



A Trans-National Smart Manufacturing Education Hub

Multiplier Event at
National Technical University of
Athens

April 25, 2023

Erasmus Plus KA203 Grant

2020-1-UK01-KA203-079283



**QUEEN'S
UNIVERSITY
BELFAST**





Project Partners

Smart-Edu4.0 Vision

- To review, investigate and develop solutions for ***managing skills gaps*** in the general manufacturing sector as we transition to factories of the future and Industry 4.0 related smart manufacturing.

Smart-Edu4.0 Objectives

1. New international curriculum model in manufacturing mechatronics
2. New degree pathways for fresh industry entrants
3. New training pathways for the current low skilled manufacturing workforce including both apprenticeship and degree programmes
4. A lifelong training pathway for the existing workforce in the manufacturing industry
5. Embedding of mobility and sustainability in the curriculum
6. Joint programme between partner institutions and beyond

Deliverables & Responsibilities

SMART-EDU4.0

05. Market Research
(QUB)

O1. Manufacturing Mechatronics UG Provision (QUB)

O6. Manufacturing Mechatronics PG Provision (QUB)

O3. CPD Training Programmes (UL)

O2. Upskilling the Workforce (SERC)

O4. Mobility and Sustainability (NTUA)

Partners' Profiles

QUB

- **Development of new UG and PGT programmes in Manufacturing Mechatronics**
- Management and Delivery
- Scoping and Market Research

SERC

- **A joint vocational/higher education pathway for further and higher education (upskilling)**
- Foundation pathways (vocational market)
- Scoping and Market Research

A UK Russell Group research intensive university with a strong track record attracting significant amount of research funding from both EU and non-EU sources. The Centre for iAMS, comprises an interdisciplinary team of researchers working together to develop innovative technologies and solutions to address the challenges of Industry 4.0.

SERC is a large, dynamic regional FE College in Northern Ireland with 1,100 employees and 32,000+ enrolments, helping them to achieve over 20,000 qualifications and over 2,000 work placements every year.

Partners' Profiles

UL

- **New CPD programmes in Smart Manufacturing**
- Scoping and Market Research
- Development of UG and PGT Programmes in Manufacturing Mechatronics

NTUA

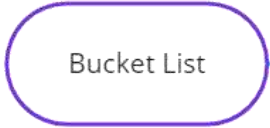
- **Embedding mobility and sustainability across all programmes**
- Curriculum design in Industrial IoT
- Scoping and Market Research

The CONFIRM Centre at UL for Smart Manufacturing focuses on the application of digital innovation across the manufacturing value chain to foster growth and competitiveness in the Irish manufacturing industry and enable Irish based manufacturing companies to compete within the rapidly changing global landscape.

NTUA is the oldest and most prestigious educational institution of Greece in the field of technology. The NETMODE group is involved in research areas including management, planning, and design of heterogeneous broadband networks in areas such as SDNs, IoTs, mobile edge computing, data analytics, performance evaluation of stochastic systems etc.

Bucket List

Smart-Edu4.0



- UG, PG and beyond CPD training
- International collaborations
- Multi-language programmes
- Talent development
- Gap analysis
- Augmented reality
- Future proofing
- Open source h/w and s/w developments shared creativity
- Stakeholder engagement industrial placements
- Use of machine learning in the training material
- Cross disciplinary
- UN SDGs

Joint Offering

Smart-Edu4.0

Joint Offering

Dual/joint degree programmes

Blended learning

Staff/student exchanges

Joint co-teaching

Joint project supervision

Industrial/Academic joint supervision

Industrial Involvement

Smart-Edu4.0

Industrial
Involvement

Industry-informed content

Industrial placements

Guest lectures

Industrial advisory board

Professors in practice

Industrial project co-supervision

Short Courses

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Short Courses

Short accredited CPD courses (2 day - 1 week)

Practical training courses

Blended learning

online

inhouse

jointly taught

Train the trainer courses

Exposure training courses for secondary school staff

Industry 3.0 courses

Away week to master basic practical skills

Summer schools

Bridging courses

e.g. Mathematics crash course

Industry 4.0 clubhouse

New Partners

Smart-Edu4.0

New Partners

New partnerships in China and Germany

Industry 4.0 clubhouse community

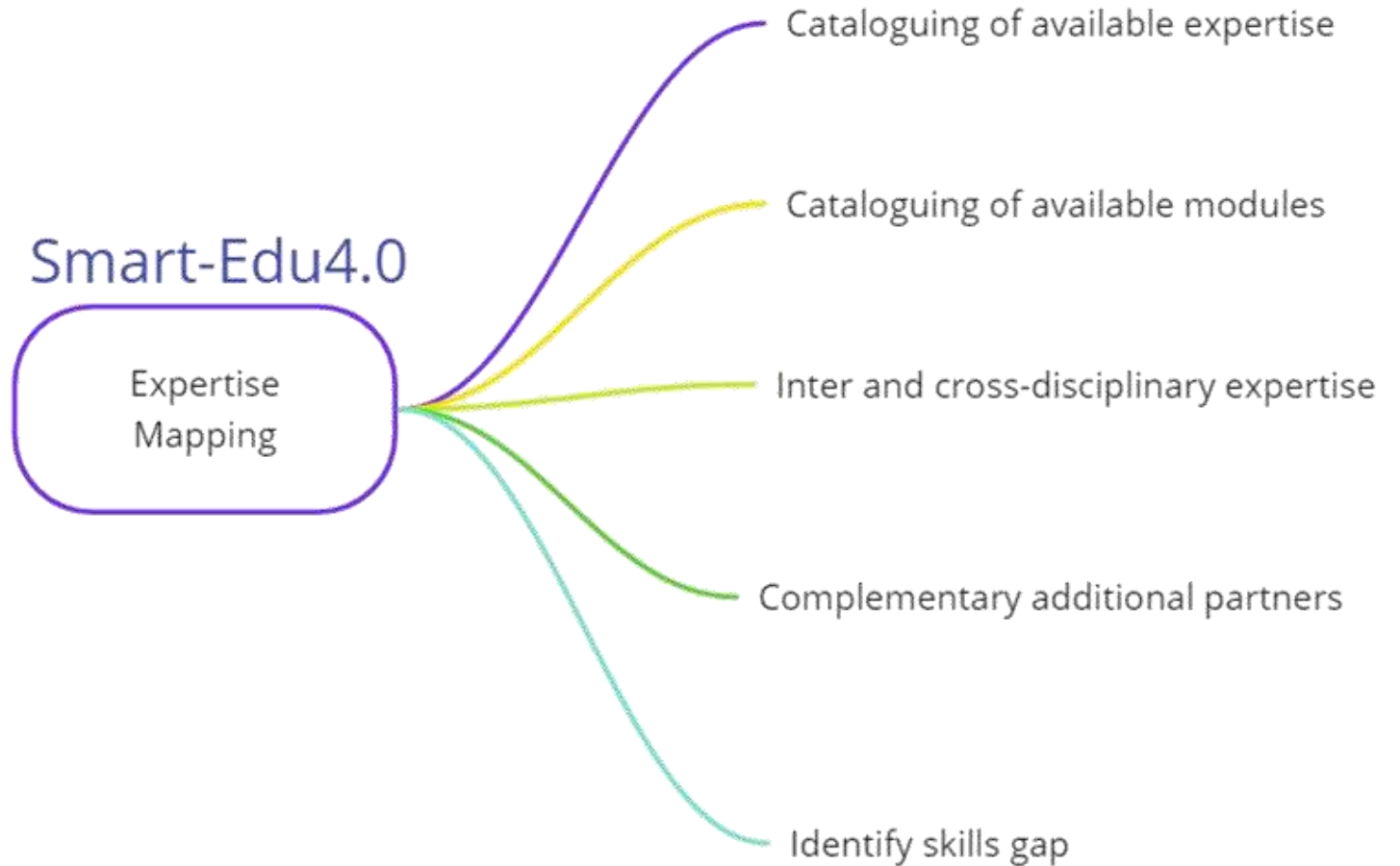
Identify statutory bodies

Informal/formal partnerships

Partnerships in other disciplines outside Industry 4.0 (soft skills)

Expertise Mapping

Smart-Edu4.0



Standardisation of IOs

Smart-Edu4.0

Standardisation
of IOs

Understanding accreditation in each jurisdiction

Taxonomy creation with common terms in each IO

Shared model for content development

Work towards MoAs, MoUs

Project Website (<https://smartedu40.eu/>)

- [Market Research Report for Industry 4.0 Related Undergraduate, Postgraduate and Training Programmes](#)
- [Sustainability Strategies of the Involved Institutions and Corporate Partners \(Intermediate Report\)](#)
- [Mobility Strategies of the Involved Institutions and Corporate Partners \(Intermediate Report\)](#)

Industrial Survey for Mechatronics Engineering Programme



Industrial Survey: Mechatronic Engineering Programme at Queen's University Belfast



Mechatronics is defined as the "Technology combining Electronics and Mechanical Engineering".

