



BE (Hons) Degree in Electronic and Computer Engineering

The BE (Hons) Degree course in Electronic and Computer Engineering at NUI Galway is a four-year full-time degree programme, introduced to meet the growing demand for Professional Engineers with knowledge and skills in computer hardware, computer software and

computer applications. The course has input from the Electrical & Electronic Engineering and the Computer Science & Information Technology disciplines of the School of Engineering and Informatics. During the first two years, students study foundation Engineering and Science subjects, including Electronic Engineering, Computing, Physics, Chemistry, Engineering Graphics and Mathematics. Practical labs support the subject material.

In the third and fourth years, students learn the advanced technical skills required in the engineering profession, i.e. structured analysis, design, implementation and test of electronic circuits, embedded systems and software applications

to professional standards using both traditional and computer-aided methods. Application areas include Embedded Systems, Software Development, Communications, Digital Signal Processing and VLSI Design. Students also receive grounding in economics, business management and project management.

In third year, prior to PEP, students complete a year-long project working in groups of two. This exercise provides them with technical experience in a specific area of Electronic and Computer Engineering, in addition to developing their skills in project management and team work. Further information on Electrical & Electronic Engineering may be obtained at: www.eee.nuigalway.ie



Primary areas of undergraduate training:

Embedded Systems.	Microprocessor architectures, RISC, CISC and DSP. Embedded system design. Real-time OS, multi-tasking, hardware/software co-design. Application and driver development.	Advanced Software Engineering.	Development environments, visual programming, GUI design and implementation. Database integration. Distributed systems & co-operative computing.
Analogue Systems & Semiconductor Technology.	Analogue circuit design and analysis, semiconductor physics, characteristics of circuit elements, technology options, IC design and layout, silicon fabrication.	Signal Analysis & Analogue Communications.	Fourier analysis, signal processing, filter design, Matlab/SPICE analysis, analogue communication techniques, digital modulation and transmission, electrostatic & magnetostatic theory, antennae, transmission lines, microwaves, EMC.
Digital Systems Design.	Embedded digital system design techniques and applications. Structured design and documentation methodology, microprocessor architectures, VHDL, simulation and synthesis. ASIC/FPGA technologies and implementation. Testability.	Communication Systems Engineering.	Datacomms protocols, LANs, WANs, ISDN, ATM, mobile and satellite communication, telecommunications software apps, protocol specification, intelligent networks.
Programming and Software Engineering.	Programming in C, Java. PC and Unix development environments. Structured design methodology, system analysis, testing and QA. Modularity, software maintenance and re-use. Object-oriented programming.	Digital Signal Processing.	Fundamental theory, time-domain and frequency-domain analysis, system design, digital filters, multirate systems. Applications: speech and image processing, communications, adaptive filters, biomedical signal processing.

Electronic & Computer Engineering

Professional Experience Programme (PEP)

Students can carry out the following roles:

- Technical Support
- Software Development
- Programming
- Graphic Design
- Software Research
- Documentation
- Database Validation
- Customising Software
- Reporting
- Debug and error reporting
- Hardware Research
- Software Testing
- Work on the Intranet
- Web Servers
- Circuit Board Design
- Write Test Scripts
- Website Development and Update
- Networks
- Circuit Board Testing
- Electronic Component Production
- System Integration



Final Year individual project.

During the PEP, participating companies may offer the student project work that could become the basis of the student's subsequent final-year project. This offers an on-going benefit to both company and student.

Examples of recent industry-related individual final year student projects (20% of degree marks):

Project Supervisor Name/Tel/Email	Project Title
Dr. John Breslin Tel: +353 91 492622 john.breslin@nuigalway.ie	<ul style="list-style-type: none"> • Modern PDA technology for effective handheld solutions in the retail industry. • Home automation with an internet table and LinuxMCE.
Dr. Peter Corcoran Tel: +353 91 492764 peter.corcoran@nuigalway.ie	<ul style="list-style-type: none"> • A microprocessor-controlled variable power supply for industrial instrumentation. • A java-based system to control and download data from a digital oscilloscope via RS-232.
Dr. Maeve Duffy Tel: +353 91 493972 maeve.duffy@nuigalway.ie	<ul style="list-style-type: none"> • DC/DC converters for handheld electronic devices. • Development of an automated test setup for magnetic sensors used in automotive applications.
Dr. Martin Glavin Tel: +353 91 492035 martin.glavin@nuigalway.ie	<ul style="list-style-type: none"> • JPEG image compression for automotive systems. • RFID-based hospital patient monitor using web infrastructure.
Prof. W.G. Hurley Tel: +353 91 493136 gerard.hurley@nuigalway.ie	<ul style="list-style-type: none"> • Battery management system for standby power. • Power electronics for automotive applications.
Dr. Edward Jones Tel: +353 91 492720 edward.jones@nuigalway.ie	<ul style="list-style-type: none"> • Frequency domain adaptive filtering. • Noise suppression for speech communication.
Dr. Liam Kilmartin Tel: +353 91 492749 liam.kilmartin@nuigalway.ie	<ul style="list-style-type: none"> • Perceptual speech quality analysis in mobile and VoIP networks. • Mobile inter-network mobility management.
Dr. Fearghal Morgan Tel: +353 91 493137 fearghal.morgan@nuigalway.ie	<ul style="list-style-type: none"> • Implementation of an FPGA-based platform for intrinsic evolution of digital circuits. • Secure wireless financial transaction system prototype development.
Prof. Gearoid Ó Laighin Tel: +353 91 492685 gearoid.olaghin@nuigalway.ie	<ul style="list-style-type: none"> • Fall detection system for elderly patients. • Accelerometer-based personal trainer system.