



UNIVERSITAT
ROVIRA I VIRGILI

etsEQ

Escola Tècnica Superior d'Enginyeria Química

Rovira i Virgili University

· Chemical Engineering School (ETSEQ) ·



University Master's Degree in

Energy Conversion Systems and Technologies

- ✓ Official University Master's Degree
- ✓ A modular and flexible course for graduates and professionals
- ✓ Renewable Energy/ Energy Smart Grids/ Low-Carbon Technologies/ Near Zero Energy Buildings
- ✓ Design, development and management of sustainable energy networks
- ✓ Energy transition and Climate change targets
- ✓ On-line/blended learning courses (100%/62.5%) & Laboratory Training (7.5%)
Master Thesis (30%)
- ✓ Full-time (1 year) or Partial time (2-3 years) dedication

<http://www.urv.cat/en/studies/master/courses/energy-conversion-systems/>

Academic coordinator

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www.urv.cat/en/studies/master/courses/energy-conversion-systems/

Location

Universitat Rovira i Virgili (URV) is located in the town of Tarragona (Spain).

The Chemical Engineering School (ETSEQ) is located in the University Campus Sescelades which is an urban, modern and compact campus with a wide range of facilities for students: lecturer rooms, learning and research resource center, laboratories, meeting rooms, cafeteria, etc.

Programme

In the MSc in Energy Conversion Systems and Technologies you will study integrated energy solutions to address multiple complex problems that concerns our society nowadays: from the recovery of waste energy and the use and integration of renewable energy sources in energy smart grids to its final application in buildings and industrial facilities with low-carbon and cost-effective energy technologies.

This innovative MSc aims to provide graduates with:

- Knowledge of *renewable energies technologies* and skill to select the most convenient one for any particular case.
- Modelling skills and characterization of the *energy demand in industrial facilities and buildings*.
- Knowledge, sizing and selection ability of HVAC *technology systems* and equipment.
- Management of *energy saving strategies* in buildings and energy facilities.
- *Processing of experimental data* of thermophysical properties of fluids and mixtures for the *detailed modelling of energy systems*.
- Sizing and integration of *energy conversion technologies* for the design of efficient systems with *low environmental impact*.
- Knowledge of current framework and trends in the *national and international energy landscape*.



Entry requirements

Students must be in possession of an Official University Degree achieved in Spain or any State integrated in the European Space of Education, in the following

Engineering fields:

Mechanical, Energy, Electrical, Automation, Chemical, Environmental, Industrial Technologies, Physical, Civil, Aerospace, Naval, and other related

The program is taught in English which is an excellent opportunity to reinforce the professional competitiveness of students. In this sense, a minimum proven B2 level is required. Alternatively, if the candidate is not in possession of a certificate, the academic coordinator will arrange an interview to check the level of reading, listening and speaking of the candidate. Optionally, the master thesis can be written in Spanish.

Teaching

Extensive use of the on-line resources:

Web conferences, webinars, On-Live lectures, Forum discussions, self-evaluation progress tests...and individual support from a member of the teaching staff plus all required material in electronic format.

Facilities

- Multifunctional test bench for characterizing heat pumps, chillers and small capacity thermal engines.
- Experimental facility for studying heat and mass transfer in sorption and desorption processes.
- Laboratory of air-conditioning technologies and techniques of diffusion and control.
- Laboratory of thermophysical properties of fluids.
- Computing laboratory with simulation and optimization tools for buildings and processes.

Assessment

Methods of assessment include self-monitoring activities, resolution of problems, project work, team work skills, case studies modelling and experimental activities

Monitoring of student progress is continuous by means of regular communication with the teaching staff.

