Application of Laplacian techniques for monitoring electrical activity of human smooth muscle: emphasis on electrohysterogram

SECOND YEAR

Specialization Courses	Optional Courses	Master Thesis	Total 2 nd Year
39 ECTS	9 ECTS	12 ECTS	60 ECTS

Specialization courses		
Code	Course Name	Credits
33722	Power electronics and energy generation systems	6
33723	Design of Power Electronics Systems	6
33724	Industrial instrumentation systems	6
33727	Advanced digital systems	6
33728	Digital systems with microcontrollers	6
33725	Network instrumentation and communications	4.5
33726	Industrial Process Automation	4.5

Optional Courses		
Code	Course Name	Credits
33796	Advanced Hydraulic Machinery	4.5
33795	Life cycle assessment and carbon footprint	4.5
33773	Analysis of the industrial risks	4.5
33787	Probabilistic analysis of risks	4.5
33779	Industrial applications of solid modelling	4.5
33783	Operations consultancy	4.5
33775	Quality control of industrial processes	4.5
33789	Design for manufacture	4.5
33778	Eco-design. Consideration of environmental aspects into product's design process	4.5
33792	Biomedical equipment	4.5
33782	Work study	4.5
33800	Technology and innovation management	4.5
33794	Acoustic engineering	4.5
33801	Innovation and Design Thinking	4.5
33785	Inspection and diagnosis of service failures	4.5
33770	Applications of artificial intelligence to processes management and engineering	4.5
33799	Thermohydraulics introduction and its applications	4.5
33797	Maintenance of thermal machines and related facilities	4.5
33790	Energy markets	4.5
33788	Reciprocating Internal Combustion Engines	4.5
33771	Negotiation and decision making	4.5
33776	Practicum construction	4.5
33777	Practicum installations	4.5
33786	Radiologic protection in radioactive and nuclear installations	4.5
33769	Corporate social responsibility in the engineering	4.5
33781	Mobile robotics	4.5
33798	Energetic simulation in buildings	4.5
33774	Quality systems and environment	4.5
33791	Wind power systems and photovoltaic for electric power production	4.5
33772	Integrated systems of business management: Projects and Operations	4.5
33784	Welding and union techniques	4.5
33793	Electric vehicles	4.5
33780	Artificial vision	4.5
34251	Recruitment skills	4,5
34252	Advanced performance measurements systems	4,5
34253	Systematic innovative thinking for engineers and researches	4,5
35254	Organizational behavior	4,5



The specialty area in Energy Generation includes thermal, hydraulics, eolic and nuclear energy. The energy field is complex, so it requires a detailed study of energy sources, transforming equipment, facilities and energy costs.

It is possible to do the Master Thesis in different Departments or research Institutes, in addition to receiving complementary training. For example:

- **CMT** (www.cmt.upv.es), involved in the development of the future combustion engine.
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- **IIE** (iie.webs.upv.es), approaching multidisciplinary different areas of R&D&I on the Energy field.
- **ISRYM** (www.upv.es/isiry/), for the promotion and development of excellent scientific research, technology transfer and technical advising to companies.

After finishing this specialty course the student will be able to access jobs in the **conventional or renewable energy sector**.

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Specialization Courses	Optional Courses	Master Thesis	Total 2 nd Year
39 ECTS	9 ECTS	12 ECTS	60 ECTS

Specialization courses		
Code	Course Name	Credits
33702	Combustion and heat generation	4.5
33705	Nuclear energy and radiations	6
33706	Hydroelectric power plants and wind power	6
33707	Solar thermal and photovoltaic power plants	4.5
33710	Advanced hydraulic machines	4.5
33711	Machine maintenance and thermal installations	4.5
33712	Energetic simulation of buildings	4.5
33713	Thermohydraulics introduction and its applications	4.5
33703	Cooling and refrigeration systems	4.5
33708	Nuclear reactor physics	4.5
33709	Nuclear safety	4.5
33704	Power plants	4.5

Optional Courses		
Code	Course Name	Credits
33796	Advanced Hydraulic Machinery	4.5
33795	Life cycle assessment and carbon footprint	4.5
33773	Analysis of the industrial risks	4.5
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33772	Integrated systems of business management: Projects and Operations	4.5
33784	Welding and union techniques	4.5
33793	Electric vehicles	4.5
33780	Artificial vision	4.5
34251	Recruitment skills	4,5
34252	Advanced performance measurements systems	4,5
34253	Systematic innovative thinking for engineers and researches	4,5
35254	Organizational behavior	4,5



The specialty area in Industrial Organization and Management introduces the student to the Industrial Engineering world, learning to understand problems' companies and organizations from a different point of view, to be able to manage or improve them, making them more efficient and effective. The specialization courses give the student a deep vision of the system of operations of a company, and give the necessary support to interpret the problems and complex situations in the working world.

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Specialization courses		
Code	Course Name	Credits
33744	Operations Management (II)	6
33746	Applied Operations Research and Management	4.5
33747	Quality engineering	6
33748	Advanced business management	4.5
33749	Finance and Cost Management	4.5
33750	Innovation and technology management	4.5
33745	Lean manufacturing	4.5
33751	Enterprise Information Systems	4.5

Optional Courses		
Code	Course Name	Credits
33796	Advanced Hydraulic Machinery	4.5
33795	Life cycle assessment and carbon footprint	4.5
33773	Analysis of the industrial risks	4.5
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The specialty area in Process Control, Automation and Robotics belongs to **Department of Systems Engineering and Control (DISA)**. The professors are also researchers, who work mainly at the **Institute for Automatic and Industrial Informatics** (<http://www.ai2.upv.es/en>). They develop some projects related on Sustainability and Energy, Industrial Processes, Mobility and Logistics, Food or Health and Functional Quality of Life. There are several Groups of research, for example **Predictive Control and Optimization Group (CPOH)** or **Control of Complex Systems Group (CCS)**.

Some of the research projects of CPOH are “Application of advanced control and optimization techniques to Flight Control Systems for UAVs” or “Applying Optimization Techniques to control hybrid systems engines”. This Group works on issues related to model predictive control and optimization applied to process control, mainly using heuristic techniques. For more information: <http://cpoh.upv.es/en/research>

The research lines of CCS are, for example, “Development of new strategies for postprandial glucose control in type 1 diabetes” or “Modeling and control of biotechnological processes, systems biology, and synthetic biology”. This Group focuses its research on the modeling and control of dynamical systems showing uncertainly, non-linearities, several behavior modes, etc., i.e. those systems appearing under the common denomination of complex systems. For more information: <https://gcsc.ai2.upv.es/content/research>

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Specialization Courses		
Code	Course Name	Credits
33686	Industrial automation	4.5
33687	Industrial robotics	6
33688	Control Engineering	6
33689	Advanced process control	4.5
33690	Industrial instrumentation	4.5
33691	Control System Implementation	4.5
33693	Modeling tools and processes simulation	4.5
33692	Identification and Control of Complex Dynamic Systems	4.5

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33761	HVAC and domestic hot water	6
33759	Cogeneration	4.5
33760	Combustion engines	6
33764	Energy audit	4.5
33762	Energy efficiency in hydraulic systems	4.5
33763	Energy efficiency of buildings	4.5
33765	Advanced Hydraulic Machinery	4.5
33768	Introduction to Thermalhydraulic and its applications	4.5
33767	Energy simulation of buildings	4.5
33766	Maintenance of thermal machines and related facilities	4.5

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