



Engineering At UL
@EngineeringAtUL

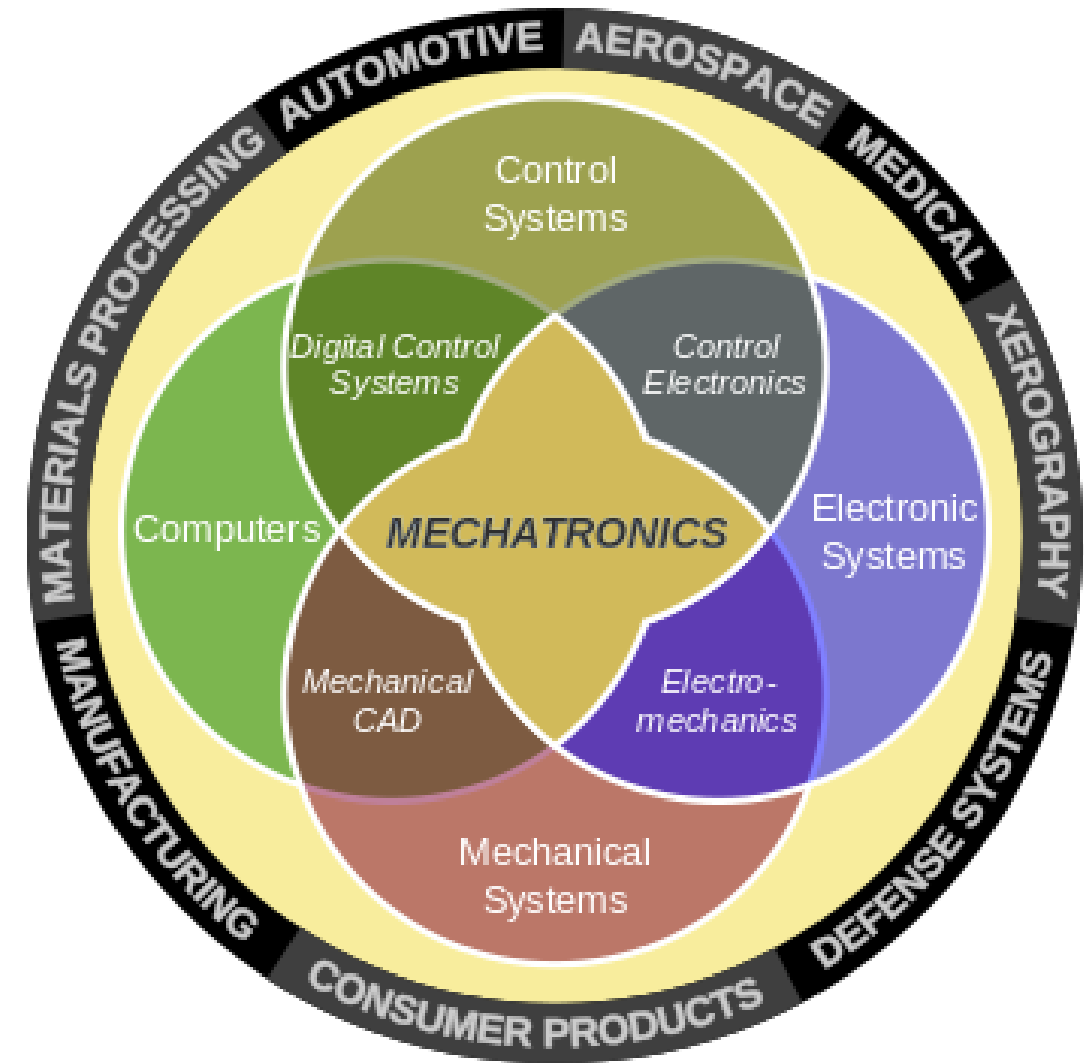
BE/ME Digital Mechatronic Engineering

A SoE/ECE Inter-departmental Enhanced Workplace based BE/ME Programme

Faculty of Science + Engineering

BE/ME Digital Mechatronic Engineering - Overview

- Combination of mechanical, electronic, robotic and software engineering systems
- Underpins many sectors (as shown right)
- Used extensively in modern manufacturing industries
- Becoming one of the fastest growing career areas
- Manufacturing sector in Ireland employs over 260,000 people directly and a further 230,000 indirectly
- Responsible for 34.5% GDP in 2020



Manufacturing in Ireland by the numbers

260,000

260,000 people -
12% of total employment

€12.5 billion

€12.5 billion in wages and
employment taxes annually

150,000

Irish manufacturers employ
150,000 people abroad; 60,000
in the US and 25,000 in the UK.

