



OLLSCOIL NA  
GAILLIMHÉ  
UNIVERSITY  
OF GALWAY

Foghlaim & Forbairt  
Ghairmiúil d'Aosaigh  
Adult Learning &  
Professional Development

# Part-time courses built around *you*

Science & Technology  
Courses



University  
ofGalway.ie



# Science & Technology courses

Our **Science & Technology** courses offer participants rewarding career prospects in a variety of areas, such as thriving industry sectors or upskilling to avail of promotional opportunities. Our courses are developed to address current and future skills requirements of the high-tech sector ensuring that our graduates are well positioned to withstand the challenges of working in a changing economic environment. Courses offer a comprehensive range of educational opportunities and we have a range of progression pathways to suit individual needs.

See summary of part-time courses available below. The Specialist Diplomas are particularly suitable for those requiring up-skilling for career advancement or focused re-skilling for career change.

## Science & Technology Courses

**Start Date:** September

**Entry Requirements:** A Pass in Leaving Cert Maths is required for the Diploma. For all other courses a minimum Level 7 of 90 ECTs is required in relevant area.

(IELTS)/TOEFL certificate is required if English is not your first language.

Course	NFQ Level	ECTs	Duration	Modules	Mode of Study
Science & Technology Studies - <b>Diploma</b>	7	120	2-4 yrs	20	Blended
Science & Technology Studies - <b>Degree</b>	8	120	2-4 yrs	19	Blended
<b>Specialist Diplomas</b>					
Automation & Control	8 (Minor)	30	1 yr	4 + project	Online
Corporate Environmental Planning	8 (Minor)	30	1 yr	6	Online
Medical Device Science	8 (Minor)	30	1 yr	6	Online
Lean & Quality Systems	8 (Minor)	30	1 yr	4 + project	Online



# Science & Technology Studies

## Diploma

The Diploma focuses on the knowledge and skill requirements of high-tech industries. The modular structure is designed with flexibility in mind, enabling students to balance study with work and other commitments and to accumulate credits over a timeframe that suits their lifestyle. Learning is delivered via a blend of distance and online resources, on campus tutorials and labs, and company-based projects.

## Degree

The Degree further advances your knowledge and skills to meet the requirements of high-tech industries. The modular structure is designed in the same format as the Diploma. The syllabus provides a comprehensive grounding in the foundations of Science, Engineering and Technology, and introduces areas of specialist knowledge found in high-tech operational environments.

## Delivery & Assessment

The course is delivered using a blended learning approach with Saturday workshops (approximately monthly). The delivery model also includes online learning and self-directed learning elements. Modules are assessed by a combination of written assignments, e-learning and multimedia activities, and written exams. Project modules are assessed by submission of written reports and presentations.

## Career Opportunities & Further Study

The course is primarily intended to support those seeking career advancement in a variety of high-tech industries such as medical devices, pharmaceuticals, biotechnology and manufacturing or those with an interest in specialising in a particular area of science and technology. See Postgraduate courses below:



## Micro-credentials

Modules can be taken on standalone basis from the suite of courses on offer. Each module has a specific number of credits attached to it and you may consider this option for upskilling and developing your continuing professional development portfolio to meet the requirements of your industry sector and/or profession. The modules are offered over one semester on a part-time basis September – December and January – May.



## Reasons to study this course:

- Our courses provide students with a comprehensive grounding in the theoretical foundations of Science and Engineering.
- You will develop important managerial skills such as problem solving, decision making and advanced communication skills.
- It introduces students to areas of applied and specialist knowledge found in today's high-tech environments, through the provision of elective streams allowing you to specialise in areas of interest to you.



