

A Trans-National Smart Manufacturing Education Hub

# **Intellectual Output 3**

Joint Continuous Professional Development Programme for Future Leaders



CREATING OPPORTUNITIES FOR THE UK ACROSS EUROPE









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## Contents

Introduction
Overview
Professional Development Programmes for Future Leaders4
Professional Doctorate Eng (PDEng) in Principal Engineering4
MEng in Equipment Systems engineering4
Table 1: Consortium Partners and abbreviations    5
Database of Modules in Transferable Skills5
Summary6
Appendix 1: University of Limerick
External Generic & Transferrable Skills Modules7
Appendix 2: Queens University Belfast9
Stage 2: Professional Engineering and Innovation (c)9
Stage 3: Engineering Entrepreneurship (c)10
Appendix 3: SERC
Appendix 4: NTUA
Postgraduate Athens MBA13
(Participation of E.C.E School-Mechanical and Chemical Engineers)
School of Mechanical Engineering Undergraduate Modules13
School of Chemical Engineering Undergraduate Modules14
School of Naval Architecture and Marine Engineering14
School of Mining and Metallurgical Engineering15
School of Civil Engineering15
Appendix 5: Professional Doctorate in Engineering16
Appendix 6: MEng in Equipment Systems Engineering



## Introduction

The skill needs of the manufacturing sector are wide and, in some instances, complex. Addressing skills needs, therefore, has several facets. Providing specific modules, accredited work placements or amending the curriculum within the mainstream education and training system to ensure that graduates have relevant industry skills. Addressing specific industry in-house skills needs through upskilling and building upon existing skills base and experience within the firm – this requires flexible systems of Continuing Professional Development (CPD), online delivery, post graduate qualifications and conversion courses. In many cases, these shortages are small in scale but acutely felt by industry due to the critical nature of the roles within the firm. Need for specialist expertise to drive innovation and growth within the firm; expertise that is mainly developed through experience and is in demand globally. The main requirements from education and training relate to ensuring access to relevant research expertise and/or collaboration on company specific product/process development.

## Overview

This report will supply a database of modules in Transferable Skills offered by the Smart-Edu4.0 consortium partners (See Table 1 for list of consortium partners). Regarding certified upskilling of Staff in Industry, the University of Limerick runs a successful one-year full time Engineering Masters in Mechatronics. This Mechatronics MEng was co-developed by industry experts, finding skills gaps and the requirements for upskilling students to achieve the required industrial-relevant skills. Since the commencement of the Smart-Edu4.0 project however, UL has designed, developed, and launched a new two-year apprentice Master of Engineering Course, in Equipment Systems Engineering (ESE). This course began in September 2021, where the students are embedded in industry, working on an industrially relevant project. The students attend weekly online sprints on different ESE topics such as compliance, procurement, and data management. In addition to this, UL has launched a Professional Diploma in Equipment Systems Engineering in September 2022. This course is aimed at upskilling industry staff in an online setting part time, allowing for far reach of the course. The students will receive a professional diploma certification upon completion. The design of these courses is available to the consortium.

As part of joint scientific training options, UL has started to make online content from the MEng in Mechatronics available for training purposes to the consortium. The content, consisting of high-quality tutorial videos for robot programming and PLC programming, allows students anywhere in the world to understand basic core concepts of the topics.

Leveraging Confirm's industrial equipment resources, UL is currently co-developing a mobile testbed with industry, designed for teaching smart manufacturing skills. This testbed consists of robotics, programmable logic controllers (PLCs), sensors and actuators. In addition to the hardware, a carefully planned training course is being developed, which can travel with the platform to consortium member sites for teaching various smart manufacturing technologies, as well as developing other transferable skills such as teamwork and problem solving. The design and fabrication of this testbed is currently underway.

UL has also developed an undergraduate course in mechatronics, between the School of Engineering and the School of Electronics and Computer Engineering. A detailed overview of the course was



presented at the June 2022 consortium meeting, where feedback was received from all parties. The course breakdown has subsequently been shared with the consortium.

The consortium partners have collated a database of the transferable skills offered. To ensure that the trainees/students have the transferable skills needed to become future leaders in their fields, they must take courses on pre-defined topics (see table 2 below). Together with the supervisors, the fellow must find courses that suit existing knowledge and skills. The supervisor will help the fellow to find and to enrol in relevant courses in transferable skills at their own host institution or, with free access, at one of the other academic partner organisations. Table 2 outlines a comprehensive database of modules in transferable skills offered by Smart-Edu4.0 consortium partners (see Table 2).