€1.7 billion

€1.7 billion of tangible
investment

28.8%

28.8%, or over €4.4 billion
of corporation tax

€20 billion

€20 billion spent each year
on goods and services from
suppliers in the Irish economy

90%

Irish owned manufacturing
exporters grew sales by over
80% between 2010 and 2021

64%

Inward FDI manufacturers
grew their exports by 64%
in the same period

€165.2bn

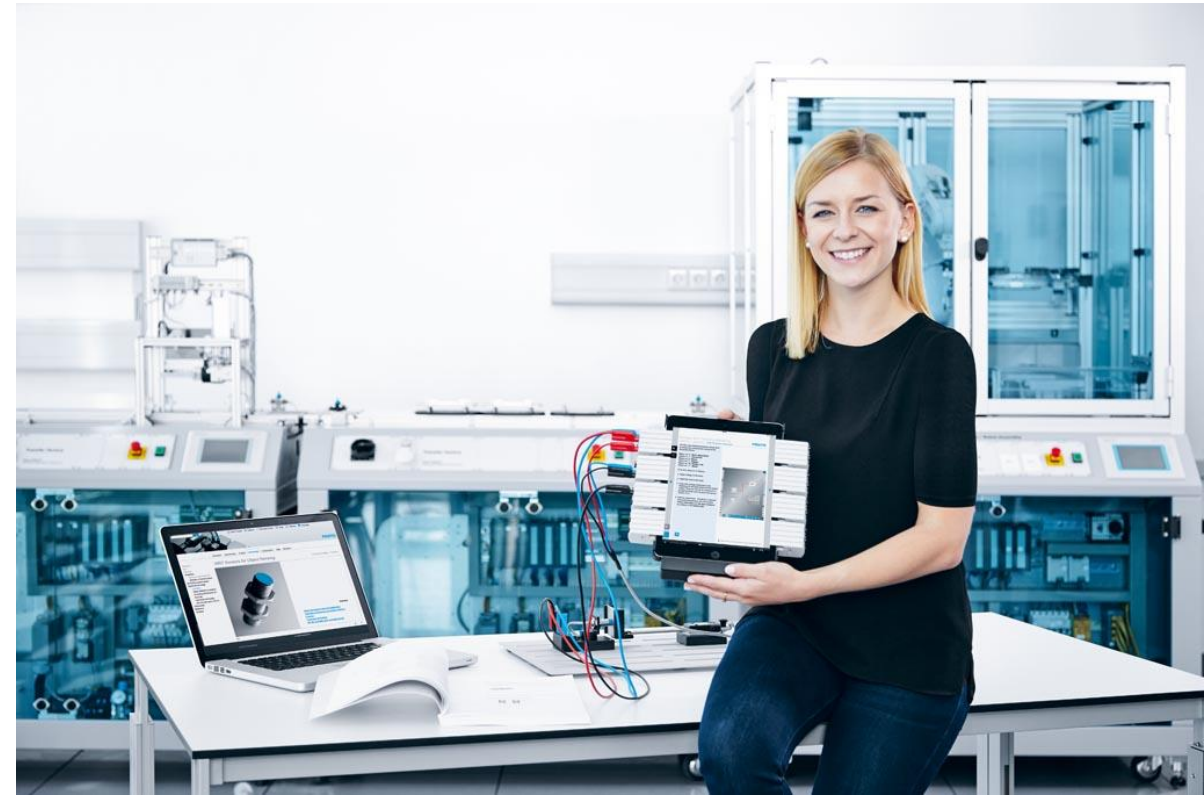
The state exported a record €165.2
billion worth of goods in 2021