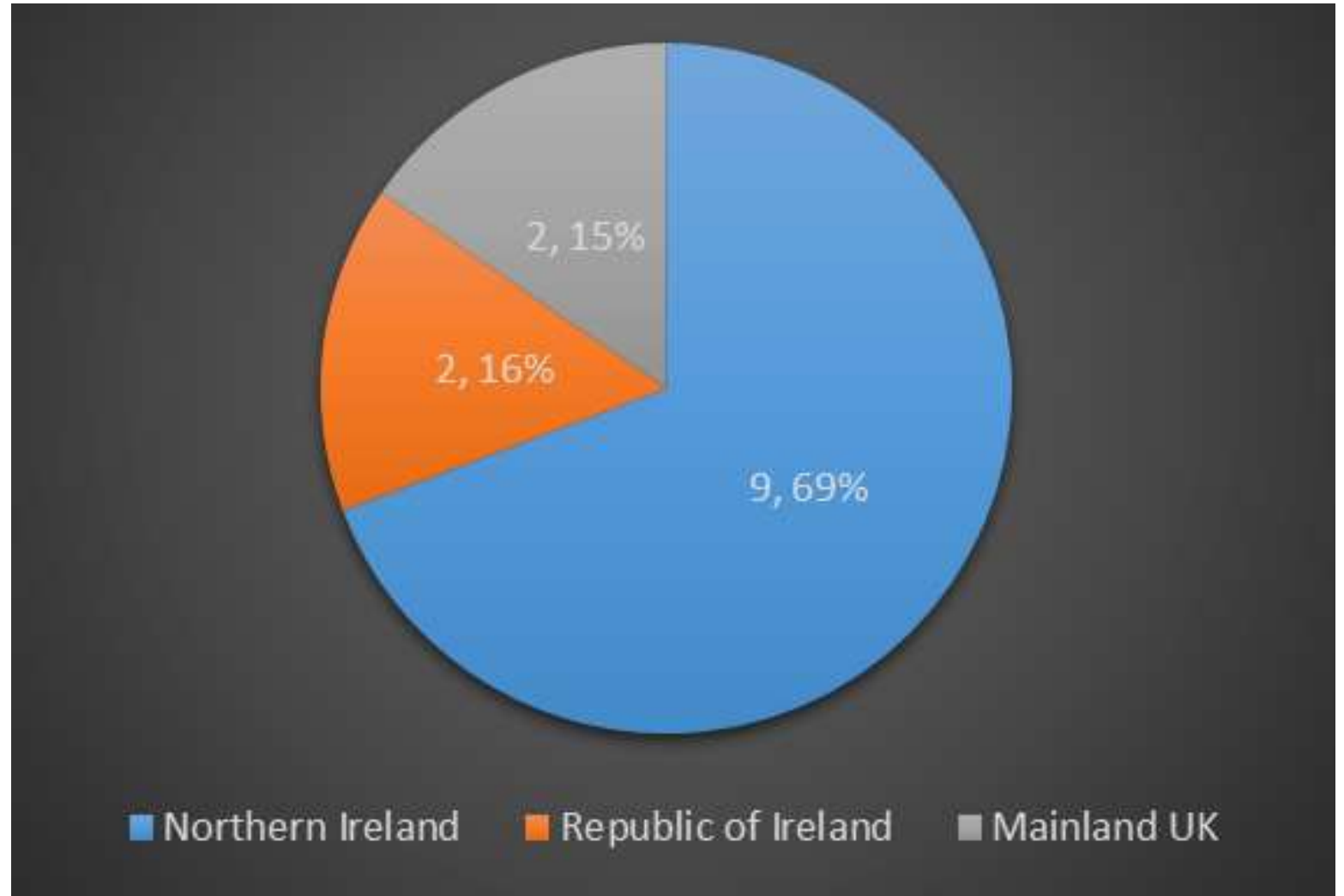
Queen's University Belfast is planning to launch a new Engineering programme related to Mechatronics and Robotics. This survey aims to understand the needs of your Industry, in relation to Mechatronics and Robotics, gauge interest in potential engagement activities, and gain insight on employability of graduates with a Mechatronics and Robotics degree.

The survey will be completely anonymised and any identifiable information will be removed for public dissemination. We will not ask your date of birth or any other personal information such as your address.

The survey has a maximum of 25 questions and should only take 3-5 minutes to complete. Any queries may be directed to smart-edu4.0@qub.ac.uk



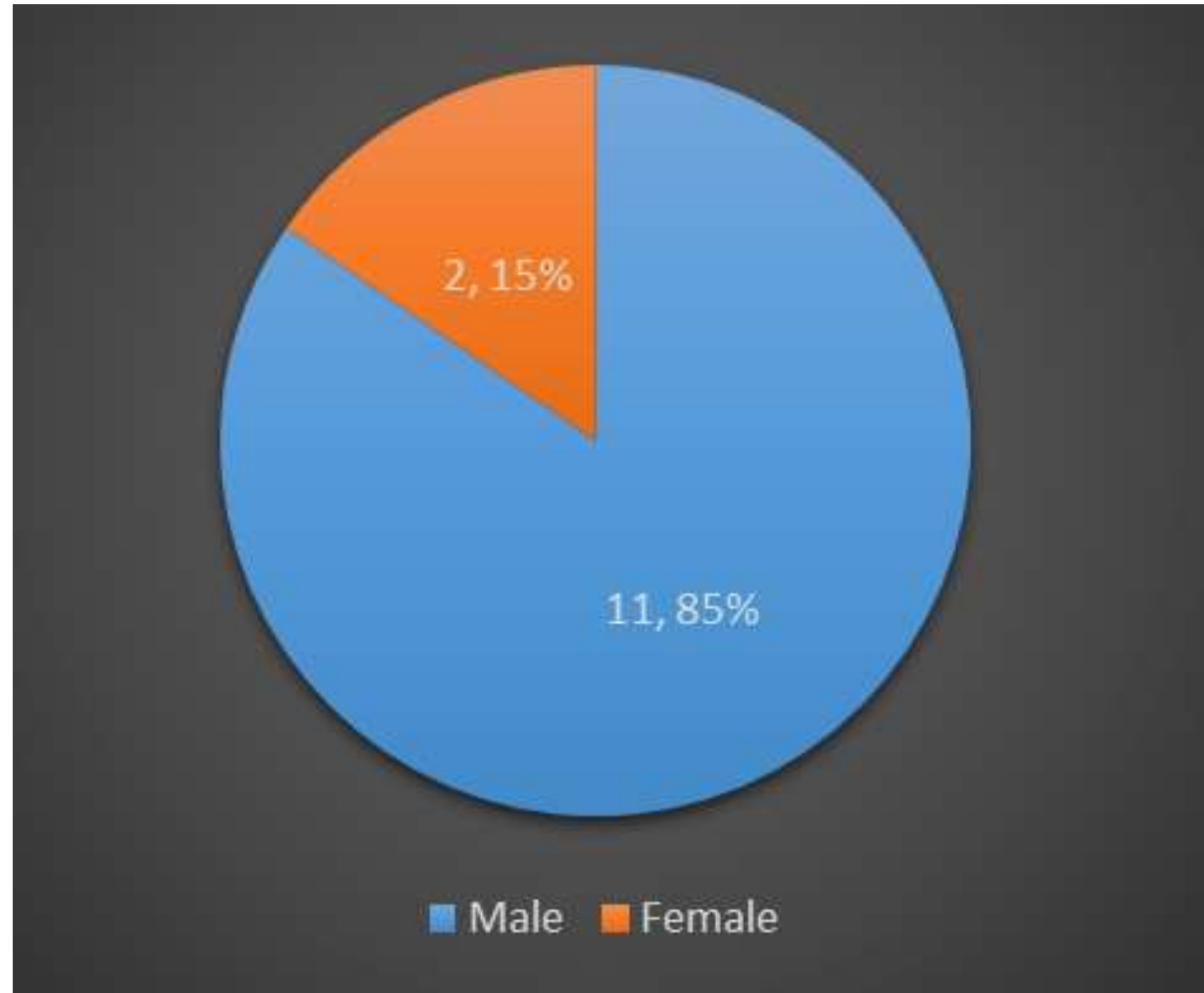
Where are
you
based?