## Professional Development Programmes for Future Leaders

As mentioned in the earlier section, the University of Limerick has opened two courses to the Smart-Edu4.0 Consortium partners.

### Professional Doctorate Eng (PDEng) in Principal Engineering

Professional doctorates (PDEng) differ from the traditional doctorate, it recognises the existence of research activities which can be described as professional practice. The context for this PDEng programme is the practitioner workplace and the focus is on solving real-world problems faced in the daily workplace. The scope of these problems can be sufficiently large to be addressed in a significant piece of research planned and conducted over a period and which can ultimately result in a PDEng award.

This qualification is aimed at those pursuing professional rather than academic careers. The PDEng acknowledges that significant research takes place within the practitioner's workplace, therefore, the context for this PDEng programme is the practitioner workplace and the focus is on solving real-world problems faced in the daily workplace.

The PDEng programme will equip students with a diverse knowledge of technology principals, disruptive inventions and innovative designs, processes, and techniques, as well as substantial knowledge at the forefront of industry and the forefront of academic research. Through problem-solving, heuristics, theory of inventive problem solving, technical analysis and critical evaluation, apprentices will gain the ability to significantly contribute to the creative process.

The aim of a Professional Doctorate programme is to produce a qualification which, whilst being equivalent in status and challenge to a PDEng, is more appropriate for those pursuing professional rather than academic careers. The PDEng acknowledges that significant research takes place within the practitioner's workplace. Candidates are required to contribute to both theory and practice in their field, and to develop professional practice by contributing to (professional) knowledge.

(Further details can be found in Appendix 5)

### MEng in Equipment Systems engineering

The second programme UL has opened to the Smart-Edu4.0 consortium partners is the MEng in Equipment Systems Engineering (MEng ESE). The ESE Academy (E-Cubers) has partnered with the University of Limerick (UL) to deliver Ireland's first Equipment Systems Engineering apprenticeship at level 9 (MEng).



This Apprenticeship programme provides experienced engineers with a comprehensive framework to manage the implementation of Industry 4.0 innovations in their employer's equipment. This two-year MEng, in conjunction with vibrant Communities of Practice (CoP), supplies an ideal framework for the apprentice to comprehensively and efficiently evaluate both disruptive and sustaining innovation solutions. After they have qualified as Equipment Systems Engineers (ESEs), learners will be able to remain engaged with the CoPs throughout their long and productive careers. (Further details of this course can be found in Appendix 6).

Abbreviation	Consortium Partner
UL	University of Limerick
QUB	Queens University
SERC	South Eastern Regional College
NTUA	National Technological University of Athens

Table 1: Consortium Partners and abbreviations

## Database of Modules in Transferable Skills

The table (Table 2) below outlines the transferable skills programme offered by Smart-Edu4.0 consortium partners. The courses offered are outlined on the left-hand side with the number of credits offered per course and the consortium partner that offers the course, highlighted in dark orange colour.

Transferable Skills Programme offered by Smart-Edu4.0 Consortium Part- ners (c) = compulsory (o) = optional						
Consortium Partne	r	[	UL	QUB	SERC	NTUA
Programme title		Credits				
Responsible Re- search and Inno- vation	Public engage- ment ad science education (c)	3				
	Open access ( c)	3				
	Research Integ- rity (o)	3				
	Gender equality (o)	3				
	Research Ethics (c)	3				
IP, Data Manage- ment and Entre- preneurship	Dissemination and Exploration skills (c)	3				
	Presentation Skills (o )	3				
Professional De- velopment	Developing an ac- ademic profile (c)	3				
	Leadership Train- ing (o)	3				



	CV Preparation and career skills development (c)	3		
Other	Induction training at host organisa- tion (c)	3		
	Writing into aca- demic communi- ties (o)	3		
	Digital Research Management (o)	3		
	Project Planning (o)	3		
	Innovation (o)	3		
	Sustainability (o)	3		
	Entrepreneurship (o)	3		
	Citizenship (o)	3		
	Working with Others (o)	3		
	Project Manage- ment (o)	3		
	Competition Analysis and mar- ket research (o)	3		
	Economic analy- sis and business administration (o)	3		
	Decision Support systems (o)	3		
	Business risk management (o)	3		

Table 1: Transferable Skills Modules database

A full overview of the transferable skills courses offered by each consortium partner is provided in Appendices 1-4.