Ref: IBEC



BE/ME Digital Mechatronic Engineering - Programme Outline

- Integrated BE/ME (4/5 Year, May Finish)
- Workplace Based (extended 12/13 Month Co-Op Placement)
- 270/330 ECTS Credits
- Common Entry through LM116 Engineering (Common Entry)
- Start-of-the Art Labs (Mechatronics M.Eng, UL @ Work, Confirm Centre)
- Strong links to Industry
- Strong links to R&D
- Will seek accreditation through *Engineers Ireland* (after 1st cohort graduates according to normal approach)



Year 1 - LM116 Common Entry Engineering

Semester 1			Semester 2		
Core			Core		
Code	Title	ECTS	Code	Title	ECTS
ME4001	Introduction to Engineering	3	MA4002	Engineering Mathematics 2	6
MA4001	Engineering Mathematics	6	ME4111	Engineering Mechanics 1	6
ME4121	Engineering Science 1	6	ME4412	Fluid Mechanics 1	6
EE4001	Electrical Engineering 1	6	MT4002	Materials 1	6
EE4011	Engineering Computing 1	6	-	<i>Choose One of three Electives Below</i>	
CH4001	Chemistry for Engineers	3			
Electives : None			Electives : Choose 1		
Code	Title	ECTS	Code	Title	ECTS
			ME4042	Introduction To Design For Manufacture	6
			ME4032	Structural Engineering Design	6
			ID: 8002	Introduction to Digital Mechatronics	6

Year 2 – B.E. Digital Mechatronic Engineering

Semester 3			Semester 4		
Core			Core		
Code	Title	ECTS	Code	Title	ECTS
MA4003	Engineering Maths 3	6	MA4004	Engineering Maths 4	6
ME4112	Engineering Mechanics 2	6	DM4004	Plant Automation	6
ME4213	Mechanics of Solids 1	6	ME4113	Applied Mechanics	6
ET4013	Communications Networking Fundamentals	6	EE4214	Control 1	6
CE4703	Computer Software 3	6	EE4524	Digital Systems 3	6

Year 3 – Extended Co-Op Option (12/13 month Placement)

Summer			Semester 5			Semester 6		
Core			Core			Core		
Code	Title	ECTS	Code	Title	ECTS	Code	Title	ECTS
CO4230	COOPERATIVE EDUCATION 1	30	ID:8194	COOPERATIVE EDUCATION 2A	15	ID:8195	COOPERATIVE EDUCATION 2B	15
			<p style="color: green;">Students on Extended Co-op: The five modules below are taken in blended format to garner 30 ECTS Credits in place of a standard Semester 6</p>					
			Semester 5 (Electives None)			Semester 6 (Electives None)		
			Code	Title	ECTS	Code	Title	ECTS
			ID:8039	Critical Problem Solving*	6	ID:7979	Introduction to Machine Learning for Engineers*	6
			AU4043	LEAN THINKING / LEAN TOOLS*	6	AU3131	INTRODUCTION TO QUALITY MANAGEMENT*	6
			ID8316	Enhanced Placement Engineering Portfolio 1*	3	ID:8096	Enhanced Placement Engineering Portfolio 2*	3

* Delivered in a blended format

Year 3 – Standard Co-Op Option

Summer			Semester 5			Semester 6		
Core			Core			Core		
Code	Title	ECTS	Code	Title	ECTS	Code	Title	ECTS
CO4230	COOPERATIVE EDUCATION 1	30	CO4310	COOPERATIVE EDUCATION 2	30	MF4756	Product Design & Modelling	6
						DM4016	Product Automation	6
						EE4044	Communication & Network Protocols	6
						ET4224	Robotics 1: Sensors and Actuators	6
						ID:7979	Introduction to Machine Learning for Engineers	6

