



**CENTRE FOR ADVANCED MANUFACTURING  
AND MANAGEMENT SYSTEMS**

Course Handbook



# CENTRE FOR ADVANCED MANUFACTURING AND MANAGEMENT SYSTEMS (CAMMS)

The Centre for Advanced Manufacturing & Management Systems (CAMMS) is attached to the Department of Mechanical, Biomedical and Manufacturing Engineering at MTU Bishopstown Campus, Cork. CAMMS is a Continuing Professional Development Centre (CPD) within MTU dedicated to providing opportunities for workforce development and personal upskilling. The centre capitalises on the extensive expertise within MTU together with external professionals to deliver up to date education and training programmes in Automation and Robotics, Lean Sigma, Project Management, and Manufacturing Engineering. CAMMS aims to provide career-focused education for the benefit of the personal, intellectual and professional development of students and to solve problems directly related to skills required by industry.

Many CAMMS programmes are validated awards by MTU under delegated authority of Quality Qualifications Ireland (QQI) leading to European Credit Transfer and Accumulation System (ECTS) credits on the National Framework of Qualifications (NFQ).

CAMMS is currently delivering thematic knowledge areas that reflect the strengths of the Faculty.

## Course themes include:

- Quality, Lean Sigma
- Project Management
  - Automation & Robotics
  - Advanced Mechatronics
  - Manufacturing Engineering
  - Biomedical Device Manufacture
  - Process Plant Technology

SCHOOL OF  
MECHANICAL,  
ELECTRICAL  
& PROCESS  
ENGINEERING

## CAMMS HEAD

Niall Morris

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E: [CammsCork@mtu.ie](mailto:CammsCork@mtu.ie)  
[www.camms.ie](http://www.camms.ie)

Please refer to [www.camms.ie](http://www.camms.ie)  
for further details.



## Courses

- 1.0 Mechanical, Electrical and Plumbing – BIM Applications
- 2.0 Lean & Six Sigma Programmes
  - 2.1 Introduction to Lean & Six Sigma
  - 2.2 Lean Sigma Yellow Belt for Service and Operational Productivity Improvement
  - 2.3 Lean Sigma Green Belt for Service and Operational Productivity Improvement
  - 2.4 Lean Sigma Black Belt
  - 2.5 Lean Sigma Master Black Belt for Service and Operational Productivity Improvement
  - 2.6 Continuous Improvement for Production Teams
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  - 3.2 Diploma in Project Management
- 4.0 Automation Programmes
  - 4.1 Certificate in Automation and Robotics (Level 7)
    - 4.1.1 Mechatronics
    - 4.1.2 SCADA and Automation Systems
    - 4.1.3 Robotics
  - 4.2 Certificate in Industrial Automation and Networks (Level 8)
  - 4.3 Certificate in Intelligent Manufacturing Systems (Level 9)
- 5.0 Automotive Programmes
  - 5.1 Certificate in Digitised Automotive Operations (Level 7)
  - 5.2 Bachelor of Science in Transport Management (Level 8, part time)
- 6.0 Manufacturing Engineering
  - 6.1 Metrology Training (AUKOM Level 1)
  - 6.2 Certificate in Computerised Production and Inspection Processes
  - 6.3 Certificate in Biomedical Device Manufacture
- 7.0 Bachelor of Engineering Degrees
  - 7.1 Bachelor of Engineering (Honours) in Process Plant Technology
  - 7.2 Bachelor of Engineering (Honours) in Advanced Manufacturing Technology



# 1.0 MECHANICAL, ELECTRICAL AND PLUMBING - BIM APPLICATIONS



COURSE CODE  
**CR\_EMEPB\_7**  
(LEVEL 7)

## LOCATION

MTU Bishopstown  
Campus, Cork

## COURSE FEE

€1,950

## ENQUIRIES

T: 021 432 6264  
E: [CammsCork@mtu.ie](mailto:CammsCork@mtu.ie)  
W: [www.camms.ie](http://www.camms.ie)

Course & Module Information, and to apply online, visit [go.mtu.ie/CREMEPB7](http://go.mtu.ie/CREMEPB7)

This programme aimed at those who wish to enhance their 3D drawing and design skills in order to operate within a Building Information Management (BIM) regulated environment. It is suitable for those employed or seeking employment with design consultants or engineering/facilities departments within the pharmaceutical, biopharmaceutical, medical device, food manufacturing and water treatment sectors.

The programme has been specifically designed in response to industry needs for upskilling as identified by the South West Regional Skills Forum (SWRSF). The SWRSF (made up of manufacturing, mechanical and MEP consultancy companies) has identified BIM and Revit as two of their top three priority areas for upskilling.

## Content

Participants will be provided with the skills necessary to contribute effectively through the use of BIM related software applications, specifically Autodesk Revit for Mechanical, Electrical and Plumbing (MEP), in conjunction with a specialised module dedicated to piping design.

Students will develop the ability to use modern computer-based engineering tools to solve well defined building services design problems and communicate effectively with the engineering community. They will learn to create and place equipment, route and coordinate pipework, add electrical components and use P&ID data all within a multidiscipline 3D environment. The programme will also incorporate the use of Piping Standards (BS, DIN, ANSI, etc.) and engineering symbols standards.

## Modules

Revit Introduction – introduction to the BIM environment  
Revit-MEP – multidisciplinary services design  
3D Piping Design – detailed piping design in a virtual environment

Specific content includes

- Intelligent P&ID generation linked to 3D Piping Packages
- 3D Piping and Equipment Modelling
- Estimating pipe sizes and duct sizes using Revit software
- 3D Isometrics and BOM generation
- Utilising Project Browser to generate and manage useful views
- Generating reports and schedules using Revit software

## Admission Requirements

Applicants should have a minimum of a Level 6 qualification (or equivalent) in an engineering discipline such as mechanical, electrical or building services engineering. Equivalent recognition may be given through the Recognition of Prior Learning (RPL) process on an individual case-by-case basis to candidates who have not achieved this academic standard but who can demonstrate significant relevant professional experience in the Built Environment discipline.

## Duration

September – May, two evenings per week.

## Awarding Body

Special Purpose Award - 15 ECTS Credits at Level 7 on the National Framework of Qualifications, awarded by Munster Technological University.

