Programme Specification

Master of Science (Industrial Automation and Instrumentation Control)

General Information

Awarding Institution: ECT (Engineering College of Technology)

Modes of Delivery: Online, Full-time & Part-time.

Course Title: Master of Science (MSc) Industrial Automation and Instrumentation Control

Interim Award Titles (Exit Awards):

- **Postgraduate Certificate (PGCert)**
- **Postgraduate Diploma (PGDip)**

Programme Overview

The Master of Science (Industrial Automation and Instrumentation Control) has been developed in close consultation with industry stakeholders to address current and emerging technologies in the rapidly evolving field of industrial automation. The programme comprises of eight modules including elective options and a substantial project thesis, equipping graduates with the technical knowledge, applied skills and professional competencies required to excel in process and manufacturing environments.

The programme is ideally suited to engineers from disciplines such as electrical, electronics, mechanical, instrumentation & control, or industrial computer systems engineering and is particularly relevant for professional aiming to transition into or advance within automation roles across industry sectors.

The initial modules build core expertise across the discipline. Industrial Automation Introduction equips students with a contextual understanding of automation systems, technologies, and integration approaches. Programmable Logic Controllers (PLCs) explores in-depth the architecture, programming, networking, and application of PLC systems in industrial environments. Industrial Process Control Systems combines control theory and modelling with applied knowledge of system architecture and software tools used to implement control strategies in both continuous and batch operations. Industrial Instrumentation examines key measurement techniques, transducers, and the use of microprocessor-based devices to deliver robust and reliable monitoring systems. Industrial Data Communications develops proficiency in contemporary industrial networks, including fieldbus protocols and industrial wireless systems.

In the later stages of the programme, SCADA and Distributed Control Systems (DCS) explores system architecture, configuration, and evaluation of commercially available platforms, enabling students to assess suitability for different industrial applications. Advanced Process Control focuses on multivariable and predictive control systems, algorithm design, and application in dynamic and complex industrial settings.

Throughout the programme, themes of ethical engineering practice, data protection and cybersecurity, sustainability, and equity, diversity and inclusion (EDI) are embedded within technical modules, project-based learning and industry-relevant case studies. These elements ensure that graduates are equipped not only

with technical expertise, but also with the professional judgement and social awareness required in contemporary engineering environments.

The programme culminates in a Project Thesis, an independent, research-led investigation requiring critical thinking, technical depth, and reflective professional practice. As a significant component of the programme, the thesis facilitates the application of advanced knowledge and skills to a novel engineering challenge. Students are expected to demonstrate ethical responsibility, personal accountability, data integrity, and a strong awareness of social and environmental impact, while also applying inclusive design and risk-aware methodologies. This integrative project ensures graduates are well-prepared for advanced roles in automation, instrumentation, and control engineering globally.

Programme Aims

- Provide students with advanced knowledge and understanding of key topics in Industrial Automation and Instrumentation Control.
- Develop practical and transferable skills in research, problem-solving, and knowledge acquisition.
- Prepare students for professional careers in industrial automation by equipping them with technical expertise and teamwork skills.
- Foster awareness of professional responsibilities, including ethics, data security, sustainability, and inclusive practices.
- Encourage creative and systematic approaches to solving complex engineering problems across diverse industrial environments.
- Offer opportunities to apply learning through a substantial research project that contributes to knowledge and practice in the field.
- Support progression to further study or professional recognition, including pathways to Chartered Engineer* status.
  **Subject to successful accreditation*

Programme Learning Outcomes (PLOs)

Graduates of this programme will be able to demonstrate the following learning outcomes:

1. Demonstrate a comprehensive understanding of the scientific and engineering principles and apply underpinning natural, physical and engineering sciences, mathematics, statistics, computer and information sciences to identify, formulate and solve complex engineering problems in industrial automation.
2. Apply a deep and broad understanding of core and specialist knowledge in industrial automation engineering, while incorporating risk management, security protocols and ethical responsibility into engineering professional practice.
3. Critically reflect on and synthesise engineering knowledge to plan and execute research-based projects or design led projects in industrial automation and instrumentation control, demonstrating awareness of evolving trends in risk assessment and security challenges within the field.
4. Demonstrate comprehensive knowledge of engineering design practice and understand the scope, principles, norms, accountabilities and bounds of sustainable engineering practice, and social and environmental responsibility in the industrial automation context.
5. Apply systematic approaches, design processes and established engineering methods, tools, techniques and resources, underpinned by hazard and risk framework considerations to conduct and manage industrial automation engineering projects.
6. Communicate complex technical ideas, design concepts, and research outcomes clearly and effectively to diverse audiences, including conveying complex risk, security and ethical considerations in an accessible manner.
7. Engage proactively in lifelong learning and reflective practice, demonstrating initiative and intellectual curiosity, and apply creative and innovative thinking to develop original and sustainable solutions to real-world engineering challenges.
8. Critically evaluate, manage, and use information and data responsibly, demonstrating professional integrity, data security awareness, and compliance with relevant engineering codes and digital governance frameworks.

9. Demonstrate autonomy, adaptability, and accountability in professional decision-making, exhibiting sound judgement informed by technical expertise, ethical values, and a commitment to inclusive, responsible engineering practice.
10. Work effectively in diverse, cross-disciplinary and intercultural teams, showing leadership and collaboration skills while actively fostering a professional culture that supports equity, diversity, inclusion (EDI) and robust risk-aware engineering practices.

Programme Learning Outcome Mapping

Programme Learning Outcomes: Level 7	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
MIAI711	X	X	X	X	X	-	-	X	X	X
MIAI712	X	X	X	-	X	X	-	X	X	-
MIAI713	X	X	X	X	X	-	X	X	-	-
MIAI714	X	X	X	X	X	-	-	X	-	-
MIAI715		X	-	-	X	X	-	X	X	-
MIAI716	-	X	X	-	X	X	-	X	X	X
MCSX700	X	-	X	-	-	X	X	X	X	X
MSPT701	X	X	X	X	X	X	X	X	X	X
Optional Electives										
ELEC725	X	X	-	X	X	-	X	-	-	-
ELEC724	X	X	-	X	X	X	X	X	-	X
ELEC723	X	X	-	-	X	-	X	X	-	X
ELEC726	-	X	-	X	X	X	-	-	X	X
MIAI717	X	X	X	X	X	-	X	X	X	-
Workshops and Industry Experience Units										
PRAC005	X	-	X	X	X	X	X	X	X	X
INDX002	X	X	X	X	X	X	X	X	X	X

Programme Structure

Students must complete 180 credits comprising 8 modules and one capstone Project Thesis. The Project Thesis has 60 credits, and all other modules have 15 credits each.

There are 5 optional elective modules for students to choose from in Trimester 2 (FT) Trimester 4 (PT).

The Master of Science (Industrial Automation and Instrumentation Control) can be completed within the following registration periods:

Full time: minimum of one-year, maximum of two years.

Part time: minimum of two years, maximum of four years.

To qualify for graduation, students are required to complete or receive Recognition of Prior Learning (RPL) for one discipline-specific hands-on workshop unit PRAC006 and to undertake 240 hours of documented professional experience INDX002.

Assessment Regulations

- The pass mark for all Master's modules and assessments is 50%.
- Students must achieve at least 50% in each module in order to be awarded the associated credits.
- The Research Dissertation/Project must also be passed at 50% or above; no compensation is permitted for this component

Teaching periods:

Full-time students undertake four modules in each of the first two trimesters, followed by the capstone project module in the third trimester. This structure is based on three teaching periods per year and is designed for completion within one academic year.

Part-time students undertake two modules per trimester over four consecutive trimesters, followed by the capstone project module, which is completed over the final two trimesters. This structure is based on three teaching periods per year and is designed for completion within two academic years.