## Summary

IO3 focuses on developing joint continuous professional development programs for future leaders, enabling Smart-Edu4.0 trainees/students to gain the ability and skills needed to become a smart manufacturing leader. As part of this output, IO3 addressed specific industry in-house skills needs through upskilling. This report included a database of modules in Transferable Skills offered by the Smart-Edu4.0 consortium partners. It also supplies details of Joint Continuous Professional Development Programmes for Future Leaders offered by University of Limerick which are both opened to the other Smart-Edu4.0 consortium partners. These programmes include PDEng in Principal Engineering and the MEng in Equipment Systems engineering.



## Appendix 1: University of Limerick

The Structured PhD Programme in Science and Engineering (S+E) is a four-year Level 10 Structured PhD, offered by the Faculty of Science and Engineering at the University of Limerick (UL). The first registration of students to the programme was in September 2013. The programme consists of two major components, which includes the PhD Research and Thesis (weighted at 270 credits) and the taught element, consisting of 12 credits (minimum) of specialised modules (which can be any Level 8 or 9 modules, taken from within or outside UL) and 18 credits of Generic and Transferrable Skills (again, can be taken from within or outside UL). The Faculty of Science and Engineering offers a significant number of "pre-approved" specialised modules, which have been selected as suitable modules for Structured PhD's. In addition, UL's Certificate in Generic and Transferrable Skills affords S+E Structured PhD students to obtain their 18 credits of generic and transferrable skills during the summer semester of their first or second year of study.

All students registered on the S+E Structured PhD must get 30 credits of taught modules, to consist of a minimum of 18 credits of Generic and Transferable Skills and a minimum of 12 credits of Specialist Modules (chosen from Level 8 or 9 modules). The programme is very flexible as far as the Specialised modules and Generic and Transferrable skills modules can be garnered from both within and outside UL over the four years of the programme. It is, however, strongly recommended that the specialised modules be taken during the first 18-24 months of the programme, and that student enrols in the Certificate in Generic and Transferrable Research Skills programme.

If students wish to enrol on UL's Certificate in Generic and Transferrable Research Skills programme, then sufficient credits for generic and transferrable skills (i.e., 18 credits) will be garnered during the first or second summer semester of the Structured PhD. In addition, students may wish to also obtain their 12 credits of Specialised modules during the first 18-24 months of the programme (and this is strongly recommended so that the research element becomes the focus towards the latter half of the PhD programme).

UL launched the Certificate in Generic & Transferrable Research Skills during the summer semester, 2014. The certificate consists of the following six modules in Generic and Transferrable Research Skills, and all are 3 ECTS credits each. For Science and Engineering Structured PhD Students the modules are taken on a pass/fail basis.

## External Generic & Transferrable Skills Modules

It is possible to take other Generic & Transferrable Skills modules (not listed in Table 3) from UL or from other institutions once they adhere to the skills shown by the Irish Universities Association's fourth level network of Deans of Graduate Studies as relevant to PhD student education. These skills are, but not limited to, Research skills and awareness, Ethics and social understanding, Communication skills, Personal effectiveness/development and Team-working and leadership. This is not an exhaustive list, and their relevance to students will vary upon experiential learning, disciplinary and professional development needs. All external modules must be approved by the PhD Supervisor and confirmed for quality and credit level by the Head of Department and the S&E Structured PhD Course Director by



filling in Section A of the 'Structured PhD Programme and Research Student Module(s) Registration Form' - prior to taking the module.