# 2.0 LEAN & SIX SIGMA PROGRAMMES

## 2.1 INTRODUCTION TO LEAN & SIX SIGMA



COURSE CODE  
**CR\_EILSS\_X**

### LOCATION

MTU Bishopstown  
Campus, Cork

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie

Course Information, and to apply online, visit [go.mtu.ie/CREILSSX](http://go.mtu.ie/CREILSSX)

Lean is a generic process management term referring to the identification and steady elimination of waste. It is closely linked with Six Sigma because of the methodology's emphasis on reduction of process variation. Lean Sigma introduces the methods and tools used in both techniques.

**Note:** Introduction to Lean/Lean Sigma is not a pre-requisite to attending the Lean Sigma Yellow Belt, Lean Sigma Green Belt.

### Content

- **Day 1:** Introduction to Lean: Introduce the participants to the background to Lean and the concepts behind reducing waste.
- **Day 2:** Introduction to Six Sigma: Explains how Six Sigma targets variation and introduces the concepts.

### Admission Requirements

This programme requires no prior knowledge or experience of Lean or Lean Sigma. The programme is suitable for all personnel working within the design, manufacturing, transactional, sales or support environment. It is suitable for management and team leaders through to shop floor personnel and employees directly involved in the process.

### Duration

Two full-time days.

### Certification

CAMMS, MTU. Please contact CAMMS directly for more details.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

**Note:** Delivery of this programme is subject to sufficient number of applicants.

**Lean Sigma Master  
Black Belt**  
CR\_ELSMB\_9

**Lean Sigma Black Belt**  
CR\_ESSBB\_8

**Lean Sigma Green Belt**  
CR\_ELSGB\_7

**Lean Sigma Yellow Belt**  
CR\_ELSYB\_6

**Lean Sigma Introduction**  
CR\_EILSS\_X



## 2.2 LEAN SIGMA YELLOW BELT FOR SERVICE & OPERATIONAL PRODUCTIVITY IMPROVEMENT



COURSE CODE  
**CR\_ELSYB\_6**  
(LEVEL 6)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€995\* (includes course  
notes and exam fees)

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course Information, and to apply online, visit [go.mtu.ie/CRELSYB6](https://go.mtu.ie/CRELSYB6)

Lean Sigma is a very successful methodology for Continuous Improvement in all organisations. Lean Sigma is based on the elimination of waste and the reduction of variability in processing through engagement and respect for all staff.

A certified **Lean Sigma Yellow Belt** has the knowledge to identify opportunities for continuous improvement in their workplace. A Yellow Belt can apply Lean Sigma principles and problem solving tools to eliminate waste and reduce variation in a process. A Yellow Belt understands how improvements are made through team effort.

### Content

- Introduction to Lean/Six Sigma
- Lean Sigma Concepts
- Voice of the Customer
- Eliminating Waste
- In-class Project Work
- DMAIC Methodology and Tools
- Continuous Improvement Tools
- Improving Service Processes
- Reduction in Variation

### Project mentoring and support

A group project is undertaken as part of the course. Students will receive project support and mentoring from their tutors.

### Online support

Online resources are provided for students to support classroom learning.

### Admission Requirements

Candidates must have a total of at least four years combined academic and work experience.

### Duration

5 days over 3 months.

### Awarding Body

Special Purpose Award - 10 ECTS Credits at Level 6 on the National Framework of Qualifications, awarded by Munster Technological University.

### Discount

Corporate discounts are available. You may be eligible for funding through EI, IDA, Skillnet or Springboard.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.



## 2.3 LEAN SIGMA GREEN BELT FOR SERVICE & OPERATIONAL PRODUCTIVITY IMPROVEMENT



COURSE CODE  
**CR\_ELSGB\_7**  
(LEVEL 7)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€2,250\* (includes  
course notes and  
MTU exam fees)

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course Information, and to apply online, visit [go.mtu.ie/CRELSGB7](https://go.mtu.ie/CRELSGB7)

Lean Sigma is a very successful methodology for Continuous Improvement in all organisations. Lean Sigma is based on the elimination of waste and the reduction of variability in processing through engagement and respect for all staff.

A certified **Lean Sigma Green Belt** has the skills and tools to apply a structured approach to problem solving using Lean Sigma and to put a sustaining mechanism in place to ensure problems do not reoccur. A Green Belt understands the application of DMAIC/DMADV models. They are able to identify non-value added activities in a process and to use the appropriate tools to eliminate waste. A Green Belt will demonstrate project team leadership ability.

### Content

- Introduction to Lean/Six Sigma
- Lean Sigma Concepts and Tools
- Measurement Techniques
- Introduction to Statistical Tools
- Process Capability using SPC
- DMAIC Methodology and Tools
- Defining the Project/Goals Setting
- Analysis of Process Data
- Cause and Effect
- Co-ordinating Project Teams

### Project mentoring and support

A work-based project is undertaken as part of the course. Students will receive project support and mentoring from their tutors.

### Online support

Online resources are provided for students to support classroom learning.

### Admission Requirements

Level 6 qualification and at least three years work experience preferred.

### Duration

9 days over 3 months.

### Awarding Body

Special Purpose Award - 15 ECTS Credits at Level 7 on the National Framework of Qualifications, awarded by Munster Technological University.

### Discount

Corporate discounts are available. You may be eligible for funding through EI, IDA, Skillnet or Springboard.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

## 2.4 LEAN SIGMA BLACK BELT



COURSE CODE  
**CR\_ESSBB\_8**  
(LEVEL 8)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€4,750\* (includes course  
notes and exam fees)

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie

Course Information, and to apply online, visit [go.mtu.ie/CRESSBB8](https://go.mtu.ie/CRESSBB8)

Lean Sigma is a very successful methodology for Continuous Improvement in all organisations. Lean Sigma is based on the elimination of waste and the reduction of variability in processing through engagement and respect for all staff.

A certified **Lean Sigma Black Belt** is an expert in Lean Sigma philosophies and principles, including supporting systems and tools. A Black Belt will demonstrate team leadership, understand team dynamics and assign team member roles and responsibilities. Black Belts have a thorough understanding of all aspects of DMAIC/DMADV models. They have a thorough knowledge of Lean enterprise concept and are able to identify non-value added activities in a process and to use the appropriate tools to eliminate waste.