Could you please give a short description of your company.
What do you do and in which sector are you working?

1.	Electric Power Sector. Our Company manufacture Prime & Standby Diesel Generator Sets.
2.	Manufacturing. Plastic moulding. Supplying aerospace, medical, automotive, building, military and hair brushes
3.	Defence sector, multi-domain engineering, R&D and system management, specialising, but not limited to close range super sonic missile systems.
4.	FPGA based Accelerator cards for Datacenter applications
5.	professional services firm which provides design, engineering, architecture, planning, and advisory services.
6.	Financial Technology. DevSecOps for a Global Trading company
7.	I work in the oil and gas, petrochemical, pharmaceutical industry covering inspections and maintenance work as a technician.
8.	We are a Bakery supplying baked goods into the NI, ROI, GB and EU markets. We supply both ambient and frozen products across a range of Pan Bread, Muffins, Rolls, Fruit Bread, Irish Soda Bread, Morning goods, Cakes and buns
9.	Electrical mechanical engineering, PLC Programming, Bespoke data collection, Control Panel design and manufacture, component sales Electrical , PLC, and pneumatics all supported technically. All sectors Aero space, Food and Beverage, Pharmaceutical, Agricultural.
10.	PID Tuning and Monitoring Software for the Process Manufacturing Industries
11.	Manufacturer and supplier of DC drive systems for medical, aerospace, automotive, mobility and industrial automation industries. Maxon also have a battery department for low volume production. Ceramic Injection and Metal injection moulding ,
12.	Automation sales
13.	Specialised Distributor

What is
your
gender?



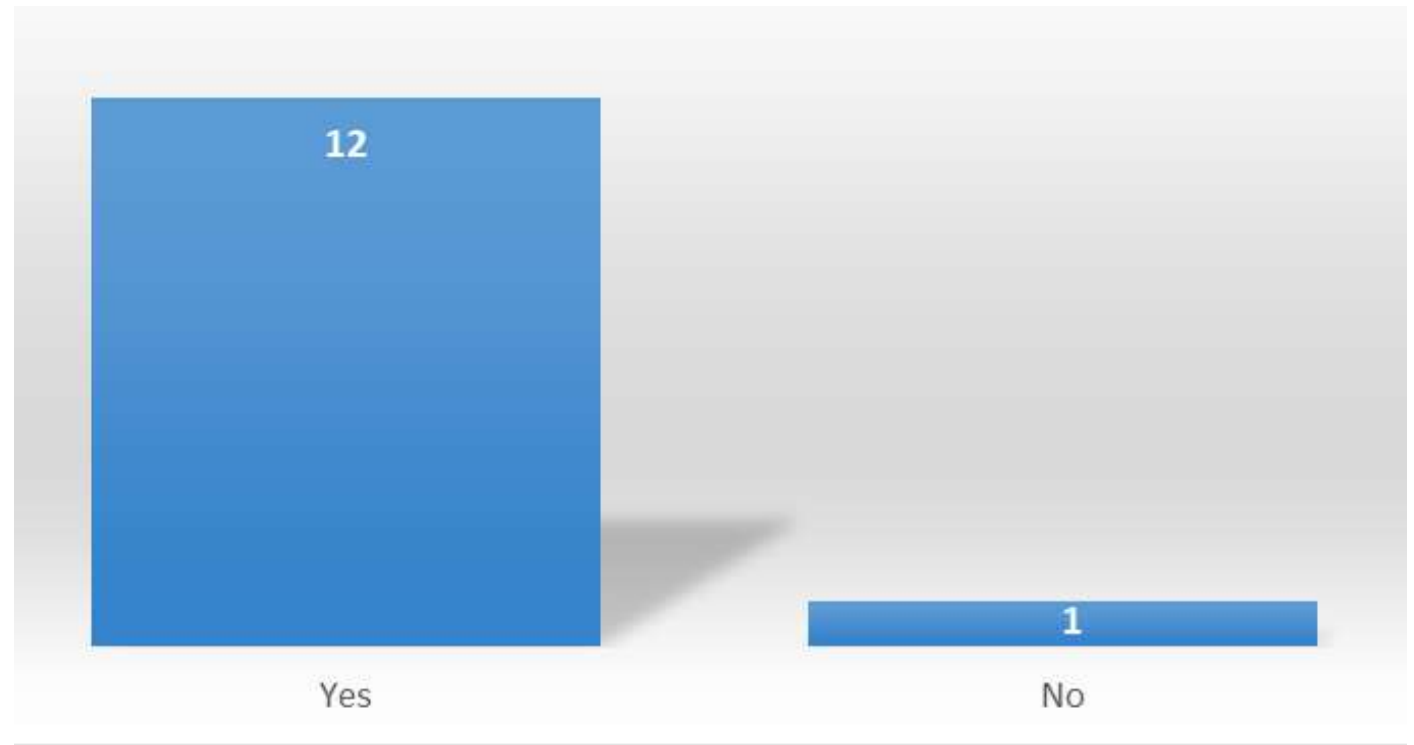
Could you please give a short description of your company. What do you do and in which sector are you working?



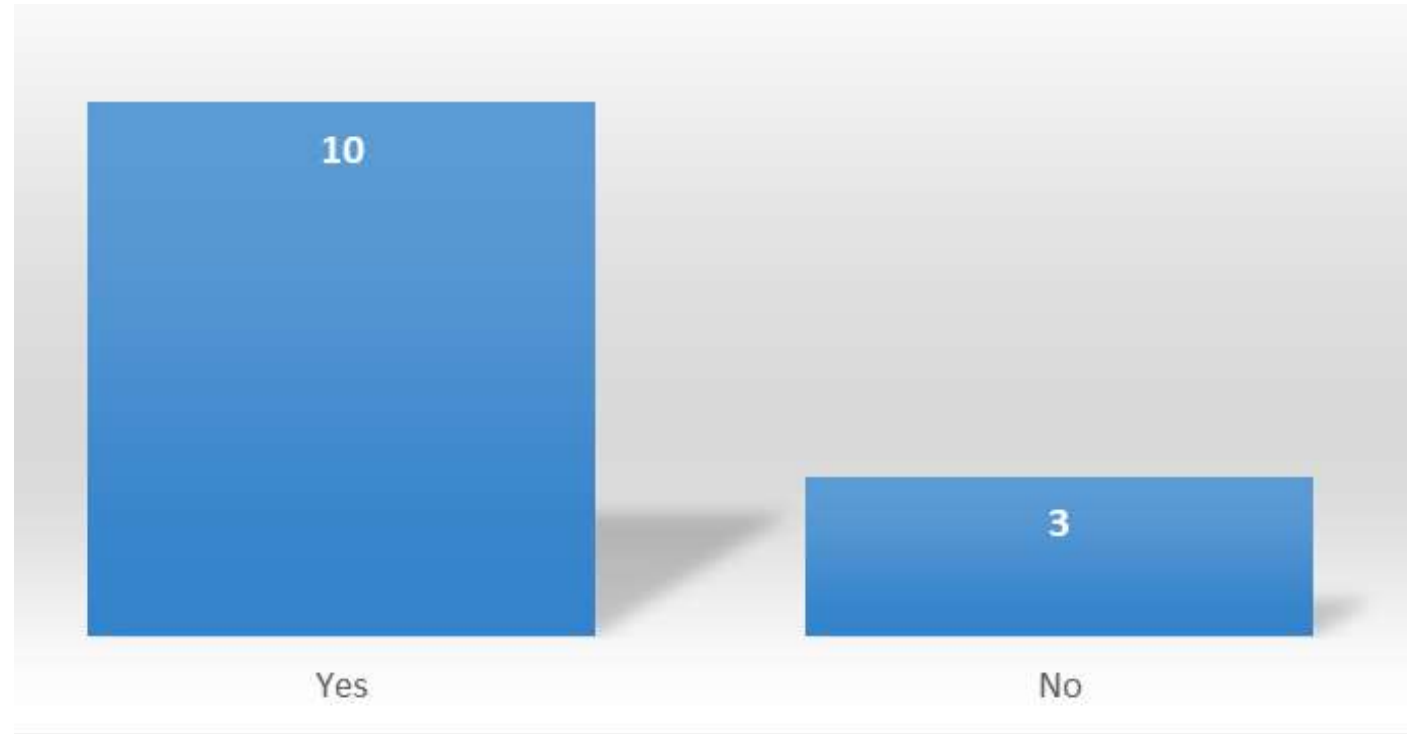
Please tell us of any software/programming languages you work with in engineering and related tasks. (e.g., Matlab, Python).