## Modular Structure

Diploma Cycle 120 ETCS		
5 ECTS 10 ETCS 20 ECTS		
Core Modules		Compulsory Modules (16)
Introduction to Learning	<b>Maths 2</b>	Introduction to Environmental Science
Chemistry	Statistics	Human Biology Fundamentals
Introduction to Management	Physics 1	Organisational Behaviour
Information Technology	Physics 2	<b>Project 1</b>
Introduction to Operations Engineering	Operations Engineering	<b>Project 2</b>
<b>Maths 1</b>		



Elective Modules		Choose (4)
Introduction to Management Science	Design of Engineering Systems	Database Applications
Introduction to Quality Management	Science, Technology & Innovation	CAD Modelling
Biology & Biotechnology		



**Qualification Awarded**  
**Diploma in Science & Technology Studies Level 7**



Degree Cycle - 120 ETCS		
5 ECTS 10 ETCS 20 ECTS		
Core Modules		Compulsory Modules (11)
Product & Process Development	Management Information Systems	Environmental Science
Health & Safety Systems	Materials Science & Processes	Regulatory Compliance
<b>Project Management</b>	<b>Research Methodology</b>	Applied Innovation
Technology Innovation & Entrepreneurship	<b>Project 3</b>	



Elective Streams		Choose 2 Streams
<b>Automation &amp; Control</b> <ul style="list-style-type: none"> <li>Automation 1</li> <li>Manufacturing Technology</li> <li>Automation 2</li> <li>Machine Design</li> </ul>	<b>Medical Device Science</b> <ul style="list-style-type: none"> <li>Mechanics of Solids</li> <li>Human Anatomy &amp; Physiology</li> <li>Medical Device Science</li> <li>Biocompatibility &amp; Device Design</li> </ul>	<b>Lean &amp; Quality Systems</b> <ul style="list-style-type: none"> <li>Problem Solving Tools &amp; Techniques</li> <li>Enterprise Modelling &amp; Simulation</li> <li>Lean Thinking Lean Tools</li> <li>Quality Science Six Sigma</li> </ul>
<b>Regulatory Affairs</b> <ul style="list-style-type: none"> <li>Introduction to Quality Management Systems</li> <li>Fundamentals of EU Medical Device Regulations</li> <li>Auditing and Compliance</li> <li>Fundamentals of US Medical Device Regulations</li> <li>Validation and Calibration</li> </ul>	<b>Corporate Environmental Planning</b> <ul style="list-style-type: none"> <li>Environmental Management for Organisations</li> <li>Environmental Leadership for Organisation</li> <li>Energy Management</li> <li>The Lean Organisation &amp; Technology</li> </ul>	
These elective streams may also be taken as standalone Specialist Diplomas/Cert (Level 8 – 30 ETCS)		



**Qualification Awarded**  
**Degree in Science & Technology Studies Level 8**

# Specialist Diploma in Automation & Control

## Your part-time course:

This one-year, part-time course aims to develop knowledge around the issues and opportunities associated with automation and control technology and to improve skills in the areas of engineering materials including metals, ceramics, polymers and composite materials; manufacturing processes, both traditional and recently developed; and electronic manufacturing technologies. Students gain an understanding of industrial control systems, robotics and automated production lines.

## Delivery & Assessment:

The course is delivered using an online learning approach with Saturday workshops (approximately 10 hours per module). The delivery model also includes self-directed learning elements. Students complete a project over the academic year which requires them to apply their knowledge to real world scenarios.

## Career Opportunities & Further Study:

Graduates find employment in well-established industries which are embedded in the local economy, providing a basis for sustainable long-term employment and career advancement. Graduates can opt to progress to the BSc in Science & Technology Studies (NFQ level 8) with credit for their studies.



*“The knowledge gained from the course has improved & upgraded my skillset. As a shift worker I found the online teaching method to be very flexible and the lecturers were also industry professionals themselves. I also found the course modules to be very relevant to all walks of industry. I particularly enjoyed the Machine Design module which opened a brief insight into the world of Mechanical Engineering.”*

**Rónán Mulhall**  
Specialist Diploma in  
Automation & Control

## Reasons to study this course:

- This course is suitable for those who want to upskill in the areas of engineering materials, manufacturing processes and electronic manufacturing technologies.
- It addresses the critical shortage in skills in the areas of automation and machine control, supply chain management and manufacturing processes.
- It was developed in consultation with industries who continue to have input into both development and delivery.