### Content

- Introduction to Lean/Six Sigma
- Change Management
- Team Building and Facilitation
- Lean Sigma Supply Chain
- Measurement System Analysis
- Regression
- Process Capability
- Project Control
- DMAIC Methodology and Tools
- Return on Investment
- Critical Success Factors
- Hypothesis Testing
- Control Charts
- Design of Experiments

### Project mentoring and support

A work-based project is undertaken as part of the course. Students will receive project support and mentoring from their tutors.

### Online support

Online resources are provided for students to support classroom learning.

### Admission Requirements

Level 6/7 qualification preferred. Green Belt qualified or several years work experience in a supervision role is required. Experience in Lean or Six Sigma principles is desirable.

### Duration

19 days over 12 months.

### Awarding Body

Special Purpose Award – 30 ECTS Credits at Level 8 on the National Framework of Qualifications, awarded by Munster Technological University.

### Discount

Corporate discounts are available. You may be eligible for funding through EI, IDA, Skillnet or Springboard.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.



# 2.5 LEAN SIGMA MASTER BLACK BELT FOR SERVICE & OPERATIONAL PRODUCTIVITY IMPROVEMENT



COURSE CODE  
**CR\_ELSMB\_9**  
(LEVEL 9)

## LOCATION

MTU Bishopstown  
Campus, Cork

## COURSE FEE

€5,750\* (includes  
course notes and  
exam fees)

## ENQUIRIES

Mark Stockil  
E: [mark.stockil@camms.ie](mailto:mark.stockil@camms.ie)



Course Information, and to apply online, visit [go.mtu.ie/CRELSMB9](https://go.mtu.ie/CRELSMB9)

Lean Sigma is a very successful methodology for Continuous Improvement in all organisations. Lean Sigma is based on the elimination of waste and the reduction of variability in processing through engagement and respect for all staff.

A certified **Lean Sigma Master Black Belt** is the go to person for deployment of Lean Sigma systems in the organisation. They hold a key role within or in support of the management team for business achievement of goals utilising improvement and problem-solving techniques. They may mentor and educate others in the organisation and determine best practice adaptation within the organisation for Operational and Design success. MBBs provide everyday leadership to the Lean Sigma effort. MBB's establishing and maintaining the long term Lean Sigma Environment.

## Content

- Creating and Measuring the Lean Sigma Environment (Site visit)
- Lean Sigma MBB Deployment Research Project
- Lean Sigma Analytics (Site visit)
- Lean Sigma MBB Deployment Application Project

## Project mentoring and support

A work-based project and a research project are undertaken as part of the course. Students will receive project support and mentoring from their tutors.

## Online support

Online resources are provided for students to support classroom learning.

## Admission Requirements

Black Belt or equivalent required.

## Duration & Delivery

12 days over 12 months.

## Awarding Body

Special Purpose Award – 30 ECTS Credits at Level 9 on the National Framework of Qualifications, awarded by Munster Technological University.

## Discount

Corporate discounts are available. You may be eligible for funding through EI, IDA, Skillnet or Springboard.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

# 2.6 CONTINUOUS IMPROVEMENT FOR PRODUCTION TEAMS

## COMPANY BASED GROUP TRAINING



### LOCATION

MTU Bishopstown  
Campus, Cork

### APPLICATION

Please email  
CammsCork@mtu.ie  
for further information.

### COURSE FEE

Price will vary on  
specific company  
needs.

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie

Course Information, visit [go.mtu.ie/CRECIPTX](https://go.mtu.ie/CRECIPTX)

Continuous improvement is an on-going effort to improve products, services or processes. These efforts can seek “incremental” improvement over time or “breakthrough” improvement all at once. Continuous improvement for production teams involves company based training, concentrating on the forming and development of teams, selecting projects, and then mentoring the operators and facilitators to the completion of these projects.

### Content

In general, the course content and delivery is tailored to suit the company’s needs. The course content is a combination of delivered lecture material and actual project focused work. Participants will be introduced to continuous improvement practice using basic quality analysis tools and how to apply them in a team environment on company targeted improvement areas. The sessions will include:

### Team members and Facilitators

- Quality concepts and basic quality tools
- Small team project management process
- Project focused work

### Facilitators Only

- Mentoring and Facilitation techniques for Facilitators

Having completed the course, candidates will be able to apply quality tools and to interpret information and data. In addition, they should be able to apply team concepts both as a member and leader. The Facilitators should be able to understand their role in the process and experience being a Facilitator on a given project.

### Duration & Delivery

Two or four days delivery, four or six weeks mentoring.

### Certification

CAMMS, MTU. Please contact CAMMS directly for more details.

# 3.0 PROJECT MANAGEMENT PROGRAMMES

## 3.1 PROJECT MANAGEMENT TECHNIQUES



COURSE CODE  
**CR\_EMBXX\_7**  
(LEVEL 7)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€925\*

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie

Course Information, and to apply online, visit [go.mtu.ie/CREMBXX7](http://go.mtu.ie/CREMBXX7)

This course is a comprehensive and practical introduction to Project Management. **The content and delivery is applicable to all industrial sectors (not just technical projects).** The content is based on the Project Management Body of Knowledge (PMBOK®) which is administered by the Project Management Institute (PMI) in the USA. The PMBOK is a worldwide recognised professional standard for the practice of Project Management.

The course is aimed at those involved in a wide range of projects. Participants come from a broad range of sectors and backgrounds and are typically involved in the planning, control and execution of project work in the broadest sense. Lectures are combined with case studies, workshops, simulations and practical projects. Course delegates complete various assignments in the class, as project teams and individual assignments. There are also hands-on computer practical sessions which will be used to instruct participants in the key areas of project planning and control. Candidates should have basic computer skills.

The course focuses on two main areas, primarily learning new tools and techniques to manage projects more effectively. Secondly, to gain increased awareness and learning in the area of 'soft skills' (e.g. leadership, team management, motivation, communication, negotiation, etc.) that are essential to effective project management.

### Content

Participants are expected to work on a project of their own choosing. Some short course assignments to be submitted to achieve certification.

- Introduction to Project Management and the fundamentals
- Project selection & initiation. Defining the Project Charter and Project Scope
- Project Planning and defining the Work Breakdown Structure (WBS)
- Managing Project Scope and Change in projects

- Project Time Management – Activity Definition, Activity Duration Estimating, Activity Sequencing, Schedule Development, Schedule Control
- Project Scheduling Software – MS Project version to 2016
- Progress measurement and reporting
- Managing Project Quality and Risk management
- Managing Project Finance and Resources
- Managing People – Team development and the Project Managers Role
- Improving personal effectiveness as a project manager
- Leadership Styles, Communication, Negotiating
- Project Closeout and Evaluation

### Duration & Delivery

The evening course is delivered fully online. The course is 10 weeks in duration and consists of one evening session per week, every Tuesday, 6.30pm – 9.30pm.

