

Specialisation

Specialisations allow students to pursue greater depth in a chosen area and add value to their degrees. The specialisation will be reflected on the academic transcript, which would assist students in their job search/career as well as in their higher studies.

Criteria

In order to obtain the specialisation, students have to meet the following criteria:

1. Complete a minimum of 15 AUs from one specialisation group.
2. FGO-declared courses can be counted towards a specialisation.
3. Maximum two specialisation will be reflected on the transcript.
4. Students who do not wish to obtain a specialisation may choose courses of their interest from different specialisation areas.

Note: MA48xx courses will usually offered in either Sem 1 or Sem 2 only, please take note of this when planning your study plan. Students may refer to [here](#) for offering semester and pre-requisite required for courses.

This specialisation list is applicable to MAE students admitted as Year 1 from AY2022-23 onwards and admitted as Direct Entry students from AY2023/24 onwards.

AERONAUTICAL ENGINEERING		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA2005	Engineering Graphics	Not offered to Aerospace Student.	Core	Core	Core	Core
MA2001	Mechanics of Materials		Core	Core	Core	Core
MA3701	Aerodynamics		MPE/BDE	BDE	BDE	BDE
Any 2 of the following courses:						
MA3700	Aircraft Structures I	Not offered to Aerospace Student.	MPE/BDE	BDE	BDE	BDE
MA3702	Aircraft Propulsion		MPE/BDE	BDE	BDE	BDE
MA4814	Computational Fluid Dynamics		MPE/BDE	BDE	BDE	BDE
MA4870	Mechanics of Composite Materials		MPE/BDE	BDE	BDE	BDE
*MA4872	Aircraft Reliability & Maintainability		MPE/BDE	BDE	BDE	BDE
MA4880	Airport Operations and Systems		MPE/BDE	BDE	BDE	BDE
MA4881	Air Traffic Management		MPE/BDE	BDE	BDE	BDE

**MA4872 is mutually exclusive with MA4854*

AUTONOMOUS SYSTEMS		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA3005	Control Theory	N.A.	Core	Core	Not offered to RMS stream.	Not offered to IMS stream.
MA3705	Aerospace Control Theory	Core	N.A.	N.A.		
MA1001	Dynamics	Core	Core	Core		
MA4891	AI/ML to Engineering Applications	BDE	MPE/BDE	BDE		
Any 2 of the following courses:						
MA4822	Measurements and Sensing System	BDE	MPE/BDE	BDE	Not offered to RMS stream.	Not offered to IMS stream.
MA4825	Robotics	BDE	MPE/BDE	BDE		
MA4829	Machine Intelligence	BDE	MPE/BDE	MPE		
MA4878	Autonomous Flight	BDE	N.A.	N.A.		
MA4890	Autonomous Driving	BDE	MPE/BDE	BDE		

ENERGY & THE ENVIRONMENT		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA2007/ MA3010	Thermodynamics/ Thermodynamics and Heat Transfer	Core	Core	Core	Core	Core
MA2003	Introduction to Thermo-fluids	Core	Core	Core	Core	Core
MA4819	Energy Technologies for Sustainability	BDE	MPE/BDE	BDE	BDE	BDE
Any 2 of the following courses:						
MA4811	Psychrometry & Air Conditioning	BDE	MPE/BDE	BDE	BDE	BDE
MA4813	Building Services Engineering	BDE	MPE/BDE	BDE	BDE	BDE

NAVAL ARCHITECTURE, MARINE ENGINEERING AND MANAGEMENT (MAE Students)		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME	ME (Design)	ME (RMS)	ME (IMS)
MA3006	Fluid Mechanic	Not offered to Aerospace Student.	Core	Core	Core	Core
MA4856	Naval Architecture & Marine Engineering		MPE/ BDE	BDE	BDE	BDE
MT1004	Introduction to Meteorology and Oceanography		MPE/ BDE	BDE	BDE	BDE
Any 2 of the following courses:						
MA4807	Marine Structural Integrity	Not offered to Aerospace Student.	MPE/ BDE	BDE	BDE	BDE
MA4808	Marine Control Systems		MPE/ BDE	BDE	BDE	BDE
MA4871	Non-Destructive Testing		MPE/ BDE	BDE	BDE	BDE
MT0001	Shipping and the Environment		MPE/ BDE	BDE	BDE	BDE
MT3004	Shipping Management		MPE/ BDE	BDE	BDE	BDE

NAVAL ARCHITECTURE, MARINE ENGINEERING AND MANAGEMENT (CEE Students)		COURSE TYPE		
COURSE CODE	COURSE TITLE	CEE	ENE	MS
MA4856	Naval Architecture & Marine Engineering	BDE	MPE/UE/BDE	MPE/UE/BDE
MT1004	Introduction to Meteorology and Oceanography	BDE	MPE/UE/BDE	Core
CV1012	Fluid Mechanic	Core	Core	MPE/UE/BDE
Any 2 of the following courses:				
MA4807	Marine Structural Integrity	BDE	MPE/UE/BDE	MPE/UE/BDE
MA4808	Marine Control Systems	BDE	MPE/UE/BDE	MPE/UE/BDE
MA4871	Non-Destructive Testing	BDE	MPE/UE/BDE	MPE/UE/BDE
MT0001	Shipping and the Environment	BDE	MPE/UE/BDE	N.A.
MT3004	Shipping Management	BDE	MPE/UE/BDE	N.A.