Machine Expert
EtherCAT interface
GX
Mitsubishi
soft and hardware
HTML
Matlab
VB script
Vimeo Designer
interface
Python
VHDL
Visual C
Operator Interface
Schneider Control
Visual C++
Schneider Operator
MS
Statement list
programming - unsure

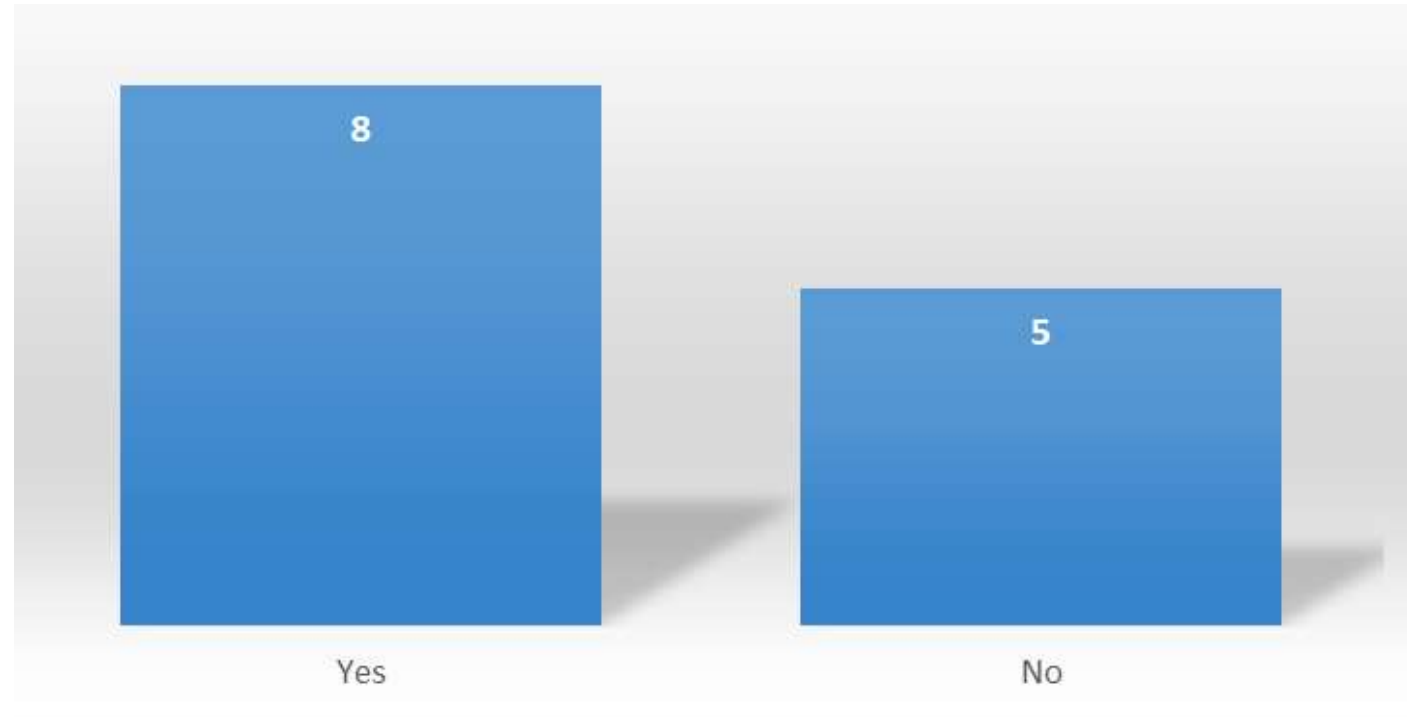
Have you
heard of
Mechatronic
Engineering
before?



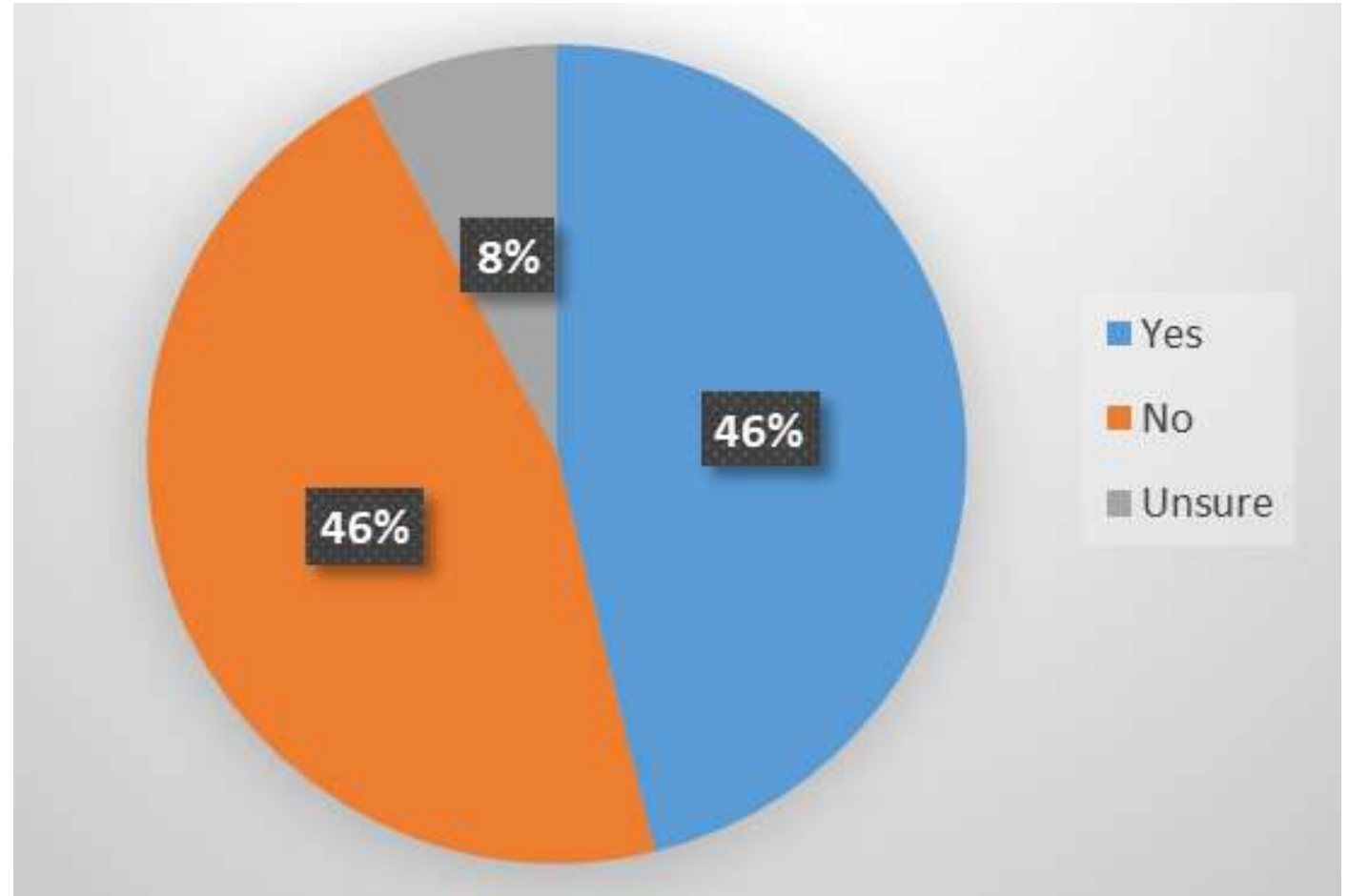
Are you familiar with the term Internet of Things (IoT)?