Module Code	Module Title	ECTS Credits
ES8002	Research Integrity	3
TL8003	Planning Research And Publication: Planning Research	3
TL8013	Developing Ideas and Arguments: Writing into Academic Communities	3
CM8003	Research Networking: Developing an Academic Profile	3
CS8013	Digital Research Management	3
LA8013	Research Ethics	3

Table 2: Modules in the Certificate in Generic & Transferrable Research Skills Programme

### https://smartedu40.eu/



## Appendix 2: Queens University Belfast

### Stage 2: Professional Engineering and Innovation (c)

### **Contents Overview:**

- Careers & Employability:
  - Winning Applications
  - o Industry Insights
  - Interview Preparation
  - o Assessment Centres
  - Professionalism in the Workplace
  - o Year of Professional Experience Briefing
- Ethics
- Project planning
- Innovation
- Sustainability

#### Learning Outcomes:

- To prepare a structured CV and detailed industrial applications
- To deliver professional technical presentations and project briefings
- To use published and digital information technologies for research preparation
- To adopt an engineering approach to product/system development
- To compile accurate requirements information
- To devise research documentation for specification, design, and implementation
- To implement teamwork, communication, and interpersonal skills
- To demonstrate production planning, costing, and report writing
- To express designs using common notations
- To demonstrate creativity and innovation in team-based work
- To prepare students for placement year and graduate employment by developing an awareness of the business environment and the issues involved in successful career management.
- To develop a range of transferable skills including communication skills, presentation skills and team working skills.

#### Skills Learned through this module:

- Self-awareness and discipline
- Formal and technical report writing
- Presentation of technical and academic information
- Basic research methods
- Elements of business practice and employability
- Professional judgement, ethics, sustainability, and communication and interpersonal skills
- Independent working and organisation
- Professional development, creativity and innovation
- Validating outcomes and comparative assessment
- Collaboration, building relationships, networks and team working



- Giving and receiving feedback, and peer review
- Using information sources and Digital Literacy
- Skills align with IET Accreditation recommendations, which compliment technical learning in subject-specific modules.

### Stage 3: Engineering Entrepreneurship (c)

### **Contents Overview:**

- Introduction to enterprise
- Student example pitches
- Overview of the startup process
- Intellectual property overview
- Funding opportunities
- Business consultancy approaches
- Importance of branding

#### Learning Outcomes:

- Report writing
- Business presentation
- Assimilation of business practices
- Generation of product
- Ability to pitch business concept

#### Skills Learned through this module:

- Presentational skills
- Development of business acumen
- Business plan creation
- Team-working
- Self-assessment
- Creativity



## Appendix 3: SERC

Unit Title	тот	Credit Value	GLH	Level
Citizenship	30	3	20	Two
Working with Others	30	3	20	Two
Problem-Solving and Deci- sion Making	30	3	20	Two
Self-Management	30	3	20	Two
Work Professionalism	30	3	20	Two
Digital Literacy	30	3	20	Two

Table 3: OCN-NI Level 2 Certificate in Transferable Skills

Notes:

Total Qualification Time (TQT) for this qualification: 180 hours

Guided Learning Hours (GLH) for this qualification: 120 hours

2.	Be able utilise tools to manage digital information from multiple sources.	<ul> <li>2.1. Use appropriate techniques to carry out and refine online searches safely.</li> <li>2.2. Illustrate how to effectively manage, store and share digital information safely and securely.</li> <li>2.3. Apply rules relating to copyright and creative commons licensing to digital resources.</li> </ul>	2.M.1 Assess the relevance and reliability of digital information sources.	2.D.1 Demonstrate how to appropriately reference digital resources.
3.	Be able to use technology to create digital content.	3.1. Use appropriate tools to design and present digital content in different formats.	3.M.1 Illustrate how the content developed in AC 3.1 can be modified for different audiences.	3.D.1 Work with others to support them to use technology to create digital content.

Table 4: Specification Extract



T-Skills Blueprint Criteria	Aware around ac	of rules ceptable	Complies around ac	with rule ceptable b	es Model e-compli	sand ance w	promotes ith rules
	behaviour	in college.	haviour in	college.	around	l acce	ptable be-
					haviou	r in col	lege.
L2 Certifi-	1. Outline	e what is	1M.1 Appr	y the prine	CI-1.D.1 A	ssess o	wn contri-
cate Mapped Cri-	meant by	social di-	ples of	social dive	er- buti	on to	the group
teria	versity.		sity thro	ough a grou	up proj	ect und	lertaken in
			project i	nvolving	at AC 1	.M.1	including
			least on	e of the fo	ol- how	ow	vn per-
			lowing:		sona	l choice	es and be-
				a. staf	f havi	ours	apply
				b. pee	rs the	orincipl	es of social
				c. oth-	- dive	rsity ide	entifying
				ers	poss	ible ar	eas for im-
					prov	ement.	