### Awarding Body

5 ECTS Credits at Level 7 on the National Framework of Qualifications, awarded by Munster Technological University.

**Note:** Successful participants from the evening class will be eligible to two days exemption from the Diploma in Project Management and a reduced price from €3,850 to €3,250.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

\* A discount structure is available for groups: 5% for 2 people, 10% for 3 or more.

## 3.2 DIPLOMA IN PROJECT MANAGEMENT



COURSE CODE  
**CR\_EPMAN\_8**  
(LEVEL 8)

### LOCATION

Online and  
MTU Bishopstown  
Campus, Cork

### COURSE FEE

€3,850 (includes  
MTU exam fees and  
PMI exam preparation)

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: [www.camms.ie](http://www.camms.ie)

Course Information, and to apply online, visit [go.mtu.ie/CREPMAN8](https://go.mtu.ie/CREPMAN8)

With the emergence of Project Management as a standalone profession, international accreditation that is accepted across industries is becoming increasingly important. The course is suitable for individuals who may have practical experience of **either being involved in projects or managing and leading projects** but need to supplement this with the necessary education. This course is aimed at those who seek to employ professional project management methodologies in the Initiation, Planning, Execution, Control and Close-Out of their Projects.

This MTU accredited Special Purpose Award in Project Management uses a combination of external experts and in-house lecturers to provide a broad scope of industrial and academic expertise. Our panel of lecturers and experts includes those with PMI® (Project Management Institute), 'Registered Education Provider' (REP®) Approval. The content and delivery is applicable to all industrial sectors (not just technical projects).

The programme covers all knowledge areas of the internationally recognised professional standard for the practice of Project Management, the PMBOK® (Project Management Body of Knowledge) which is administered by the PMI (Project Management Institute). As Agile Project Management is becoming more commonplace, the Diploma also includes detailed insight into the use of Agile methods to deliver projects, showing how Scrum, Lean, Kanban and Agile hybrids can be applied to different industries. The Diploma programme educates students in both traditional predictive / waterfall & Agile Project Management approaches – both essential toolsets for a Project Manager.

The Special Purpose Award combines advanced Project Management techniques and methodologies with the real-life experiences of an expert panel of leading project management lecturers from a wide range of industrial sectors. The course consists of a combination of lectures, seminars, case studies, guest speakers, simulations and practical projects. Course delegates complete various assignments in the class, as project teams and individual assignments.

The course is designed for those involved in a wide range of projects. Participants come from a broad range of sectors and backgrounds and are typically involved in the planning, control and execution of project work in the broadest sense.

### Duration & Delivery

The Diploma is approximately 6 months in duration, consisting of just one class each week.

Please see <https://www.cit.ie/course/CREPMAN8> for detailed timetables.

### Certification

Students who complete all three modules, will be entitled to an accredited Diploma in Project Management (Special Purpose Award – 15 ECTS Credits at Level 8 on the National Framework of Qualifications, awarded by Munster Technological University.

As part of the Diploma, we also help students evaluate which PM Certification option may be the best fit (this is an optional element of the course), providing dedicated support for PMI or Agile exam certification application and preparation.

The Diploma incorporates a two-day ScrumMaster Bootcamp, providing Diploma students with an additional option to sit the 'Professional Scrum Master™' (PSM) certification exam (their exam fee is not included in the course price) – a certification that is in high demand with over half a million certified professionals.

PM Techniques evening course graduates are exempt from Day 1 & 2

## MODULE 1

- Project Initiation & Selection
- Project Charter
- Project Scope Definition
- Project Cost Management
- Project Scheduling
- 'Microsoft Project' – Scheduling Software Tutorial
- Project Budgeting
- Managing Project Change
- Project Risk Management

Project Management Principles  
5 ECTS Credits, Level 8

## MODULE 2

- Project Stakeholder Management
- Project Quality Management
- Project Communications
- Procurement for Project Managers
- Project Resource Management
- Project Integration
- PM Ethics
- Selecting and Applying for the relevant PM Certification
- Agile Project Management
- 2-Day Professional Scrum Master™ (PSM) Bootcamp
- Presentation Skills

Project Management Context  
5 ECTS Credits, Level 8

## MODULE 3

- Myers Briggs profiling, Teams and Communication Styles
- Presentation Skills
- Strategic Project Management
- Project Governance / Global teams
- Using PM Techniques to implement Change Management
- Managing challenging stakeholders
- Recovering a project in difficulty
- Business Process Mapping – Driving Organisational Change through Projects

Project Management Advanced Concepts  
5 ECTS Credits, Level 9

Diploma in Project Management  
15 ECTS Credits, Level 8



## 4.0 AUTOMATION PROGRAMMES

### 4.1 CERTIFICATE IN AUTOMATION & ROBOTICS

SPECIAL PURPOSE AWARD - 20 ECTS CREDITS AT LEVEL 7



COURSE CODE  
**CR\_EACSY\_7**  
(LEVEL 7)

#### LOCATION

MTU Bishopstown  
Campus, Cork

#### COURSE FEE

Overall Fee: €3,100 (Only applicable when ALL three modules are taken in one academic year)

#### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course Information, and to apply online, visit [go.mtu.ie/CREACSY7](https://go.mtu.ie/CREACSY7)

Students who successfully complete the modules Mechatronics; SCADA & Automation Systems; and Robotics will be entitled to a Certificate in Automation & Control Systems (Special Purpose Award) Level 7 on the National Framework of Qualifications, awarded by Munster Technological University.

These modules can also be taken and certified individually. Please see course code, fee, and online application for each module.

## 4.1.1 MECHATRONICS

#### LOCATION

MTU Bishopstown  
Campus, Cork

#### COURSE FEE

€1,950\*

#### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



COURSE CODE  
**CR\_EACSY\_7**

Course Information, and to apply online, visit [go.mtu.ie/CREACSY7](https://go.mtu.ie/CREACSY7)

#### Content

##### Practical

- Pneumatic design and implementation
- Electro-pneumatic design and implementation
- PLC design and implementation
- Mechatronic design and implementation

##### Theory

- Principles of the "Total Engineering Approach" to production systems
- Principles of typical sensors
- Principles of pneumatic, mechanical and electrical actuation systems
- Principles of embedded control (PLCs, controllers)
- Design, build and fault find on mechatronic systems

This course covers the practical and theoretical requirements for certification by MTU. Certification requires that a candidate provides evidence of competence in the construction, operation and maintenance of pneumatic and electro-pneumatic systems through practical tasks and by meeting knowledge criteria.