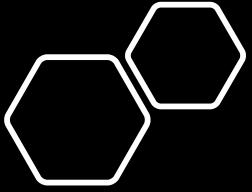


Are you familiar with the term Industry 4.0?

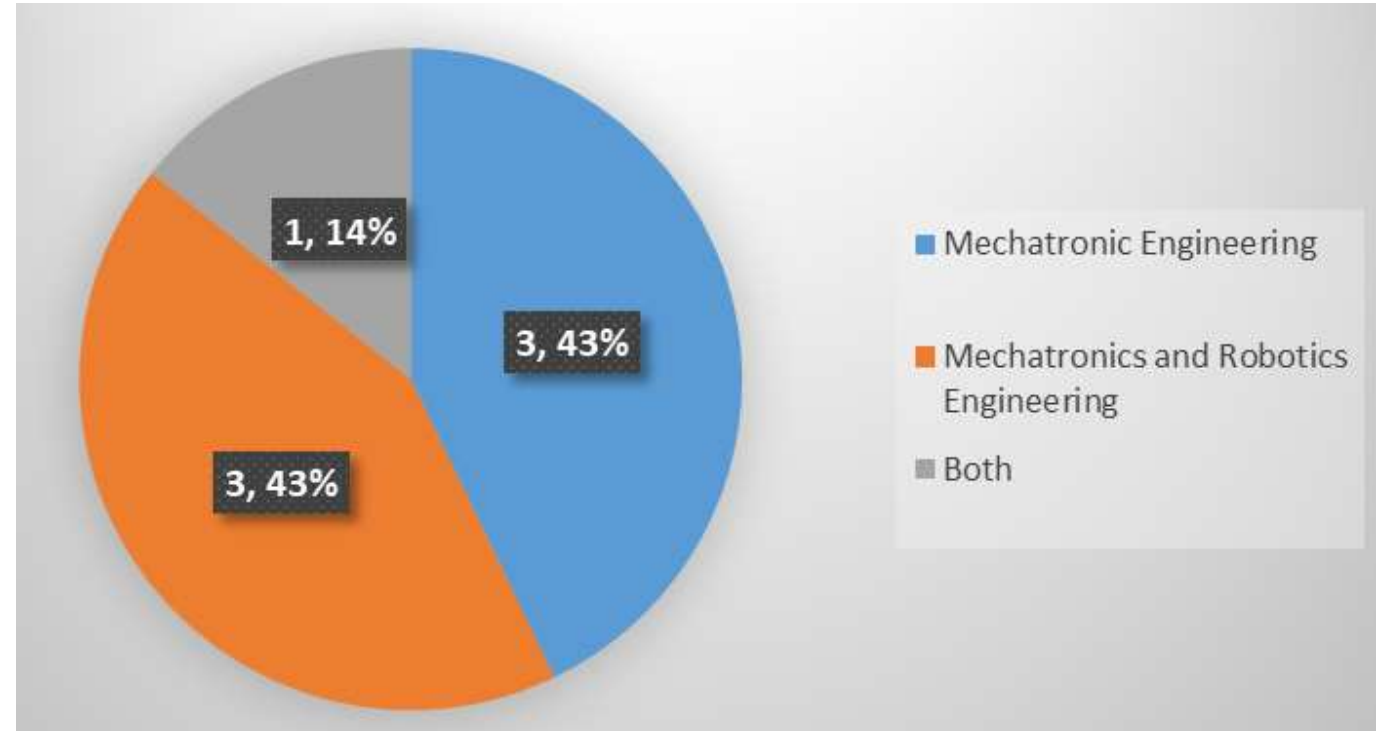


In general, do you consider a Mechatronics /Robotics Engineer suitable for your company?

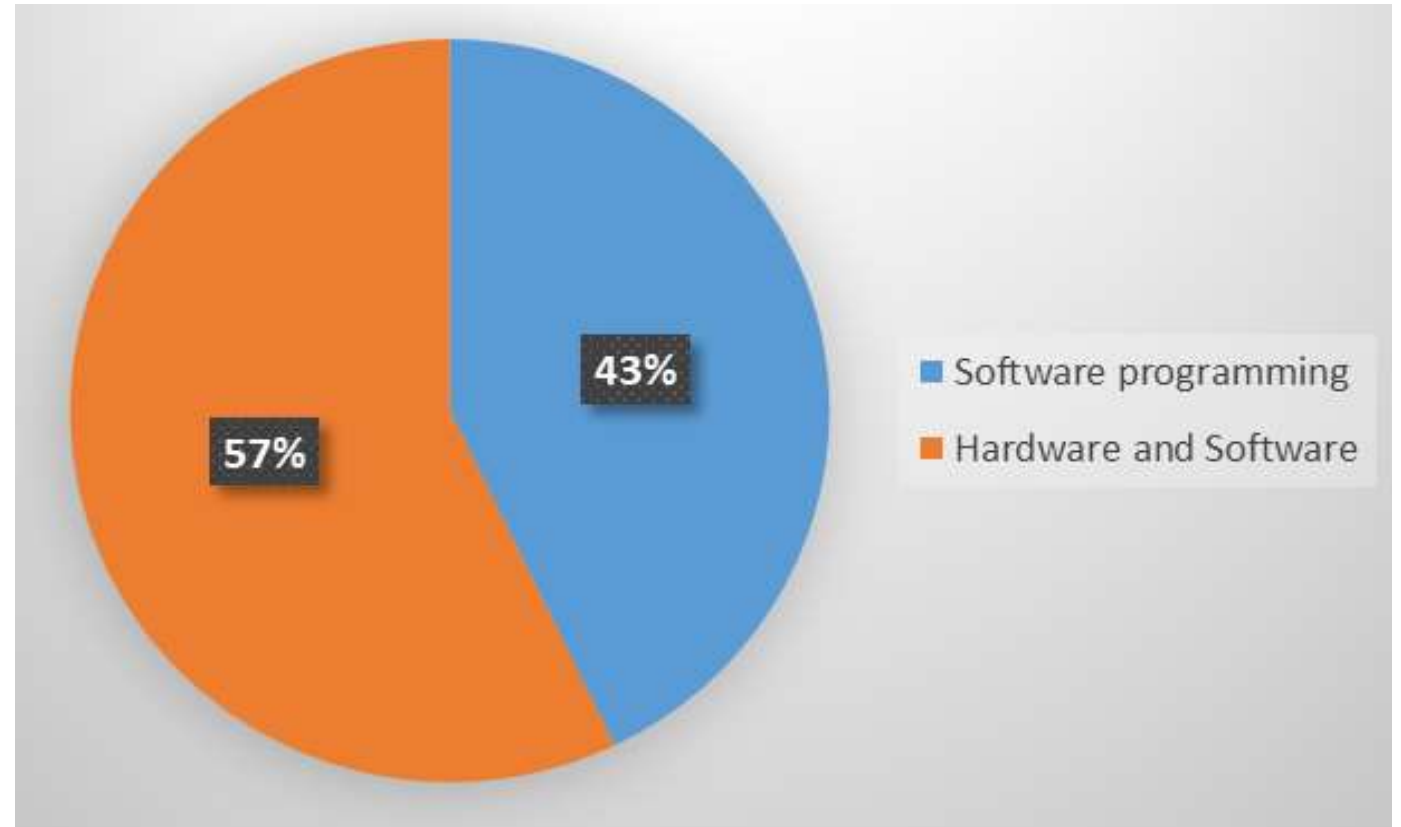




Which title
would you
prefer?

