



OÉ Gaillimh
NUI Galway

B.E. in Energy Systems Engineering GY413

- **Multidisciplinary degree programme**
- **Integrating energy sources, energy conversion and energy utilisation**
- **Professional qualification (level 8 degree) for the Energy sector**

WHERE DO ENERGY SYSTEMS ENGINEERS WORK?

ESB

Design, building and operation of the power system

AIRTRICITY

Design and operation of wind farms

GE ENERGY

Design of electromechanical energy conversion systems

SUSTAINABLE ENERGY IRELAND

Renewable energy systems and energy management in buildings

ARUP CONSULTING ENGINEERS

Design of sustainable buildings and structures

Course Structure:

Energy Systems Engineering will cover the fundamental sciences, mathematics and computing in the early years, along with an introduction to the multidisciplinary nature of energy systems. The multidisciplinary aspect of the programme will come to the fore in the latter years culminating in integrated design projects that address the sourcing, conversion and utilisation of energy. Modules relating to energy policy, economics and environmental issues will be included to place the technical content in a broader societal context. The programme will include a range of optional modules which provide the student with the maximum flexibility to choose from diverse career paths.

Year 1: Along with modules in the fundamental sciences and maths, the first year will include an introduction to energy systems that covers Wind, Wave, Solar, Geothermal and Bio-Fuel sources.

Year 2: In second year, the theoretical foundation of first year will be expanded into the engineering sciences and practical courses, with applications focussed on energy.

Years 3 and 4: Multidisciplinary energy systems design projects will be supported by advanced modules in engineering design, analysis and information technology. Elective modules will enable students to specialise in particular energy sectors that include buildings, transportation, renewable and conventional power generation and electrical power systems.

A 5 month Professional Experience Programme (PEP) will take place in the energy industry at the end of third year.

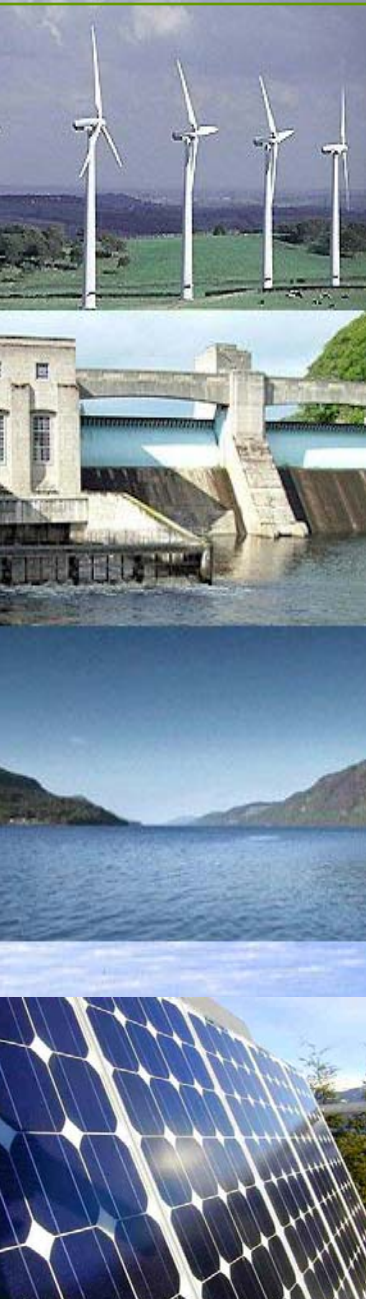
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ENERGY SYSTEMS ENGINEERING



What is Energy Systems Engineering?

Energy is one of the biggest challenges facing humanity, as evidenced in daily media coverage of issues relating to the environment, energy resources and energy usage. The National Development Plan 2007–2013 and the current Programme for Government have each identified Ireland's future energy needs as a national priority. Additionally, the Strategy for Science, Technology and Innovation 2006–2013 listed energy as a research priority and proposed the establishment of a National Energy Council. Most recently, draft Building Regulations for New Homes have been published, which include a mandatory minimum renewable energy requirement. This is the first step to ensuring that renewable energy becomes part of our everyday lives.

Not surprisingly, a proliferation of energy-related industries has grown to meet the resulting market demand for efficient heating and electrical generation systems based on sustainable sources. However, if Ireland is really to progress on energy issues, it needs many more graduates trained specifically in energy related disciplines than are currently being produced. This latest development of a B.E. degree in Energy Systems Engineering in NUI, Galway will directly address the requirement for professionally-accredited engineers, who will be qualified to contribute to and develop technology-intensive energy industries.

What type of work does an Energy Systems Engineer do?

Graduates of this programme will be multidisciplinary engineers equipped to solve problems across the whole spectrum of energy systems. In development of an offshore wind-farm, for example, foundations must be laid on the sea bed and the turbine towers must be built to survive extreme waves. The turbines and their associated equipment - generators, gearboxes and bearings - must be designed aerodynamically and structurally to produce power in moderate wind, but also to withstand storm winds. Electrical power is taken ashore on subsea cables and transmitted through the national grid, which must be designed to accommodate the inevitable variability in wind power. All the time, sensors and control systems ensure that the equipment operates optimally and provides early warnings of any faults. The Energy Systems Engineering course will provide students with the skills to develop into professional engineers with a total view of challenges like these, with optional modules providing technical focus for different sectors of the industry.

Why study Energy Systems Engineering at NUI, Galway?

NUI, Galway is well positioned to deliver a degree in Energy Systems Engineering, as it has a strong range of all relevant engineering disciplines within its College of Engineering & Informatics (electrical & electronic, mechanical, civil & environmental, industrial & information technology). The design of a New Engineering Building (due for completion in 2010), incorporates many sustainable energy and environmentally friendly features and will provide a real-life experimental environment for students of the programme. The new building will also facilitate collaboration (in teaching and research) between all disciplines on such a multi-disciplinary programme.

What types of jobs are available to Energy Systems Engineers?

The range of primary job functions available to graduates will include the following:

- Design and implementation of renewable and efficient energy systems: in buildings and large structures (industrial plants, commercial offices and centres, educational institutes, hospitals, etc)
 - Consultancy
 - Project engineers
- Design and manufacture of components for renewable and advanced energy systems: including power converters, renewable energy control systems, wind / water turbines, gas and steam turbines, combustion systems, power generators for renewable sources, environmental sensors, mains interface controllers, power / energy meters, building energy management systems
 - Design engineers
 - Manufacturing engineers
 - Test engineers
- Design and control of power systems with renewable energy sources:
 - electricity providers (ESB, Airtricity, etc.)
 - microgeneration systems
 - wave and tidal power generation
- Innovation in clean technologies:
 - electrical vehicles and transportation
 - hydrogen fuels
 - combined cycle power stations

Other potential roles would be in the areas of energy economics, energy policy, energy regulation, energy planning and the law.

What are the Entry Requirements?

For admission to the B.E. degree in Energy Systems Engineering, applicants must satisfy the Matriculation requirements of NUI, Galway in six subjects including Irish, English, Mathematics and a Laboratory Science subject. The minimum requirements are the same as for the other engineering degree programmes at NUI, Galway and include at least a C3 in Higher Level Mathematics, or a pass in the NUI, Galway Special Entrance Examination in Mathematics.

For more information contact:

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