Year 4 : Semester 7 - B.E. Digital Mechatronic Engineering

Core			BE/ME Option (Choose 1)		
Code	Title	ECTS	Code	Title	ECTS
EE4003	The Engineer as a Professional	6	ID:8097	Project 1 Digital Mechatronic Engineering <i>(only if BE path chosen)</i>	6
ET4031	Electrical Automation	6	ET4023	Introduction to Security & Cryptography <i>(only if ME path chosen)</i>	6
CE4051	Intro to Data Engineering & Machine Learning	6			
Streams : Choose 1 Stream					
1. Digital Robotic Engineering			2. Digital Manufacturing Engineering		
Code	Title	ECTS	Code	Title	ECTS
CE4041	Artificial Intelligence	6	DM4017	Simulation Modelling & Analysis	6

Year 4 : Semester 8 - B.E. Digital Mechatronic Engineering

Core			Electives : BE/ME Option (Choose 1)		
Code	Title	ECTS	Code	Title	ECTS
RE4002	Spatial Robotics	6	ID:8098	Project 2 Digital Mechatronic Engineering <i>(only if BE path chosen)</i>	12
RE4012	Machine Vision	6	IE4248	<i>Project Planning & Control</i> <i>(only if ME path chosen)</i>	6
			EE4042	Master of Engineering Project Preparation <i>(only if ME path chosen)</i>	6
Streams : Choose 1 Stream					
1. Digital Robotic Engineering			2. Digital Manufacturing Engineering		
Code	Title	ECTS	Code	Title	ECTS
EE4216	Control 2	6	DM4006	Engineering Design	6

Year 5 : Semester 1 - M.E. Digital Mechatronic Engineering

Core (Semester 1)					
Code	Title	ECTS	Code	Title	ECTS
ID:8100	Research Project 1 (ME Digital Mechatronic Engineering)	9	DM6011	Automated System Design	6
ET4021	Electronics Life Cycle Engineering	6	ME6051	Advanced Technical Communication for Engineers	3
Streams : Choose 1 Stream					
1. Digital Robotic Engineering			2. Digital Manufacturing Engineering		
Code	Title	ECTS	Code	Title	ECTS
CE5002	Computer Vision Systems	6	DM6031	Automation & Control	6

Year 5 : Semester 2 – M.E. Digital Mechatronic Engineering

Core (semester 2)					
Code	Title	ECTS	Code	Title	ECTS
ID:8101	Research Project 2 (ME Digital Mechatronic Engineering)	12	DM6022	System Integration	6
EE5052	Robotic Sensing & Perception	6			
Streams : Choose 1 Stream					
1. Digital Robotic Engineering			2. Digital Manufacturing Engineering		
Code	Title	ECTS	Code	Title	ECTS
EE5042	Robotic Planning, Mapping & Manipulation	6	EE6452	Digital Control	6