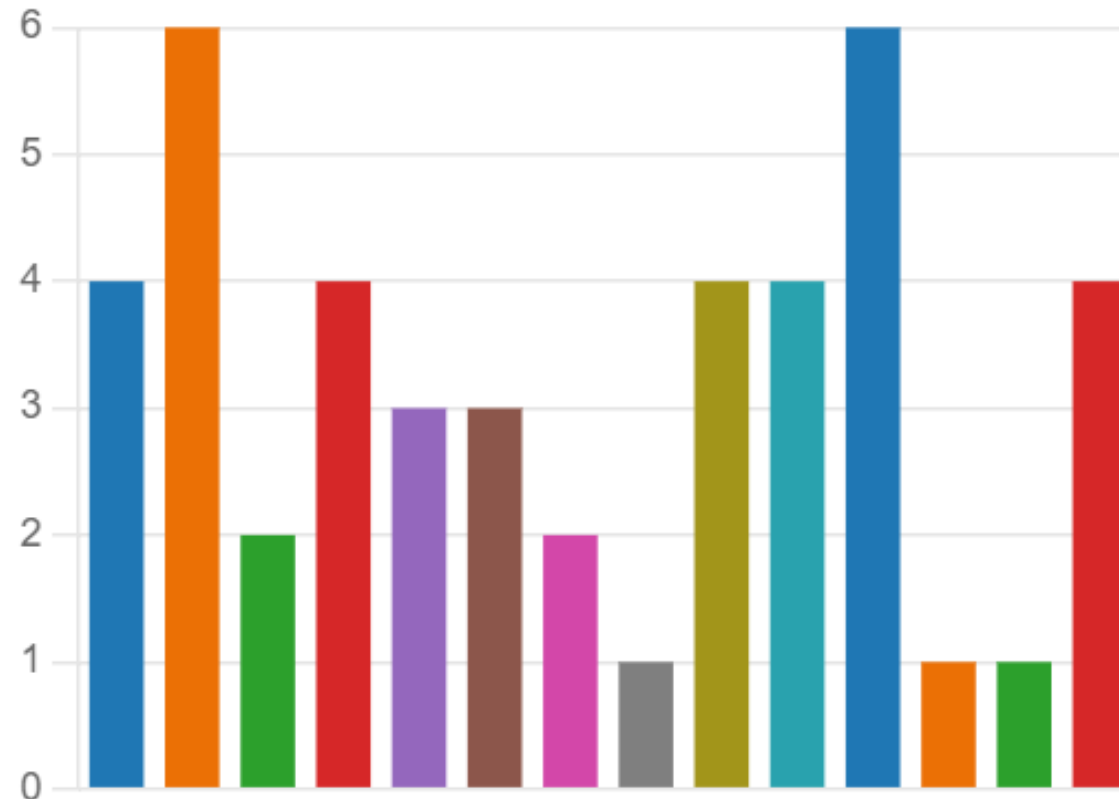


Which aspect of the course would be of most interest to your company?



Which skills are you more keen for students to gain as part of this programme? Select all that apply.

- Embedded Systems 4
- Automatic Control Systems 6
- Manufacturing Engineering 2
- Wireless Communications 4
- Electrical Power/ Energy 3
- Machine Learning / Artificial Int... 3
- Databases and Algorithms 2
- Robotics 1
- Mathematics 4
- Sustainable Engineering 4
- Programming 6
- Computer Architecture 1
- Entrepreneurship for Engineers 1
- Other 4



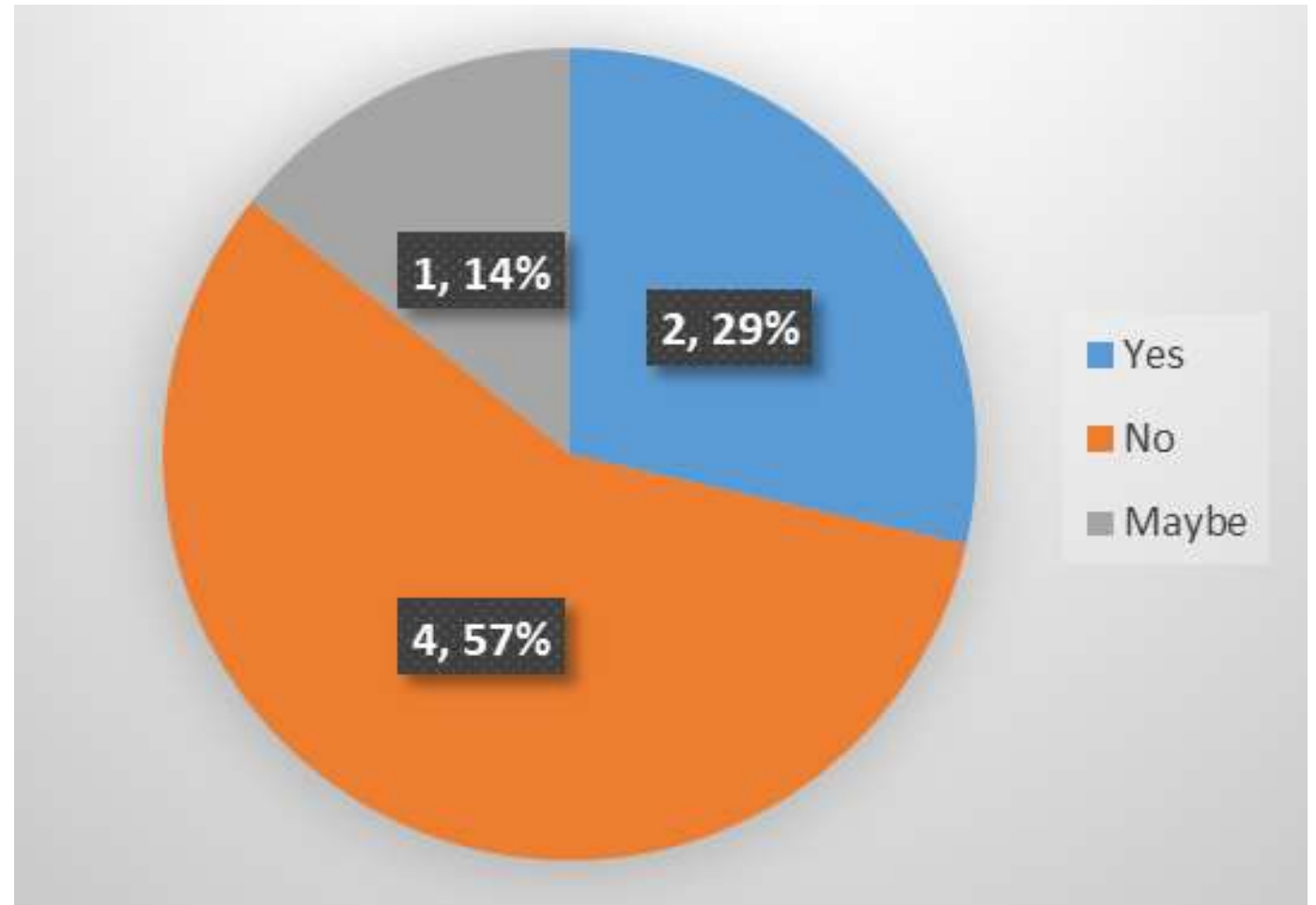
Please specify additional graduate skills preferences.