Course Modules

The formative structure is divided into the following main modules:

- Modelling and simulation of energy conversion systems.**
- Low-Carbon Energy Technologies.**
- Modelling of Natural and low GWP fluids.**
- Polygeneration in smart grids and buildings.**

Programme structure

| Subject | Credits (ECTS) | Type of subject | Learning | Semester |
|---|----------------|-----------------|---------------------|----------|
| • Determining Thermodynamic Properties and Fluid Transport | 4.5 | Compulsory | Online | First |
| • Renewable Energy Technologies | 4.5 | Compulsory | Online | First |
| • Advanced Thermodynamic Engineering | 4.5 | Compulsory | Online | First |
| • Characterization and Modelling of Energy Demand in Buildings | 3.0 | Compulsory | Online | Second |
| • HVAC and Energy Saving In Buildings | 4.5 | Optional | Online | First |
| • Thermal Energy Conversion Technologies | 4.5 | Compulsory | Online | Second |
| • Polygeneration of Energy and Energy Integration | 4.5 | Compulsory | Online | Second |
| • Modelling and Dynamic Simulation of Energy Conversion Systems | 3.0 | Compulsory | Online | First |
| • Renewable Power Systems in Smart Grids | 4.5 | Optional | Online | Second |
| • Integrated Laboratory On Energy Conversion Systems | 4.5 | Compulsory | Online/Face-to-Face | Second |
| • Creation, Planning and Management of R+D+I Projects | 4.5 | Compulsory | Online | Yearly |
| • Master Thesis | 18.0 | Compulsory | Online/On-site | Yearly |

Duration and data of interest

- Credits: 60 ECTS (60 subjects + 18 master thesis)
- One year (full-time), or two or three years (part-time)

Fellowship opportunities

The Master provides each academic year scholarships to pre-enrolled candidates. The URV Master's Grants are aimed at exempting full-time students newly registered on the master's course. **Beques Màster URV 2022-2023** are fellowships aiming to recruit international and national students with a good academic transcript for a URV master's degree programme. They cover the registration fee and a travel grant for international candidates.

Important: Candidates must be pre-registered in the master's course before applying for the fellowship.

Collaboration with Universities, Research Institutions and Companies

- Universidad de Malaga.
- Universidad de Cadiz.
- Universidad Jaume I de Castellón.
- IREC.

Career opportunities

Graduates in the MSc In Energy conversion Systems and Technologies have excellent career prospects:

- Architecture and energy consultantancies.
- Professional engineer in renewable energy sector.
- Management of energy projects.
- Manager of HVAC Systems.
- Specialist engineer in energy efficiency.
- Researcher in Universities, Research Institutes, Innovation and Development.



Society today faces a range of major challenges, including global warming, climate change, the overexploitation of natural resources and conventional energy sources, population growth in developing countries, the growing demand for refrigeration for comfort and to preserve foods, the concentration of population in urban areas, and so. These challenges require new strategies and new technologies to develop solutions that allow the continuing social and economic development of our communities around the world with new technologies that are based on clean technologies rather than burning of fossil fuels.

These challenges and the new technologies that are being developed to deal with them will require professional's expert in energy conversion systems and technologies for smart energy networks. Furthermore, it will not be possible to develop an efficient industry and a construction sector able to meet the challenge of applying new concepts of energy consumption to building without experts specializing in the latest technologies in energy efficiency and the integration of renewable energies.

The University Master's Degree in Energy Conversion Systems and Technologies provides the training needed to produce researchers and professionals who can develop, design and manage energy systems that use renewable energy sources, and which are highly integrated into energy networks to ensure the maximum efficiency and availability.

For this reason, the tools and knowledge acquired during this master's degree enable graduates to provide solutions to the current challenges in the ambit of energy.

Rovira i Virgili University · Chemical Engineering School

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How can I register myself?

- 1 Complete the pre-registration (between February and June) in:
<https://www.urv.cat/masters/alumne/index.jsp?idioma=3>
- 2 You will receive an e-mail with further info about the registration process.
- 3 Upload the documents requested via the web platform.
- 4 Wait for the resolution of your admission application.
- 5 Arrange your personalized academic plan!