The course also covers PLC programming to a high standard of achievement allowing students to programme training rigs and develop knowledge of industrial Mechatronic installations.

#### Admission Requirements

Candidates must have at least two years relevant industrial experience and should have obtained their Leaving Certificate or an appropriate craft/technician qualification.

#### Duration & Delivery

One evening per week for one academic year, one module per semester.

#### Awarding Body

10 ECTS Credits at Level 7 on the National Framework of Qualifications, awarded by Munster Technological University.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

\* Discounts available for groups of three or more.

## 4.1.2 SCADA & AUTOMATION SYSTEMS



COURSE CODE  
**CR\_EACSY\_7**  
(LEVEL 7)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€925\*

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie

Course Information, and to apply online, visit [go.mtu.ie/CREACSY7](https://go.mtu.ie/CREACSY7)

Automation has been an essential tool in enhancing productivity and competitiveness for manufacturing industries. Automation is used to improve manufacturing performance, reduce operational costs and improve quality. Most industrial plants now have some form of automation, which is controlled and monitored by SCADA systems. This course enables participants to adjust, service, maintain, and design modern equipment, and to design and develop SCADA control systems.

During the course, real data from a process control rig and flexible assembly line will be utilised in the design of applications.

### Content

- Computer based automation systems
- Control systems
- Connection and circuit technology for transducers
- PLC configuration and control
- Safety systems
- SCADA (Supervisory Control and Data Acquisition)

### Admission Requirements

Candidates must have at least two years relevant industrial experience and should have obtained their Leaving Certificate or an appropriate craft/technician qualification.

### Duration & Delivery

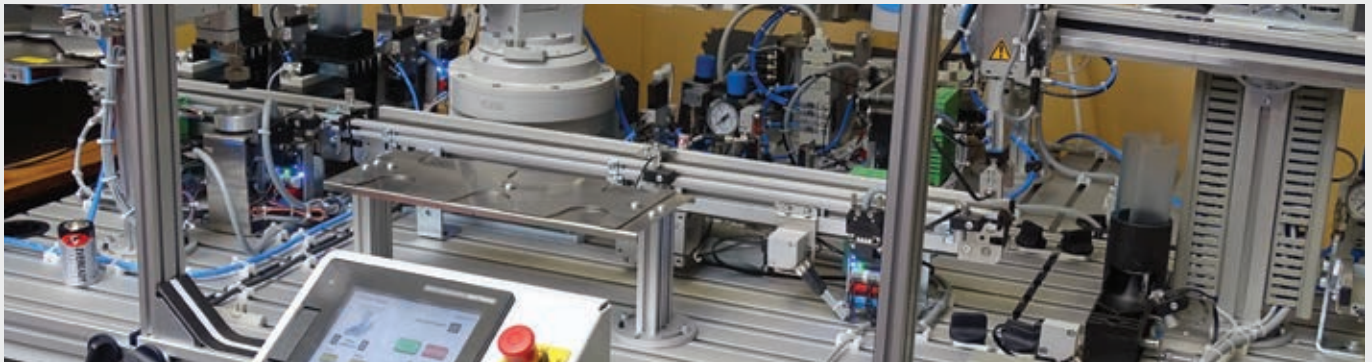
One evening per week for 12 weeks in Semester 1. Additional programme may run in Semester 2, subject to demand.

### Awarding Body

5 ECTS Credits at Level 7 on the National Framework of Qualifications, awarded by Munster Technological University.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

\* Discounts available for groups of three or more.





## 4.1.3 ROBOTICS



COURSE CODE  
**CR\_EACSY\_7**  
(LEVEL 7)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€925\*

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: [www.camms.ie](http://www.camms.ie)

Course Information, and to apply online, visit [go.mtu.ie/CREACSY7](http://go.mtu.ie/CREACSY7)

An industrial robot is defined as “an automatically controlled, reprogrammable, multipurpose device, for use in industrial automation applications”.

This course gives participants an understanding in Industrial Robotics programming and design, and an indepth knowledge of Robotic Sensors.

#### Content

- Robotic cell design
- End effectors
- Robotics programming
- External sensors

#### Admission Requirements

Candidates must have at least two years relevant industrial experience and should have obtained their Leaving Certificate or an appropriate craft/technician qualification.

#### Duration & Delivery

One evening per week for 12 weeks in Semester 2. Additional programme may run in Semester 1, subject to demand.

#### Awarding Body

5 ECTS Credits at Level 7 on the National Framework of Qualifications, awarded by Munster Technological University.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

\* Discounts available for groups of three or more.







## 4.2 CERTIFICATE IN INDUSTRIAL AUTOMATION AND NETWORKS



COURSE CODE  
**CR\_EAUTN\_8**  
(LEVEL 8)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€2,200

### ENQUIRIES

E: CammsCork@mtu.ie



Course Information, and to apply online, visit [go.mtu.ie/CREAUTN8](http://go.mtu.ie/CREAUTN8)

### Admission Requirements

Candidates should have obtained a Level 7 in Automation and Control or similar. Candidates may also be considered through MTU's well-established RPL process.

Candidates with sufficient experience which in the judgement of MTU may be deemed equivalent to this qualification will be considered following the principles/procedures set out the Institute's Recognition of Prior Learning service in MTU.

### Aim

The Certificate in Industrial Automation and Networks aims to provide the learner with advanced knowledge of PLC programming using multi-languages and the ability to develop PLC communication across the required network structures.

Upon successful completion of this programme the graduate will be able to demonstrate:

- Detailed knowledge and understanding of the essential facts, major concepts, principles and theories associated with PLC, HMI and Networking in modern automation systems.
- The ability to evaluate the five IEC61131:
  - PLC Programming Languages and the appropriate network communication protocols
  - Connect the correct Input/Outputs to the PLC, HMI and map the IO bits to the programming charts.
  - Programme a PLC incorporating a HMI using the appropriate languages communicating across the selected network.