ID ↑	Name	Responses
1	anonymous	Practical experience not just theory. Communication skills to be able to explain the systems and what he needs others to do to ensure projects are a success
2	anonymous	Soft skills - being capable of working as a multi-disciplinary team
3	anonymous	I completed the Siemens mechatronics 1st certificate and would love to progress onwards
4	anonymous	n/a
5	anonymous	Process Control

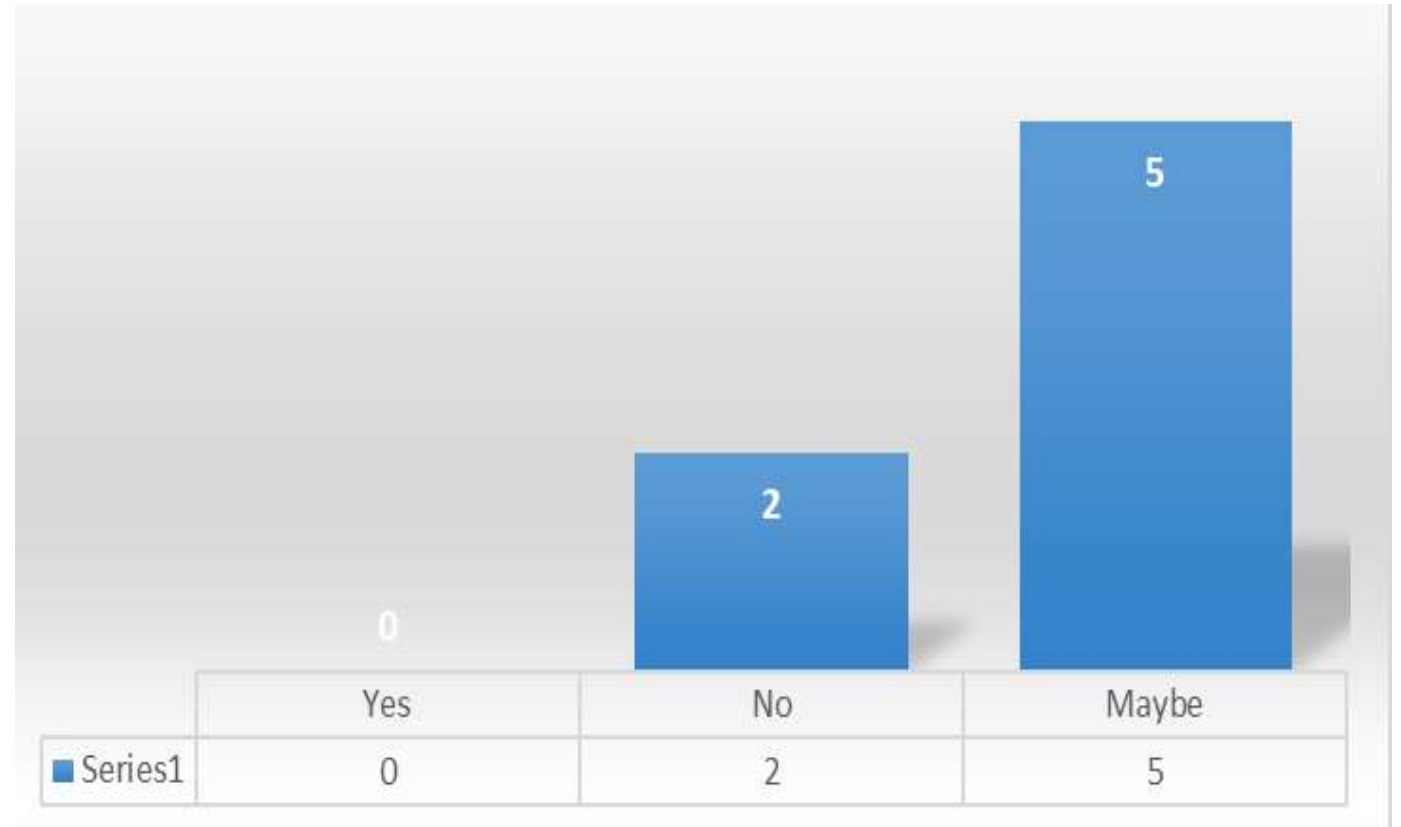
What do you identify as the biggest skills gaps between the knowledge of fresh engineering graduates and the needs of your industry?

ID ↑	Name	Responses
1	anonymous	Practical experience in the implementation of ideas into workable items/ projects
2	anonymous	There isn't so much a skills gap but more a retention problem with fresh graduates. I feel that they can become wrest-less very easy if not continually challenged and can get quickly frustrated with the bureaucracy in the industry.
3	anonymous	Use of software required in industry , e.g. Revit, AutoCad, Dialux, Amtech etc
4	anonymous	Maintenance - repetitive common failures are not really addressed
5	anonymous	Understanding the process of the Company. Every industry is different and with baking there would need to be an acceptance on how this works before integrating mechatronic engineering
6	anonymous	Practical knowledge and skills
7	anonymous	Programming

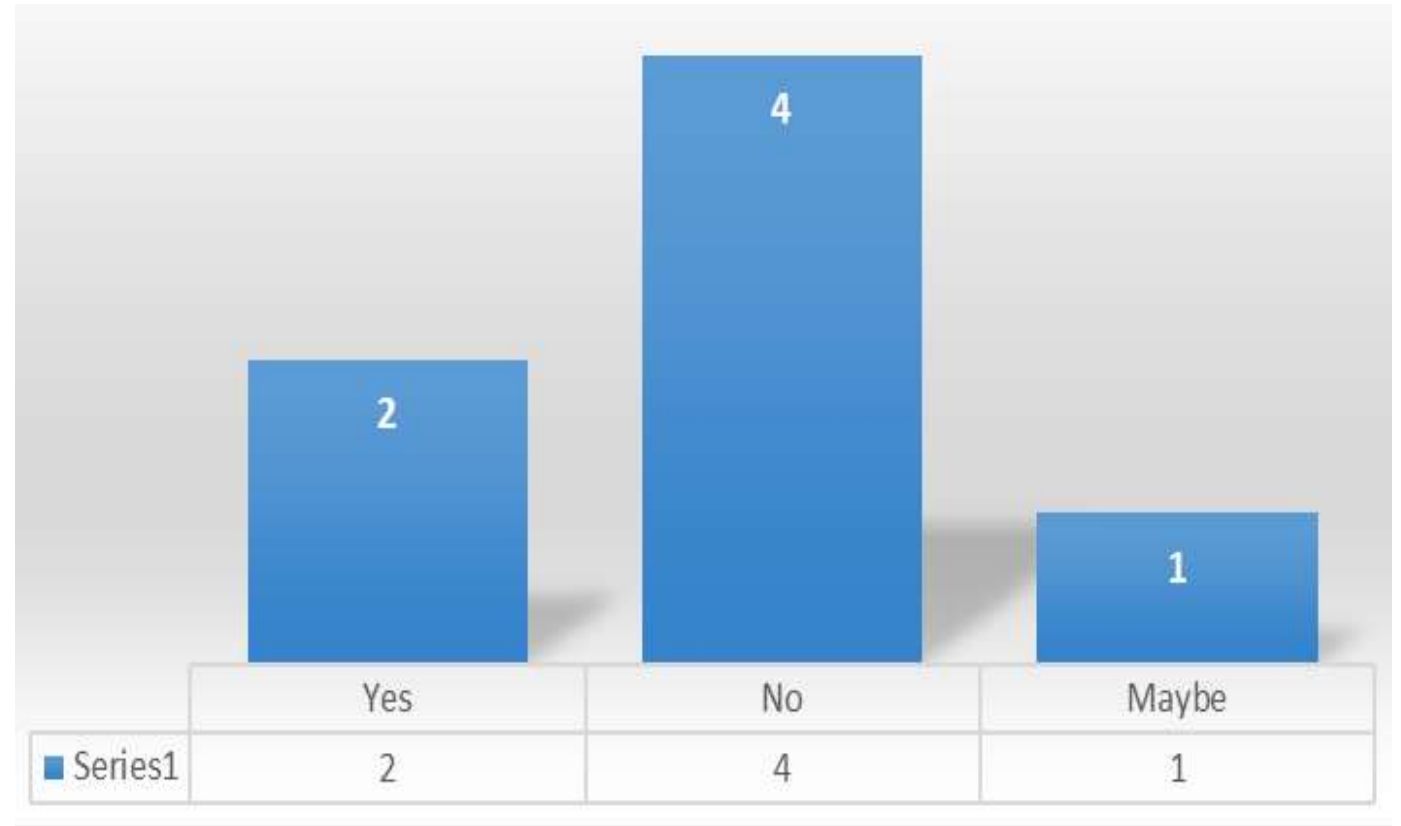
Would you be willing to be part of the Professional Advisory Board being setup for this programme at Queen's University Belfast?