Table 5: Mapping to T-Skills blueprint

Notes: Blueprint criteria will be reviews and amended as necessary



## Appendix 4: NTUA

### Postgraduate Athens MBA

(Participation of E.C.E School-Mechanical and Chemical Engineers)

The Athens MBA (Participation of E.C.E School-Mechanical and Chemical Engineers) offers various modules such as Economics for Business Administration, Business Administration, Business and Competition Law, Project and Program Management, Management Accounting, Operational Research – Management Science, Business Games, Organizational Behavior and Human Resource Management, Business Policy and Strategy, Management Information Systems, Financial Management I, and Total Quality Management. Upon completion of these courses, postgraduate students will develop competencies in different areas such as understanding the principles of economics, business management, competition law, project management, management accounting, and quality management. They will also be able to use different management models, techniques, and tools in practice. Moreover, students will gain skills and competencies to manage people and organizations effectively and efficiently. Overall, the program seems to offer a diverse set of courses that can provide students with the necessary skills and knowledge to succeed in their careers.

### School of Mechanical Engineering Undergraduate Modules

The undergraduate modules offered by the School of Mechanical Engineering cover a wide range of topics related to production/operations management and business administration. The courses provide students with a thorough understanding of various concepts related to production planning and control, quality management and control, materials management, supply chain management, and business process reengineering, among others.

The inclusion of a course on Business Games, where students can manage a hypothetical enterprise and apply their theoretical knowledge, is a way to develop practical skills and gain hands-on experience in decision-making. Similarly, the course on Management Information Systems provides a comprehensive overview of enterprise resource planning (ERP) systems, and students can learn how to analyze and design information systems, manage information systems projects, and model business processes.

The Project Management course covers various concepts related to project management, including project management processes, national, and international PM standards, and cost management techniques. The Decision Support Systems course provides students with an introduction to contemporary decision support systems, business and data analytics, and the basic principles of business intelligence systems.

The Business Risk Management course focuses on risk management concepts, enterprise risk management, and the critical success factors and risk management culture. Similarly, the Supply Chain Management course provides students with an overview of contemporary SCM principles, network design and planning, inventory management, transportation, and the role of information technology in SCM.

Overall, the modules offered by the School of Mechanical Engineering provide a comprehensive understanding of production/operations management and business administration concepts and principles. The inclusion of practical assignments and hands-on experience through Business Games and laboratory exercises further enhances students' learning experience.



### School of Chemical Engineering Undergraduate Modules

The School of Chemical Engineering offers three undergraduate modules related to business and project management.

The first module, "Competition Analysis and Market Research," emphasizes the importance of understanding the needs and requirements of users, as well as the features, structure, and trends of the market, for successful product design and development. It also highlights the relevance of market research and analysis for engineers employed in marketing, technical sales, supplies, technology and innovation management, plant design, and project management.

The second module, "Economic Analysis and Business Administration (for Engineers)," covers the basic concepts of the overall functioning of the financial environment, and then analyzes the role and form of modern business. It also explores intra-business core functions such as product development, sales, technology and innovation management, human resources management, and financial management. Finally, it analyzes methods of costing and pricing, as well as basic investment valuation tools and techniques, to provide an integrated view of how decisions are made, and a business strategy is formulated.

The third module, "Project Management," provides knowledge and skills to successfully manage projects and programs, including planning, organization, and management of complex activities within an agreed timeframe, budget, and technical specifications and requirements. It also acknowledges the increasing importance of project and network management for modern engineers and organizations, who work on projects in conjunction with their conventional organizational structures/functions and the range of products and services they produce and offer.

Overall, these modules seem to provide a solid foundation for chemical engineering students who want to pursue careers in business and project management.

## School of Naval Architecture and Marine Engineering

The modules offered by the School of Naval Architecture and Marine Engineering seem to cover a good range of topics related to finance, investment decisions, risk management, and production management. However, the descriptions provided are brief, and it is difficult to assess the depth and breadth of each module.

One recommendation could be to provide more detailed information about the course content and learning outcomes. This will help students to make informed decisions about which modules to choose and also provide a better understanding of what they will learn.

Additionally, it would be useful to include practical applications and case studies related to the maritime industry in these modules. This will provide students with a better understanding of the industryspecific challenges and opportunities and prepare them for real-world situations.

Finally, it would be beneficial to offer more opportunities for practical learning, such as internships, projects, and workshops, to supplement the theoretical knowledge gained through the modules. This will help students to develop their practical skills and gain experience in applying the concepts they have learned.