[universityofgalway.ie/adultlearning/courses](http://universityofgalway.ie/adultlearning/courses)

## Modules

This Specialist Diploma consists of four inter-related taught modules and a project, giving a total of 30 ECTS.

The project topic is chosen by the participant in consultation with their supervisor and will be company based where possible.

### Machine Design

This module introduces students to the theory behind simple and compound machines, reliability of a system, gearing and gear ratio theory, spring decision and design criteria. Machine Design also introduces the students to some 3D printing for assembly. This helps introduce and develop the students' 3D modelling skills.

### Automation 1

Students are introduced to automation and automated systems. Items such as sensors, actuators, motors, pneumatics, discrete controllers, Programmable Logic Controller (PLC) programming and robotics are discussed. PLC coding is carried out in logic ladder format to design and test automated and pneumatic systems. Material handling, automated guided vehicles, automated production lines, and storage are also considered. Automation is getting more intelligent, adaptable, autonomous, and used extensively in industry and the module addresses how these systems are used in industry. For example, quality control, increased throughput, and increasing competitive advantage.

### Automation 2

The Automation 2 module introduces material transport systems, outlines the use of storage systems, presents an overview of automated manufacturing, examines automated assembly systems, investigates the use of flexible manufacturing systems, focuses on the use made of inspection technologies and considers how product design is generally carried out in modern production environments by means of computer-aided design and computer-aided manufacturing systems, operating in combination.

### Manufacturing Technology

The Manufacturing Technology module introduces engineering materials including metals, ceramics, polymers and composite materials, manufacturing processes, both traditional and recently developed and electronic manufacturing technologies.

### Automation and Control Project

In this project the student will complete a literature review on a topic that is relevant to both the course and to their own work where possible. The student will develop a project plan and execute a practical research project using well established research methodology methods. Students will be allocated an academic supervisor who will work with them to offer guidance and ensure the successful completion of the project. This module enables development of project management skills, team-working and communication skills.



# Specialist Diploma in Corporate Environmental Planning

## Your part-time course:

This one-year, part-time course will provide the learner with a holistic perspective on environmental planning to assist in the development of best practice in environmental management, resource efficiency, sustainable design and technologies. It will raise awareness and facilitate behavioural change to a culture of environmentally sound practices. The course will empower the learner to incorporate sustainable practices into the daily running of their organisations. Supporting the growth of the green/ circular economy through improved sustainability and competitiveness will be a key outcome from this course.

## Delivery & Assessment:

The course is delivered using an online learning approach with Saturday workshops (approximately 10 hours per module). The delivery model also includes self-directed learning elements. Innovative and authentic assessment methods are used throughout the course which will enable students to demonstrate capabilities and competencies as well as academic knowledge. Methods may include written assignments, e-learning and multi-media exercises, group projects, presentations, and reports, etc.

## Career Opportunities & Further Study:

Many opportunities exist for individuals who have knowledge and skills relating to environmental planning in both the corporate and public sector. As organisations become more aware of their environmental responsibilities, they will be seeking individuals who have the capacity to provide leadership in developing solutions for contemporary environmental issues. Graduates can opt to progress to the BSc in Science & Technology Studies (NFQ Level 8) with credit for their studies.



Photo by John Caulfield

The content and learning outcomes of this course focus on the following SDGs: 4, 7, 11, 13 & 15. Scan this QR code and find out more about SDGs at University of Galway.



## Reasons to study this course:

- This is a practice based course for professional development and role specialisation.
- The learner will be positioned to support your organisation to achieve better environmental performance leading to improved resource efficiency and direct cost savings.
- The learner will be equipped to assume environmental leadership and management positions in a range of organisations in the private and public sectors.



## Modules

### Environmental Science

This module aims to enhance the students appreciation of environment-related disciplines. It covers facts and attitudes that help the student to assess current environmental issues critically, evaluate technological advances, and put environmental issues into a legal perspective.