SUPPORTS



**DIGITAL
TRANSFORMATION**



MEng Mechatronics Labs, Schrodinger building, UL



Confirm Centre - Industry 4.0 Research Labs, UL Digital District

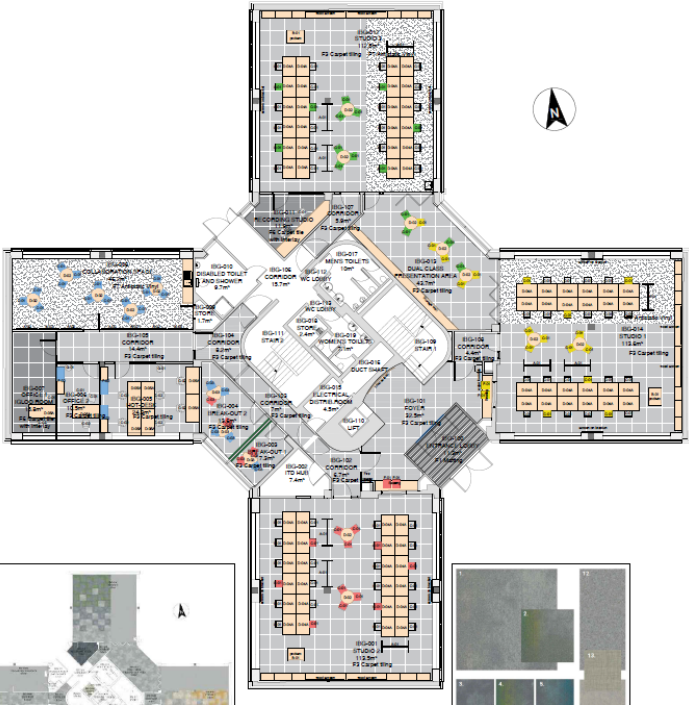


J&J Industry embedded

S&E Faculty Capital Equipment funding



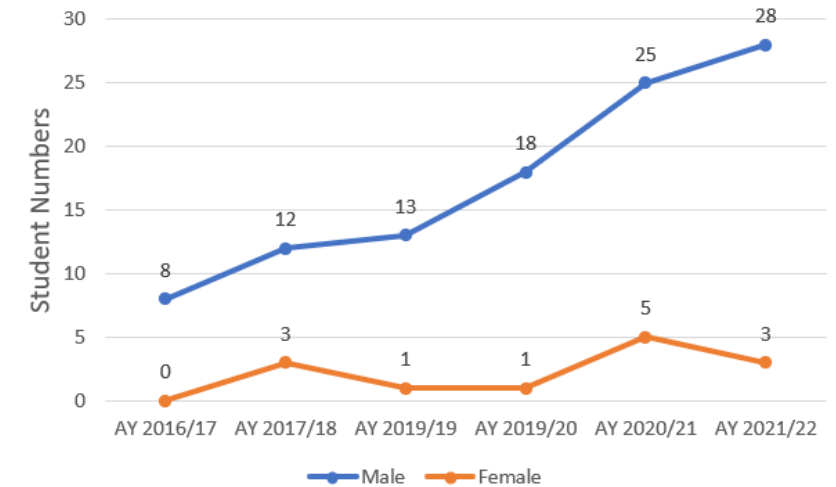
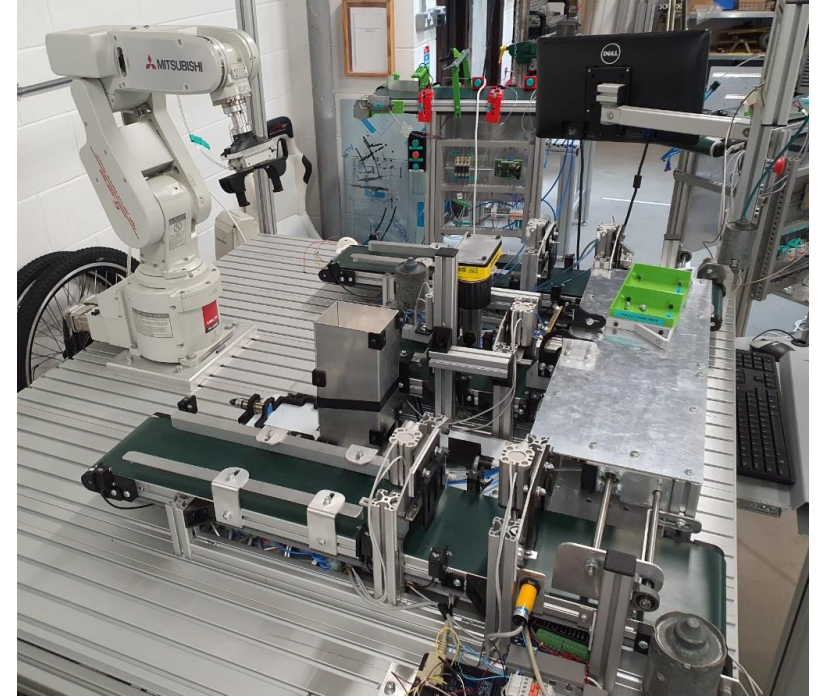
UL@Work Mechatronics Labs, IBC Block, UL (Under Construction)



MEng in Mechatronics



- Industry Experts closely involved in delivery of course
- State of the Art course
- Dedicated Lab with industry standard hardware and software modelling Industry 4.0 manufacturing systems
- Practical student work dealing with real life situations and issues
- Broad Range of knowledge and skills



Industry Consultations & Stakeholders