### Award

15 ECTS Credits on the NFQ will be received by students who successfully complete the course.



## 4.3 CERTIFICATE IN INTELLIGENT MANUFACTURING SYSTEMS



COURSE CODE  
**CR\_EINMS\_9**  
(LEVEL 9)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€4,200

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: [www.camms.ie](http://www.camms.ie)



Course Information, and to apply online, visit [go.mtu.ie/CREINMS9](http://go.mtu.ie/CREINMS9)

### Duration & Delivery

2 semesters. At least two evenings per week, partly class room based, partly blended (online).

### Admission Requirements

Candidates will require a Level 8 qualification in one of the following: Mechanical, Electrical, Electronic, Chemical Engineering, Applied Physics and Instrumentation, Mechatronics or cognate discipline. Candidates with sufficient experience which in the judgement of MTU may be deemed equivalent to this qualification will be considered following the principles/procedures set out the University's Recognition of Prior Learning service in MTU.

### Overview

The Certificate in Intelligent Manufacturing Systems is a Level 9 programme which aspires to bridge the gap between the engineering operations and information technology paradigms in the manufacturing sector. Smart Manufacturing has been described as the synthesis of advanced manufacturing capabilities and digital technologies to produce highly customisable products faster, cheaper, better, and greener. A smart factory will integrate data from system-wide physical, operational, and human assets to drive manufacturing, maintenance, inventory tracking and the digitisation of operations in order to achieve this goal.

### Award

Certificate in Intelligent Manufacturing Systems (Level 9 on the National Framework of Qualifications).



## 5.0 AUTOMOTIVE PROGRAMMES

### 5.1 CERTIFICATE IN DIGITISED AUTOMOTIVE OPERATIONS



COURSE CODE  
**CR\_TDAOP\_7**  
(LEVEL 7)

#### LOCATION

MTU Bishopstown  
Campus, Cork

#### COURSE FEE

€2,000  
(€500 per module)

#### ENQUIRIES

E: [CammsCork@mtu.ie](mailto:CammsCork@mtu.ie)

Course Information, and to apply online, visit [go.mtu.ie/CRTDAOP7](https://go.mtu.ie/CRTDAOP7)

#### Admission Requirements

Candidates must have at least three years of relevant industrial experience and should have obtained their Leaving Certificate or an appropriate craft/technician qualification. Candidates may also be considered through MTU's well-established RPL process.

#### Aim

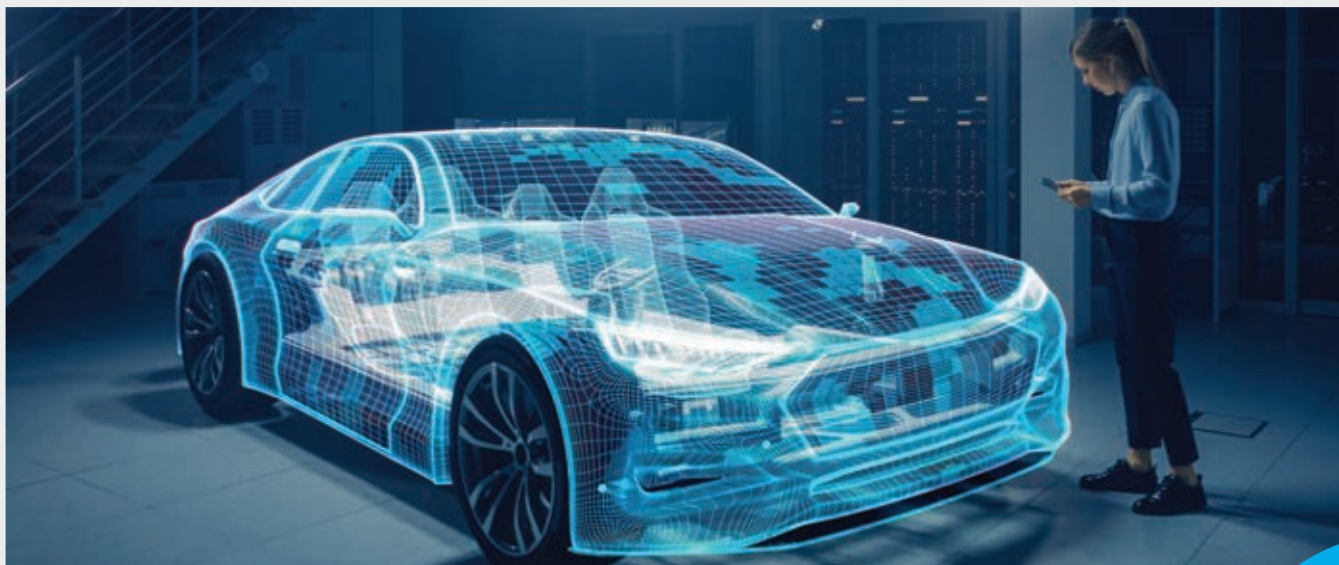
This Programme has been developed for individuals seeking employment in the Service administration area of Automotive Engineering OR those already working in the sector wishing to up-skill and gain the relevant qualifications in an evolving technological Automotive industry.

Dealer Management Software skillset is vital to Industry performance into the future, coupled with Business & Management Skills, course participants will garner essential IT skills and the ability to communicate professionally in the digital world.

Graduates will gain the expertise to manage a modern after-sales department, dealing with costing, scheduling, planning and reporting through the latest digital platforms.

#### Award

20 ECTS credits on the NFQ will be received by students who successfully complete the course.





## 5.2 BACHELOR OF SCIENCE IN TRANSPORT MANAGEMENT



COURSE CODE  
**CR\_TTMGT\_8\_PT**  
(LEVEL 8)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€2,200 per annum

### ENQUIRIES

E: [CammsCork@mtu.ie](mailto:CammsCork@mtu.ie)

Course & Module Information, and to apply online, visit [go.mtu.ie/CRTTMGT8](https://go.mtu.ie/CRTTMGT8)

### Admission Requirements

Graduates who have achieved the required grade in the Automotive Technology and Management (BSc Degree) Level 7 degree programme (or similar qualification) are eligible for entry. Candidates may also be considered through MTU's well-established RPL process.

### Aim

Transport and fleet operations play a significant role for economic activity within Ireland and worldwide. Automobile and transport industries have undergone significant changes in recent years with many technical advances making both vehicles and transport operations more efficient. This course is designed to take account of these advances and it prepares graduates for employment within such a dynamic and exciting industry.