PROGRAMME STRUCTURE (Full time)

Trimester	Modules	Credits
Trimester-1	• MIAI711 Industrial Automation Introduction • MIAI712 Programmable Logic Controllers • MIAI713 Industrial Process Control Systems • MIAI714 Industrial Instrumentation	15 15 15 15
Trimester-2	• MIAI715 Industrial Data Communications • MIAI716 SCADA and Distributed Control Systems • MSCX700 Engineering Practice and Key Research Methods **Optional Elective –** choose **one** of the following optional modules • ELEC723 Substation design and automation • ELEC724 Electrical Engineering for Industrial Automation • ELEC725 Machine Learning for Industrial Automation • ELEC726 Safety Instrumented Systems • MIAI717 Advanced Process Control	15 15 15 }15
Trimester-3	• MSPT701 – Project Thesis	60

Additional Compulsory Modules

Modules	Credits
• PRAC005 – Professional Practice Hands-on Workshop	0
• INDX002 – Professional Experience	0

PROGRAMME STRUCTURE (Part time)

Trimester	Modules	Credits
Trimester-1	• MIAI711 Industrial Automation Introduction • MIAI712 Programmable Logic Controllers	15 15
Trimester - 2	• MIAI713 Industrial Process Control Systems • MIAI714 Industrial Instrumentation	15 15
Trimester - 3	• MIAI715 Industrial Data Communications • MIAI716 SCADA and Distributed Control Systems	15 15
Trimester - 4	• MSCX700 Engineering Practice and Key Research Methods **Optional Elective –** choose **<u>one</u>** of the following optional modules • ELEC723 Substation design and automation • ELEC724 Electrical Engineering for Industrial Automation • ELEC725 Machine Learning for Industrial Automation • ELEC726 Safety Instrumented Systems • MIAI717 Advanced Process Control	15 }15
Trimester – 5 and 6	• MSPT701 – Project Thesis	60

Additional Compulsory Modules

Modules	Credits
• PRAC005 – Professional Practice Hands-on Workshop	0
• INDX002 – Professional Experience	0

Other Protocols for the Programme

All engineering disciplines are underpinned by distinct bodies of knowledge that converge to support specific applications. This programme builds upon foundational knowledge acquired during undergraduate study, particularly in mathematics, physics, and discipline-specific content while extending and deepening expertise through the specialist modules delivered at master's level. Each module contributes to students' ability to investigate complex problems, critically analyse and synthesise multifaceted solutions, and effectively communicate technical ideas and outcomes.

The curriculum is designed to foster progressive development in both technical and professional capabilities, culminating in the final capstone Project Thesis, where students integrate and apply their learning to address a complex real-world challenge. All core (compulsory) modules, the one elective module and the two compulsory professional practice and professional experience modules must be successfully completed, or formally exempted, for the award of the qualification, which requires achievement of 180 credits.

Industry Placements and Practical:

The nature of online learning means that most of our students are working in industry and can often demonstrate appropriate internships and partial or all compliance with practical workshops.

For students unable to secure industry placements, ECT will facilitate practical learning through industry informed projects, placement and virtual placements depending on each individual situation. Our dedicated student support team will also actively engage with employers to identify and arrange suitable experiential learning/industry placement opportunities.

ECT delivers all core practical learning through virtual and remote laboratories, fully integrated into each module. These platforms provide real-world scenarios, simulations, and remote control of physical equipment, ensuring all students acquire the necessary hands-on skills, regardless of geographic location.

Entry Requirements

A minimum of a lower second-class (2:2) honours degree or international equivalent in electrical, electronic or mechatronic engineering. Other disciplines including mechanical, computer science, mathematics, or physics will be considered on a case-by-case basis.

AND

evidence of strong relevant content within your degree programme. When assessing your academic record and the suitability of your degree background, we take into account your grade average with particular emphasis on relevant course units and the standing of the institution where you studied your qualification. We will be checking for sufficient relevant content in at least one of the following areas: electrical power systems, control and automation, maths and programming.

English language requirement for this course:

- IELTS at least 6.5 overall with no subtest below 6.0.
- TOEFL iBT: at least 90 overall with no subtest below 20.
- Pearson PTE: at least 70 overall with no subtest below 65.

Version Control

Version	Author	Date	Changes	Approved By
1.0	ECT		Original Version	Validation Committee
1.1	HE Admin Specialist	28/01/2026	• Add version control table • Update Programme structure to make clear the optional module choice • PLO mapping updated to reflect optional modules	Compliance & Risk Manager