### Energy Management

Improving energy efficiency and reducing carbon footprints and energy costs is a priority for many organisations. An Energy Management System (EnMS) can play a lead role in achieving these aims. An EnMS is a process for continually improving energy performance. Suitable for all organisations, whatever the size or sector, it is particularly beneficial in organisations operating energy intensive processes. This module will provide the student with a general introduction to energy, its generation, distribution and usage in industrial and commercial environments and provide a conceptual and technical foundation in energy management. The module will focus on conducting energy audits, creating energy budgets and assessing ISO 50001 requirements.

### The Lean Organisation and Technology

The concept of Lean is to provide increased value to the organisation and the customer through eliminating waste in production and operations. Lean can be applied in every commercial and industrial environment as a way of thinking and acting for an entire organisation. This module will provide students with an overview of Lean principles and the 8 wastes or lean defects it deals with: excess processing, overproduction, waiting, inventory, movement, motion and non-utilised talent. This module will focus on contemporary Lean practice, tools for Lean and emerging technologies, and how they can assist in the modern Lean organisation. The module will include the practical application of knowledge and skills through the development of a Lean strategy for the students' organisations or departments.

### Environmental Leadership in Organisations

While environmental protection is a global issue, environmental activities occur at all levels with industrial and commercial environments playing a lead role. This module will explore local and global sustainability issues and their implications for industrial and commercial environments and examine case studies of environmental leadership in practice. The module will provide students with a conceptual and practical foundation in methods of fostering teamwork, leadership and communication for effective environmental leadership in their organisations.

### Environmental Legislation and Compliance

Knowledge of current minimum legal expectations for environmental compliance is fundamental to achieving good environmental management in industrial and commercial environments. This module is aimed at professionals and will provide students with a practical foundation in the principles of compliance and risk management for compliance in Ireland. Topics will include the structure of environmental law in Ireland (EU directives, regulations, licensing etc.), current and future environmental legislative requirements, and how to ensure legal compliance for their organisations.

### Environmental Management for Organisations

Drawing on contemporary examples, Environmental Management for Organisations will explore the roots and principles of environmental planning and management in practice, introducing students to a range of conceptual and practical approaches. The module will focus on processes, scale and case studies in environmental management and planning in industrial and commercial organisations and lays a solid foundation for the other modules. Environmental planning and management will be explored in an interdisciplinary context applicable to a variety of backgrounds, such as manufacturing, operations and environmental engineering, environmental and quality science, health and safety, social geography, business and management, regulations and compliance.



# Specialist Diploma in Lean & Quality Systems

## Your part-time course:

This one-year, part-time course is intended for those who wish to focus their skills with a view to moving into specialist and hybrid lean roles, e.g. internal lean consultants, waste minimisation specialists, process optimisation advisors. It is also suitable for those who wish to upskill and specialise. On completion of the course, graduates will have highly marketable, up-to-date knowledge and skills relevant to product, process and service optimisation and improvement.

## Delivery & Assessment:

The course is delivered using an online learning approach with Saturday workshops (approximately 10 hours per module). The delivery model also includes self-directed learning elements. Students complete a project which requires them to apply their knowledge to real-world scenarios.

## Career Opportunities & Further Study:

Graduates find employment in well-established industries which are embedded in the local economy, providing a basis for sustainable long-term employment and career advancement. Graduates can opt to progress to the BSc in Science & Technology Studies (NFQ level 8) with credit for their studies.

The Specialist Diploma in Lean & Quality Systems is approved by Engineers Ireland as a CPD learning opportunity and contributes 600 hours towards an engineer's CPD requirement.



Students are provided the opportunity to take the American Society for Quality (ASQ) green belt online exam to enhance their studies to a Green Belt Qualification.



## Reasons to study this course:

- Participants will be equipped in continuous improvements, Operations Excellence Methodologies, Lean, Six Sigma and Quality Management techniques.
- Enterprise modelling and simulation is studied with an emphasis on optimising business processes and skills in change management.
- It addresses lean and quality systems within manufacturing and services sectors.