The BSc (Honours) in Transport Management course is designed for graduates who wish to progress from the Automotive Technology and Management (BSc Degree), along with other students who have similar qualifications and/or work experience and wish to progress to Honours degree level. The course places significant emphasis on Transport and Fleet operations and has been designed in cooperation with the transport industry.

The course provides students with knowledge of the motor, fleet, transport and logistics operations through a combination of lectures and directed learning along with group and individual project work. Work placement is also included as part of the programme. Employment opportunities include supervisory, management and technical positions within the motor, transport, and fleet industries.

### Modules

#### Semester One

Fleet Operations  
Transport Telematics

#### Semester Two

Transport Planning & Logistics  
Sustainable Transport

### Award

20 ECTS credits on the NFQ will be received by students who successfully complete the course.

These 20 ECTS credits form part of the overall award of 60 credits for the BSc (Hons) in Transport Management. The Honors degree may be completed over 2/3 years Part Time. Candidates may also achieve credits for the Work-placement and project modules through MTU's well established RPL process. Full suite of modules may be found here. <https://www.cit.ie/course/CRTTMGT8>

# 6.0 MANUFACTURING ENGINEERING

## 6.1 METROLOGY TRAINING (AUKOM LEVEL 1)



COURSE CODE  
**CR\_SMETR\_6**

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€1,950 (covers  
tuition, AUKOM  
Level 1 Handbook  
and exam fees)

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course & Module Information, and to apply online, visit [go.mtu.ie/CRSMETR6](https://go.mtu.ie/CRSMETR6)

### Duration

5 Days

### Admission Requirements

No specific entry requirements but applicants should have a background in CNC/CMM operations. The programme is aimed at production metrologists and consolidates fundamental principles and knowledge catering for beginners through to those with more experience.

### Overview

AUKOM is an acronym for the German phrase ausbildung koordinatenmesstechnik, which translates to “coordinate metrology training.” AUKOM was developed in Germany to establish a global training standard for production coordinate measurement practice. Its methodology is vendor-neutral, meaning the skills gained and procedures learnt during certified training are applicable to any brand of measuring equipment and software.

AUKOM training is currently offered in 19 countries and MTU is the only approved training centre in Ireland. Three levels of certification are available; this Level 1 programme concentrates on fundamental concepts, such as dimensional tolerancing, basic programming, and common measuring equipment. Full course details are available at <https://www.aukom.info/en/aukom-training-courses/content-level-1.html>.

Topics covered in AUKOM Level 1 are

- Principles of coordinate metrology
- Basic definitions, tolerancing, and geometric elements
- Measuring preparation, including stylus selection, part cleaning, and temperature control
- Documentation & quality management

Candidates will be prepared to take the AUKOM Level 1 test which will be administered by MTU personnel at the end of the programme; AUKOM certificates will be issued to those who successfully complete the programme and the test.

### Delivery

The programme is largely classroom-based but will involve practical demonstrations of Coordinate Measuring Machine (CMM) equipment and software.

### Award

Metrology Training: AUKOM Level 1 Certificate





## 6.2 CERTIFICATE IN COMPUTERISED PRODUCTION & INSPECTION PROCESSES



COURSE CODE  
**CR\_EC MPI\_7**  
(LEVEL 9)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€1,850

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course & Module Information, and to apply online, visit [go.mtu.ie/CRECMPI7](https://go.mtu.ie/CRECMPI7)

\*Multiple applications from the same company will be eligible for a 10% discount for 2 attendees, 15% for 3 attendees or more.

### Admission Requirements

Candidates should have a Level 6 qualification (or equivalent) in Engineering or cognate discipline. Candidates with sufficient experience which in the judgement of MTU may be deemed equivalent to this qualification will be considered following the principles/procedures set out the University's Recognition of Prior Learning service in MTU.

### Structure

Smart Manufacturing comprises systems that are “fully-integrated, collaborative manufacturing systems that respond in real time to meet changing demands and conditions in the factory, in the supply network, and in customer needs.” The merger of the physical and virtual worlds (cyber physical systems) opens up new areas of innovation enabling optimisation of the entire manufacturing supply chain to create higher quality products, improve productivity, increased energy efficiency involving real-time data collection and analysis.

The aim of this programme is to upskill technicians/engineers in the latest machining and inspection technologies and to show how advances in ICT can be exploited and implemented on the factory floor. The programme will utilise industry-standard computer numerical control (CNC) machine tools, co-ordinate measuring machines (CMM) and CAD/CAM software.

In the past three years, MTU has invested circa €1.5 million in bringing its CNC machining and CMM inspection equipment up to a standard comparable to that in manufacturing industry. The University also has access to the most up-to-date CAD/CAM software. Participants on the programme will thus be exposed to the current state-of-the-art technologies and to the emerging developments and trends. The University has also invested in staff training so that the potential offered by the new equipment/software is fully realised.

It is envisaged that the topics in this programme will be developed to a more advanced level in the following academic year leading to an additional 15 credits for those wishing to progress further.

### Award

Certificate in Computerised Production & Inspection Processes (15 ECTS credits at Level 7 on the National Framework of Qualifications).

## 6.3 CERTIFICATE IN BIOMEDICAL DEVICE MANUFACTURE



COURSE CODE  
**CR\_EBMDM\_7**  
(LEVEL 8)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

€1,450\* (includes  
course notes and  
exam fees)

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course & Module Information, and to apply online, visit [go.mtu.ie/CREBMDM7](http://go.mtu.ie/CREBMDM7)

This programme was developed for anyone seeking employment in or transferring into the Biomedical Devices Sector as well as anyone wishing to enhance their general knowledge of the industry. The programme is structured around common medical disorders which are treated by biomedical devices manufactured in Ireland. On completion, participants will be familiar with a range of disorders, the anatomy and physiology associated with these disorders, the devices used in their treatment, and the processes involved in the manufacture of these devices.

The programme also familiarises participants with the engineering requirements and standards that apply to cleanrooms employed in the manufacture of medical devices. The programme looks at the specification of appropriate cleaning, packaging and sterilisation operations for medical devices, the assessment of the safety risks associated with manufacturing operations and the requirements for guaranteeing a safe working environment.

The programme also examines the detailed requirements of a Good Manufacturing Practice (GMP) system and the operation of regulatory bodies such as FDA/IMB.