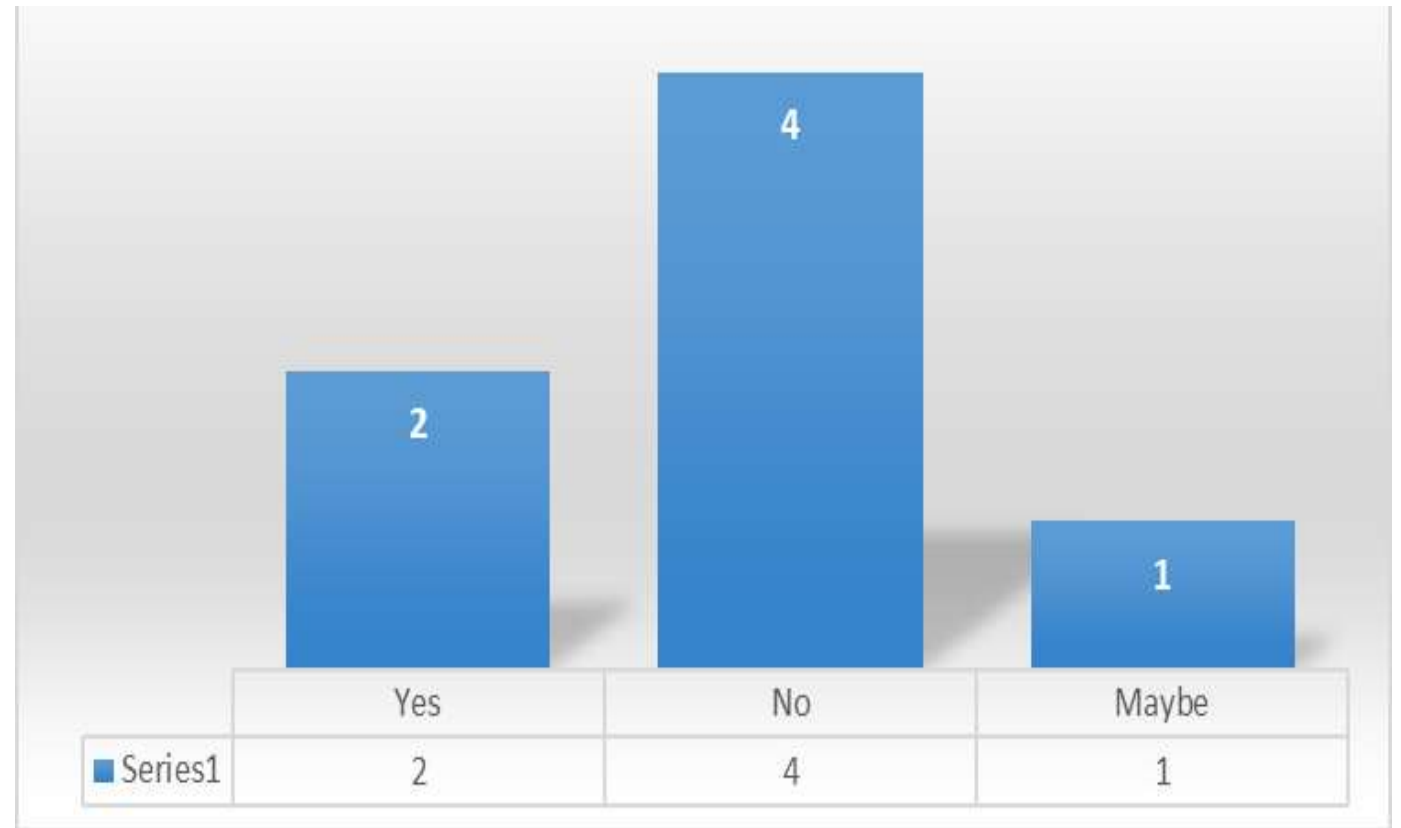
Would your company be willing to participate in specialist teaching activities such as guest lectures and seminars?



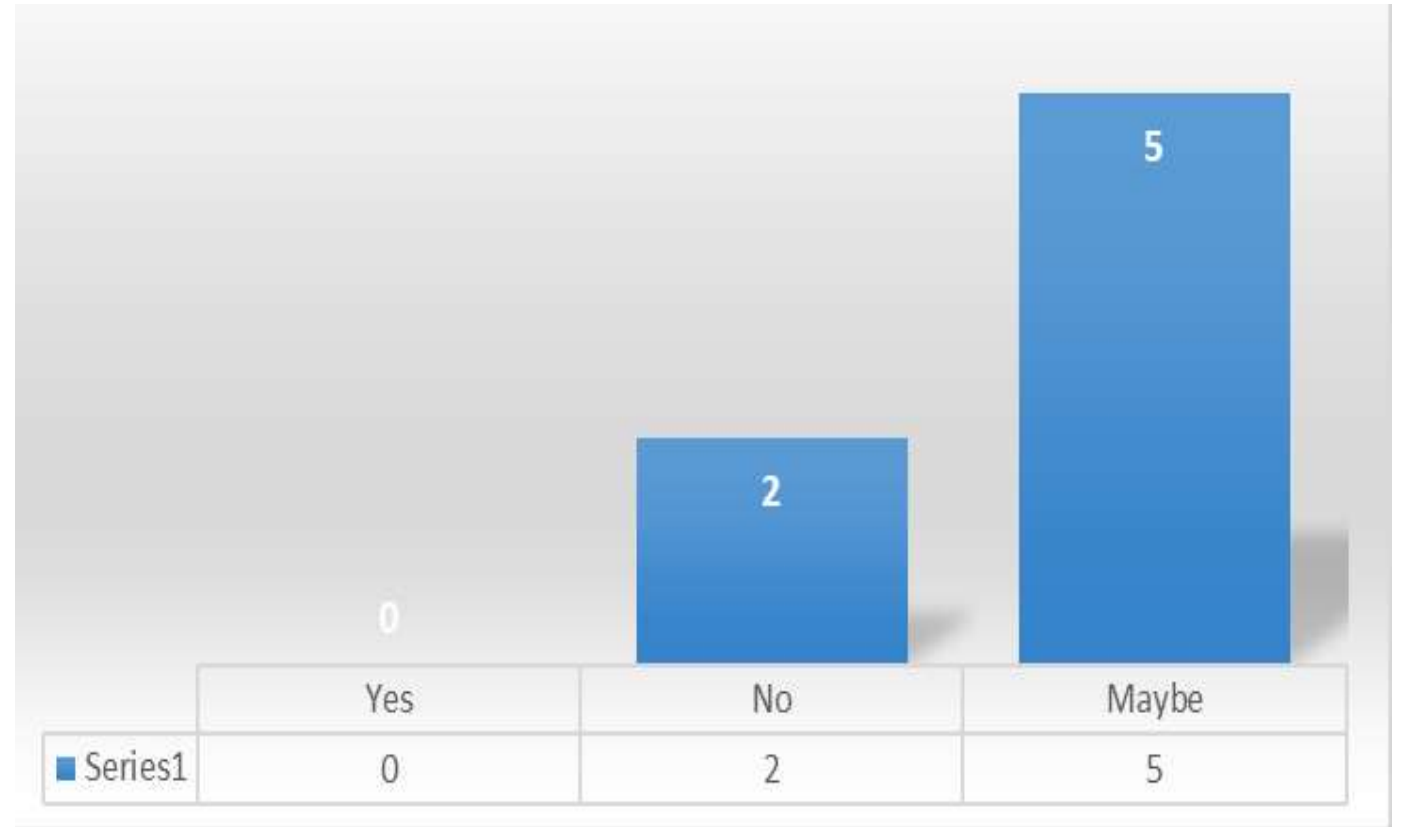
Would your company be willing to participate in the supervision of student projects (jointly with an academic supervisor)?



Would your company
be willing to facilitate
industrial visits for
Mechatronic
Engineering
students?



Would your company be willing to provide placement opportunities for students on the Mechatronics programme?



What types of job roles does your company have now, or have planned for the future, that could benefit from having graduates with Mechatronics and Robotics skill sets?

ID ↑	Name	Responses
1	anonymous	Process Engineers role
2	anonymous	Modelling and auto-coding of control and behaviour for the actuation of autonomous systems which consist of an array of sensors and actuation systems
3	anonymous	n/a
4	anonymous	Maintenance engineers covering pneumatic, hydraulics, PLC , programming and electronics
5	anonymous	We are at the start of a journey of introducing robotics into the business. We see this as a strategic growth opportunity and in doing so we need the in-house expertise to manage this process.
6	anonymous	PID Tuning and Monitoring Software installation engineer
7	anonymous	Mechanical Engineering, Mechatronics, Automotive Engineering, Electrical Engineering etc.

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