[universityofgalway.ie/adultlearning/courses](http://universityofgalway.ie/adultlearning/courses)

## Modules

This Specialist Diploma consists of four inter-related taught modules and a project. The project topic is chosen by the participant in consultation with their supervisor and will be company based where possible.

### Lean Thinking/Lean Tools

The module provides an overview of Lean Tools, a recognised precursor for digitalisation, Industry 4.0, the Toyota Production System (TPS) and Lean principles. Students examine the main components of the TPS system including Just-in-Time (JIT) and cellular manufacturing. The module covers the main lean tools including Value Stream Mapping, 5S, Kaizen, and Standard Work. The principles behind each of the tools and the various elements involved in effectively using these tools is discussed.

### Quality Science - Six Sigma

This module introduces the concept of Quality Science. Students will study Six Sigma methodology, and gain a foundation in the statistical methods and statistical thinking that forms the basis of the Six Sigma DMAIC process. Students build on this foundation so that they have the confidence and statistical skills necessary to visualise and interpret data. Learners develop a working knowledge of the statistical package Minitab.

### Problem Solving Tools & Techniques

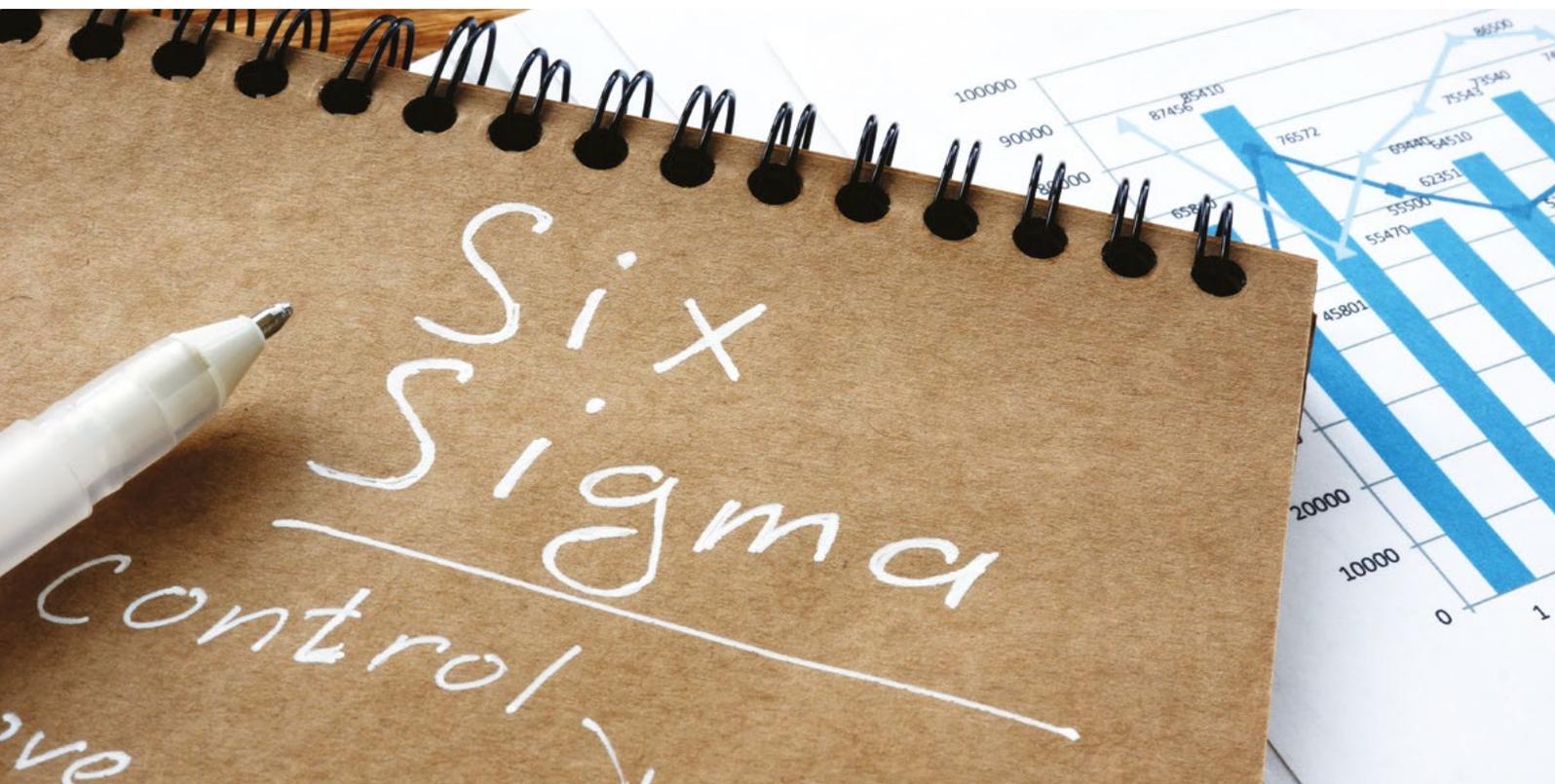
The Problem Solving Tools and Techniques module gives students an appreciation of the tools and techniques used by organisations to implement quality improvement and Six Sigma projects. Students analyse problems utilising the Six Sigma DMAIC problem solving framework.

