

School of Mechanical & Manufacturing Engineering

Structured Doctoral Pathway 2021-22

The School of Mechanical & Manufacturing Engineering has a diverse and rich history of impactful research in the areas of Mechanical & Manufacturing Engineering. The outputs from this are evident in the many top-ranking journal papers, books, patents, and research awards emanating from this research. Most significantly many of the research projects involve close ties with industry, multidisciplinary, international collaboration, and the development of the cutting edge technologies required for next generation engineering products and services. Specific areas of research strength within the School include Advanced Processing Technologies and Bioengineering. Our structured PhD programmes enable postgraduate students to complement their research with important discipline-specific and generic skills such as communication, commercialisation, and entrepreneurship.

This document details a suggested doctoral pathway for graduate researchers in the School of Mechanical & Manufacturing Engineering. While the main focus for each research candidate is to complete an original research project, students are also supported in developing a range of skills and competencies through taught modules and other learning opportunities.

During registration, all research students may take a mix of credit-bearing modules (Graduate Training Elements, GTEs). Other non-accredited educational opportunities such as seminars, workshops, and short courses are also available. First-year students are required to take the Online Research Integrity Training module during year one of their studies.

These opportunities provide both discipline-specific and transferable skills and knowledge to support students in their research and enhance their research qualification. Engagement in these activities is an important aspect of the graduate research experience.

Students who complete a minimum of 20 GTE credits, in addition to the 270-ECTS thesis, will be recognised as having completed a structured PhD. At least one module should be from the list of discipline-specific modules and one from the list of transferable skills modules. The modules chosen on the structured pathway should be discussed and agreed in the first instance with the supervisor and progress reported on the annual PGR2 form. Students should register for their approved GTE modules during the online registration process.

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Discipline-Specific Skills

- **MM523:** Product Design, Development & Value Analysis - 7.5 ECTS (Sem 1)
- **MM530:** Surface Engineering & Tribology - 7.5 ECTS (Sem 1)
- **MM584:** Manufacturing System Simulation - 7.5 ECTS (Sem 1)
- **MM532:** Computational Thermo-Fluid Dynamics - 7.5 ECTS (Sem 2)
- **MM524:** Advanced FEA - 7.5 ECTS (Sem 2)
- **MM555:** Manufacturing Process Analysis & Tool Design - 7.5 ECTS (Sem 2)
- **MM600:** LabVIEW, Data Acquisition, Analysis & Control - 7.5 ECTS (Sem 2)
- **CA684 :** Machine Learning - 7.5 ECTS (Sem 2)

- **MM409:** Adv. Eng. Materials & Manufacturing Process - 5 ECTS (Sem 1)
- **MM421:** Finite Element Analysis - 7.5 ECTS (Sem 1)
- **MM432:** Heat Transfer & Fluid Mechanics - 7.5 ECTS (Sem 1)
- **MM453:** Manufacturing Automation - 5 ECTS (Sem 1)
- **MM451:** Design for Manufacture and Assembly- 7.5 ECTS (Sem 2)
- **MM459:** Robotics - 5 ECTS (Sem 2)
- **MM485:** Operations Research Methods - 7.5 ECTS (Sem 2)
- **MM602:** Additive Manufacturing– 7.5 ECTS (Sem 2)
- **EE613:** Advanced Topics in Machine Learning 7.5 ECTS (Sem 2)

Transferable Skills

- **GS602/A:** Postgraduate Tutoring Principles and Practice - 5 ECTS (Sem 1 & 2)
- **TP602:** Research Ethics - 5 ECTS (Sem 2)
- **GS606/A:** Enterprise Experience for Graduate Researchers - 10 ECTS (Sem 1 & 2)
- **GS601:** Intellectual Property and Commercialization—5 ECTS (Sem 2)
- **EE507:** Entrepreneurship for Engineers - 7.5 ECTS (Sem 2)
- **LC600:** English for Academic Purposes - 5 ECTS (Year Long)
- **MM533:** Research Practice & Methodology - 7.5 ECTS (Sem 1)
- **CA637:** Advanced Scientific Communication Skills - 5 ECTS (Year Long)
- **MT610:** Qualitative Research Methods - 5 ECTS (Year Long)
- **MT611:** Quantitative Research Methods - 5 ECTS (Year Long)
- **Online Research Integrity Training Module** (Engineering and Technology stream) (non-accredited)

Students are also encouraged to engage with centrally- and locally-offered workshops and seminars that align with their development needs.