### School of Mining and Metallurgical Engineering

The data provided suggests that the undergraduate modules offered by the School of Mining and Metallurgical Engineering focus on Advanced Investment Analysis. The course covers various aspects of investment in mining and minerals sectors including market, technological and regulatory uncertainties. The course also introduces Real Options analysis which is a relatively innovative approach to investment valuation.

Based on the data provided, it seems that the course is well-designed and relevant to industry. However, it could be beneficial to provide some more practical examples of how Real Options analysis can be applied in the mining and minerals industry. Additionally, it might be helpful to discuss some of the limitations of Real Options analysis and its potential drawbacks.

It might also be useful to include some information on the specific skills and tools that students will acquire through the course. This could include training in financial modeling, data analysis, and risk management. Providing students with practical, hands-on experience in these areas will better prepare them for careers in the mining and minerals industry.

Overall, the School of Mining and Metallurgical Engineering seems to offer a well-structured and comprehensive course in Advanced Investment Analysis. By incorporating some practical examples and hands-on training, the course can better prepare students for successful careers in the mining and minerals industry.

## School of Civil Engineering

The Applied Economics module seems comprehensive and covers important topics related to microeconomics and accounting principles. However, it would be helpful if the module also includes macroeconomic theory, as this will provide a broader understanding of the economic environment and its impact on the construction industry. Additionally, the module could be further improved by including more case studies and real-world examples to help students apply the theoretical concepts to practical situations.

In the Quality Control and Quality Assurance module, it is good that the students will learn about quality management systems and develop project quality plans. However, the module could be enhanced by including more hands-on activities and practical exercises, such as simulations and group projects, to give students a better understanding of how to implement and use quality management systems in real-world scenarios. Furthermore, it may be useful to introduce students to emerging technologies, such as artificial intelligence and machine learning, that are increasingly being used in quality control to follow the production process and intervening when the production is out of statistical control.



Flexible Learning Centre Science and Engineering

## Appendix 5: Professional Doctorate in Engineering

NIVERSITY OF

**OLLSCOIL LUIMNIGH** 



#### **Programme Overview**

The aim of a Professional Doctorate programme is to produce a qualification which, whilst being equivalent in status and challenge to a PDEng, is more appropriate for those pursuing professional rather than academic careers.

The PDEng acknowledges that significant research takes place within the practitioner's workplace. Candidates are required to make a contribution to both theory and practice in their field, and to develop professional practice by making a contribution to (professional) knowledge.

#### For Professionals who wish to:

- Evaluate the relevance of current and emerging theories and practices within their area.
- Formulate effective solutions to complex, real-world problems common to their field.
- Design rigorous research that expands the professional body of knowledge in their field.

Candidates would typically hold a 2.1 honours degree in a relevant area and five years' experience.

Candidates must successfully complete the **Qualifier module** (Professional Portfolio PP8001) prior to being offered a place on the programme. More information on the Qualifier Module can be found <u>here</u>

4 years part-time (Online/Blended)



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Programme Content		Willie William
Year 1		
Autumn	Spring	Summer
Qualifier Module Registrations	Qualifier Module	Research Integrity
	<ul> <li>Attend 1 day seminar on campus</li> <li>Attend online support workshops i.e. Aca- demic Writing</li> </ul>	Research Ethics
	Research proposal submission to Programme	Research Networking
	Research proposal presentation to pro- gramme board	Planning and Publication
	granine board	Digitial Research Management
Vear 2		Digitial Research Management
Autumn	Spring	Summer
Research Methods for Professional Practice 1	Research Methods for Professional Practice 2	Research Dissertation 02
Research Dissertation 01	Data Strategies and Analysis Techniques for Research 1	Professional Doctorate 1
	Data Strategies and Analysis Techniques for	
Year 3	Noodai on 2	
Autumn	Spring	Summer
Research Dissertation 03	Research Impact and Dissemination	Research Dissertation 05
	Research Dissertation 04	Professional Doctorate 2
Year 4		
Autumn	Spring	Summer
Research Dissertation 06	Research Conference/Workshop	Research Dissertation 08
	Research Dissertation 07	Professional Doctorate 3
Year 5		
Autumn	Spring	Summer
Research Dissertation 09	Research Dissertation 10	Graduation
	blanded delivery of opline language and	How to Apply
face to face sessions minimising time 'off t	he job.	in to the later
There will be 12 Taught modules coupled v	vith 10 Dissertation modules and 3	Applicants are encouraged to apply online for this programme.
Progression modules delivered over 4.5 y education with online learning and approxim	ears, combining traditional distance nately 4 day face-to-face per semester.	Visit : www.ul.ie/gps/engineer-
Dedicated supervisor(s) will be provided to	support participants.	ing doctorate dong
		Programme Contact Email: <u>pdeng@ul.ie</u> Tel: +353 61 213 360