### Enterprise Modelling & Simulation

Enterprise modelling is the process of building models of whole or part of an enterprise using process models, data models, resource models and/or new processes etc. Enterprise modelling deals with the process of understanding an enterprise and improving its performance through creation of enterprise models. It is based on knowledge about the enterprise, previous models and/or reference models.

### Lean & Quality Systems Project

In this project the student will utilise Lean Six Sigma tools and apply those to real life scenarios. The student will develop a project plan and execute a practical research project using well established research methodology methods. Students will be allocated an academic supervisor who will work with them to offer guidance and ensure the successful completion of the project. This module will enable the student to develop their project management skills, team-working and communication skills.



# Specialist Diploma in Medical Device Science

## Your part-time course:

This one-year, part-time specialist diploma aims to develop specialist knowledge of the medical devices sector and to develop relevant technical and soft skills. The qualification is a minor award at degree level. This course is of benefit to people who require upskilling for career advancement within the medical devices sector, or for those looking for focused re-skilling with a view to a career change. On completion of the course, participants will have highly marketable, up-to-date knowledge and skills relevant to the medical devices sector. Students practice, and are assessed on, a range of technical and transferable skills relevant to meeting future skills needs in the workforce.

## Delivery & Assessment:

The course is delivered using an online learning approach with Saturday workshops (approximately 10 hours per module). The delivery model also includes self-directed learning elements. Innovative and authentic assessment methods are used throughout the course which will enable learners to demonstrate capabilities and competencies as well as academic knowledge.

## Career Opportunities & Further Study:

Graduates of this course already working in the industry will be well placed to move into management roles. Graduates from a science or engineering background can transfer existing skills

and develop specialist knowledge in order to move into the medical devices sector. Graduates can opt to progress to the BSc in Science & Technology Studies (NFQ level 8) with credit for their studies.



*“I recently moved from a mechanical engineering role into medical devices and thought this course was well suited for a smoother transition. The course was very helpful in terms of providing me with a good overview of medical device development and has complimented my new role well. I think the opportunity to study while working is a greater advantage, as opposed to full-time study, as I was able to observe the real-world implementation of many of the aspects I learned about in the classroom.”*

**Eimear O'Hara**

Specialist Diploma in Medical Device Science

## Reasons to study this course:

- The medical devices sector is flourishing, nationally and globally, and offers sustainable career opportunity and advancement.
- Students will develop specialist knowledge of the medical devices sector and technical knowledge and skills in design, development and manufacture of medical devices.
- You will appreciate the science and engineering behind medical devices, and study human anatomy, physiology and disease states which can be monitored or improved by medical devices.
- You will develop best practice, industry standards, policies and regulations within the medical device sector.



[universityofgalway.ie/adultlearning/courses](http://universityofgalway.ie/adultlearning/courses)

## Modules

This Specialist Diploma consists of six inter-related taught modules, giving a total of 30 ECTS.