### Content

#### • Anatomy

General anatomy, Neuro Anatomy, Cardiovascular anatomy, Orthopaedics.

#### • Medical Devices

Devices used in the treatment of neurovascular, cardiovascular, orthopaedic disorders and product development history.

#### • Manufacturing Processes

Introduction to manufacturing processes; injection moulding, extrusion, wire drawing; catheter coating process, embolic coil manufacturing.

#### • Cleanroom Technology

Cleanroom classification; particle size and counting; filter design and performance, cleanroom layout, materials & standards, cleanroom commissioning and qualification.

#### • Cleaning and Sterilisation Technology

Requirements for cleaning, soil types, cleaning systems organic/aqueous/semiaqueous), cleaning equipment. Ethylene oxide. Gamma sterilisation, electron beam. Saturated steam – gravity displacement, porous load, ballasted cycles. Dry heat sterilisation/depyrogenation. Microbial inactivation/endotoxin inactivation.

#### • Packaging

Functions of packaging, packaging requirements for sterilisation, physical & chemical properties of packaging, labelling and packaging control, distribution hazards, production of packages, forming materials and methods, lidding, sealing.

#### • GMP

Introduction to GMP, GMP documentation – SOPs/regulatory documentation/submissions, Role and requirements of the FDA/IMB/Notified Bodies, introduction to 21 CFR820/Medical Devices Directive, planning for audits. Classification of devices. FDA/IMB submissions – 510k/PMA applications.

#### • Validation

Validation protocols – Installation, operational and performance qualification. Process validation, design qualification, validation of sterilisation system, design verification, design validation. URS/FDS/FAT/SAT master validation plans. Change control.

### Admission Requirements

This course is open to anyone with a minimum of two years industrial experience.

### Duration & Delivery

One evening per week for 13 weeks.

### Awarding Body

MTU: Certificate in Biomedical Device Manufacture, Special Purpose Award 10 ECTS credits at Level 7 on the National Framework of Qualifications.

**Note:** Places are limited for this course. Eligible candidates will be considered on a first come first served basis.

\* Discounts available for groups of three or more.

# 7.0 BACHELOR OF ENGINEERING DEGREES 7.1 BACHELOR OF ENGINEERING (HONOURS) IN PROCESS PLANT TECHNOLOGY



COURSE CODE  
**CR\_EPPTN\_8**  
(LEVEL 8)

## LOCATION

MTU Bishopstown  
Campus, Cork

## COURSE FEE

See module  
listing

## ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course & Module Information, and to apply online, visit [go.mtu.ie/CREPPTN8](https://go.mtu.ie/CREPPTN8)

This course aims to produce graduates who can make a significant contribution to the design, operation, maintenance and management of process plant. The course concentrates on the mechanical aspects of process engineering design and selection, plant construction, condition monitoring, productive maintenance, plant safety, automation and control systems, project management and investment appraisal. This honours degree programme will help participants to develop the skills and knowledge to implement change and to undertake key operational management roles.

## Admission Requirements

Merit or better in a relevant Level 7 major award programme or equivalent. Candidates with sufficient experience which in the judgment of MTU may be deemed equivalent to this qualification will be considered following the principles/procedures set out by the Recognition of Prior Learning service in MTU.

## Duration & Delivery

Three evenings per week, 7pm – 10pm, and one Saturday per month, 10am – 5pm. The course can be completed in two academic years.

## Award

Bachelor of Engineering (Honours) in Process Plant Technology (Level 8 on the National Framework of Qualifications).

## Modules

## Annual Fee per Module

### Mandatory

|                                |       |
|--------------------------------|-------|
| Project                        | €1350 |
| Quality Engineering            | €510  |
| Engineering Project Management | €510  |
| Process Automation & Control   | €510  |
| Mathematics and Statistics     | €510  |
| Process Plant Services         | €510  |
| Process Plant Equipment        | €510  |
| Maintenance & Reliability      | €510  |
| Facilities                     | €510  |

### Electives (choose 1)

|                                  |      |
|----------------------------------|------|
| Automation Systems               | €510 |
| Advanced Materials and Processes | €510 |

## 7.2 BACHELOR OF ENGINEERING (HONOURS) IN ADVANCED MANUFACTURING TECHNOLOGY



COURSE CODE  
**CR\_EAMTN\_8**  
(LEVEL 8)

### LOCATION

MTU Bishopstown  
Campus, Cork

### COURSE FEE

See module  
listing

### ENQUIRIES

T: 021 432 6264  
E: CammsCork@mtu.ie  
W: www.camms.ie



Course & Module Information, and to apply online, visit [go.mtu.ie/CREAMTN8](http://go.mtu.ie/CREAMTN8)

All industries involved in the production of goods, whether biomedical, pharmaceutical, chemical, process, electronic or aeronautical require manufacturing engineers. These industries invest heavily in the most up to date automation, software and process control equipment as well as utilising the most modern of training and management techniques.

This honours degree programme aims to produce graduates who can make a significant contribution to the design, operation, and management of manufacturing systems, as well as to the quality and reliability of manufactured products, parts and equipment.

### Admission Requirements

Merit or better in a relevant Level 7 major award programme or equivalent. Candidates with sufficient experience which in the judgment of MTU may be deemed equivalent to this qualification will be considered following the principles/procedures set out by the Recognition of Prior Learning service in MTU.

### Duration & Delivery

Three evenings per week, 7pm – 10pm, and one Saturday per month, 10am – 5pm. The course can be completed in two academic years.

### Award

Bachelor of Engineering (Honours) in Advanced Manufacturing Technology (Level 8 on the National Framework of Qualifications).

### Modules

### Annual Fee per Module

#### Mandatory

|                                |       |
|--------------------------------|-------|
| Project                        | €1350 |
| Quality Engineering            | €510  |
| Engineering Project Management | €510  |
| Automation Systems             | €510  |
| Mathematics and Statistics     | €510  |
| Product Development            | €510  |
| Manufacturing Systems          | €510  |
| Maintenance & Reliability      | €510  |
| Facilities                     | €510  |

#### Electives (choose 1)

|                                  |      |
|----------------------------------|------|
| Process Automation & Control     | €510 |
| Advanced Materials and Processes | €510 |



**MTU**

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Munster Technological University



**CENTRE FOR ADVANCED MANUFACTURING  
AND MANAGEMENT SYSTEMS**

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