## Appendix 6: MEng in Equipment Systems Engineering



## **EQUIPMENT SYSTEMS ENGINEER (MEng)**

The ESE Academy (E-Cubers) in partnership with the University of Limerick have developed this MEng in Equipment Systems Engineering specifically for Industry 4.0. The apprenticeship delivery model has been selected because it facilitates 70% of the learning to occur "on the job". Busy practicing industry professionals will benefit from being mentored by industry leaders as they help prepare their employer's equipment for the digital requirements of Industry4.0.

Apprenticeship students will have access to the latest technologies and be able to openly network with Industry 4.0 experts and a vibrant Community of Practice.



#### What is Industry 4.0?

Industry 4.0 (is the latest innovation of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the Internet of things and cloud computing. Industry 4.0 creates what has been called a "smart factory".



Apprenticeship	Equipment Systems Engineer
NFQ Level	9 Major Award
Qualification on completion	Masters in Engineering (MEng)
Duration	2 years
industry Lead	The ESE Academy (E-Cubers)
Education provider	University of Limerick
Delivery	<ul> <li>On-campus 3 day Boot Camp</li> <li>Innovation and Technology Provider Topics</li> <li>Peer to peer learning through the 'Community of Practice'</li> <li>'On the job' application through thesis project</li> <li>eEXPO</li> </ul>
Applications by	July for a September start

#### For Professionals who:

- Procure, design, manufacture, commission, support or optimise Industry 4.0 equipment for the high-tech manufacturing sector in Ireland.
- Have significant expertise of Industry 4.0 technologies as applied to manufacturing equipment.
- Wish to collaborate with others to broaden their overall access to emerging research, technologies and best working practice to meet the challenges of Industry 4.0.
- Wish to improve their abilities to perform applied research in the high-tech manufacturing equipment domain.
- Have a strong desire to be recognised as technical leaders in a topic relevant to Equipment Systems Engineering.
- Have been selected by their employer to apply the knowledge gained during this course for the procurement or optimisation of manufacturing equipment in accordance with Industry 4.0.
- Have a degree and/or considerable industrial experience in the field



#### **Benefits to the Employer**

- · Developed by industry for industry
- Improves staff retention and productivity
- · Addresses and tackles skills shortage
- · Government subsidised qualifications

#### **Benefits to the Apprentice**

- Gain a Masters qualification while working
- · Develop career enhancing skills
- Learn best-practice from other organisations
- Excellent career progression prospects



#### **How it Works**

This two-year programme is structured for blended delivery of online and face to face sessions which minimises time 'off the job'. It includes:

- Introductory Bootcamp at the beginning of Year 1. •
- Disruptive innovation topics delivered remotely.
- Technology provider topics delivered remotely. • Participation in an annual eEXPO.
- A dedicated Masters Thesis supervisor.
- Participation in a 'Community of Practice'. •
- .
- Support from an Industry Mentor within the company throughout the apprenticeship. Submission of an Academic Thesis and a presentation. •
- **Entry Criteria**
- · Employers must be approved by UL & SOLAS and commit to support the apprentice throughout the programme.
- · Support from an industry mentor within the company throughout the apprenticeship.
- · Apprentices should hold a NFQ Level 8 at minimum level 2.2 honours in a relevant area. Applicants who have completed a Level 8 programme in a related field are also eligible to apply.
- Applicants with a lower qualification may also be considered provided they can prove to have considerable industrial experience as well as evidence of the ability to study at Masters Level.

Further Information and how to apply email apprenticeships@ul.ie. You can also contact one of the programme managers Phil Kelly 061-237770, Elaine Butler 061-237798 or

www.ul.ie/gps/apprenticeships | www.ecubers.ie | www.apprenticeship.ie









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