### Human Anatomy & Physiology

This module introduces the student to the structure and function of body systems. Anatomy is the science of body structures and their relationship to each other. Physiology is the study of the function of each of these anatomical structures. In this module, the human body is examined on many levels, integrating the anatomy and physiology of cells, tissues, organs, the systems in the discussion of how our body's maintain homeostasis. It aims to enhance the students appreciation of the human body, focusing in particular on its form (Anatomy) and function (Physiology).

### Biocompatibility & Device Design

This module offers a comprehensive review of all the major biomaterials. It provides a general introduction to the different classes of materials that are used in biomedical applications. It identifies ideal biomaterials for different applications, and characterises biomaterials in terms of their structural, physical and biological attributes.

### Product & Process Development

The aim of this module is to give students a broad overview of some of the methods and techniques that are used to develop new products. In addition, it will assist in developing a number of Professional Transferable Skills (PTS), such as critical thinking, problem solving, and written communication.

### Mechanics of Solids

This module in Mechanics of Solids gives the student the opportunity to learn a basic engineering subject and, at the same time, develop their analytical and problem-solving abilities. Considerable emphasis is placed on how to analyse the behaviour of mechanical and structural systems under external loading. Most of the examples and problems require the student to do some original, critical thinking.

### Medical Device Science

In this module learners will evaluate the practical application of materials, mechanics and stress analysis theory in the design of medical devices. The module addresses the clinical need, function and design requirements of the most widely used orthopaedic and vascular medical devices. Students examine the effects of mechanical loading (static, fatigue, wear) and environment on medical devices.

### Regulatory Compliance

This module presents an overview of the regulations governing the development, manufacture and marketing of drugs and medical devices, inclusive of in vitro diagnostic devices. It provides an overview of the regulatory framework pertaining to the pharmaceutical and medical device industries. The module will equip participants with the concepts necessary to enable them to work effectively with regulatory affairs personnel, and will act as a reference guide to help participants identify and source specific regulations.



## What is

# Recognition of Prior Learning (RPL)?

Recognition of Prior Learning (RPL) is a process by which prior learning is formally valued. It is a means by which prior learning is identified, assessed, and recognised by an educational institution as part of its programmes, courses, and/or modules on the National Framework of Qualifications (NFQ). This makes it possible for an individual to build on learning achieved and to be rewarded for it.

### What can RPL be used for?

The RPL process may be used to gain:

- Entry to a course where you do not meet the standard entry criteria
- Advanced entry to a course (i.e. into year 2 or year 3)
- Exemption from one or more modules on a course

**Appeals:** If your application is unsuccessful (e.g. if you are not granted an exemption or accepted onto a course of study through RPL), any available options or supports will be outlined to you. Learners may avail of the appeals procedure that is in place, which will be communicated to you.

### Types of Prior Learning

Prior Learning is learning which has taken place prior to admission to a course, or to a stage of a course, but has not necessarily been assessed, measured or assigned credits. Prior Learning may have been acquired through formal, non-formal or informal routes.

These learning routes are defined as follows:

**Formal learning** is course-based learning which takes place in an organised formal way. It is specifically designated as learning, with specific course content, learning objectives, stated duration for the course and learning support. It typically leads to certification. Formal learning is sometimes referred to as certified or accredited learning.

**Non-formal learning** is intentional from the learner's point of view. It takes place through planned, organised learning activities alongside or outside the mainstream systems of education and training. It may be assessed but does not normally lead to formal certification. Examples of non-formal learning are planned learning and training activities undertaken in the workplace, voluntary sector, or in community-based settings.

**Informal learning** is not organised or structured (in terms of objectives, time or learning support). It takes place through life and work experience – and is sometimes referred to as experiential learning. It typically does not lead to certification.



Recognition of  
Prior Learning  
Your Learning Counts



Apply online:



### Contact

Course Administrator

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[universityofgalway.ie/adultlearning](http://universityofgalway.ie/adultlearning)



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