SMART MANUFACTURING AND DIGITAL FACTORY		COURSE TYPE				
COURSE CODE	AE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA2004/MA2024	Manufacturing Processes/ Engineering Materials and Manufacturing Processes	N.A.	Core	Core	Not offered to RMS stream.	Not offered to IMS stream.
MA0218	Introduction to Data Science and Artificial Intelligence	FC	FC	FC		
MA2700	Aerospace Materials & Manufacturing Processes	Core	N. A	N. A		
MA4845	Additive Manufacturing in Industry 4.0	BDE	MPE/BDE	BDE		
Any 2 of the following courses:						
MA4853	Manufacturing Systems	BDE	MPE/BDE	BDE	Not offered to RMS stream.	Not offered to IMS stream.
MA4842	Engineering Metrology	BDE	MPE/BDE	BDE		
MA4882	Advanced Manufacturing and Materials Processing	BDE	MPE/BDE	BDE		

SYSTEMS ENGINEERING		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA2006	Engineering Mathematics	Core	Core	Core	Core	Not offered to IMS stream.
MA4001/ MA4011/ MA4012/ MA4013 / MA4701	Engineering Design/ Engineering Product Design/ Mechatronics Engineering Design/ Manufacturing Engineering Design/ Aircraft Design	Core	Core	Core	Core	
#MA4884	Systems Thinking and Systems Engineering	BDE	MPE/ BDE	BDE	BDE	
Any 2 of the following courses:						
MA4804	Optimisation Theory & Applications	BDE	MPE/ BDE	BDE	BDE	Not offered to IMS stream.
MA4849	Operations Research	BDE	MPE/ BDE	BDE	BDE	
MA4850	Supply Chain & Logistics Management	BDE	MPE/ BDE	BDE	BDE	
MA4853	Manufacturing Systems	BDE	MPE/ BDE	BDE	BDE	
*MA4854	Quality Assurance & Management	BDE	MPE/ BDE	BDE	BDE	
MA4892	Engineering Project Management: Principles and Practice	BDE	MPE/ BDE	BDE	BDE	

**MA4854 is mutually exclusive to MA4872*

#MA4884 is offered as MPE/BDE. The course will be counted towards the Specialisation in Systems Engineering for students who read this course from AY2023-24 onwards)

ME (Design Stream)

Design Stream		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA4829	Machine Intelligence	BDE	MPE/BDE	MPE	MPE	MPE
MA4831	Computer-Aided Engineering	N.A.	N.A.	MPE	MPE	N.A.
MA4843	Management of Product Development	N.A.	N.A.	MPE	N.A.	N.A.
MA4846	Sustainable Design	N.A.	N.A.	MPE	N.A.	N.A.
MA4858	Product Design	N.A.	N.A.	MPE	N.A.	N.A.

ME (Robotics and Mechatronics Stream)

Robotics and Mechatronics Stream		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA4822	Measurements and Sensing System	BDE	MPE/BDE	BDE	MPE	MPE
MA4825	Robotics	BDE	MPE/BDE	BDE	MPE	MPE
MA4829	Machine Intelligence	BDE	MPE/BDE	MPE	MPE	MPE
MA4830	Realtime Software for Mechatronics Systems	N.A.	N.A.	N.A.	MPE	N.A.
MA4831	Computer-Aided Engineering	N.A.	N.A.	MPE	MPE	N.A.
MA4832	Microprocessor Systems	N.A.	N.A.	N.A.	MPE	MPE
MA4845	Additive Manufacturing in Industry 4.0	BDE	MPE/BDE	BDE	MPE	MPE

ME (Intelligent Manufacturing Stream)

Intelligent Manufacturing Stream		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA4804	Optimisation Theory & Applications	BDE	MPE/BDE	BDE	BDE	MPE
MA4822	Measurements and Sensing System	BDE	MPE/BDE	BDE	MPE	MPE
MA4825	Robotics	BDE	MPE/BDE	BDE	MPE	MPE
MA4829	Machine Intelligence	BDE	MPE/BDE	MPE	MPE	MPE
MA4832	Microprocessor Systems	N.A.	N.A.	N.A.	MPE	MPE
MA4845	Additive Manufacturing in Industry 4.0	BDE	MPE/BDE	BDE	MPE	MPE
MA4853	Manufacturing Systems	BDE	MPE/BDE	BDE	BDE	MPE
MA4884	Systems Thinking and Systems Engineering	BDE	MPE/BDE	BDE	BDE	MPE

*You may not apply FGO for MPE courses that are not offered as BDE for your stream. If FGO is applied, you will need to take another MPE to fulfill the corresponding graduation requirement.

AERO: Specialisation in Mechanical Engineering

MECHANICAL ENGINEERING		COURSE TYPE				
COURSE CODE	COURSE TITLE	AE	ME (Mainstream)	ME (Design)	ME (RMS)	ME (IMS)
MA3704	Aircraft Electrical Devices	Core	Not offered to Mechanical Student.			
MA2002	Theory of Mechanism	BDE				
MA2009	Introduction to Electrical Circuits & Electronic Devices	BDE				
MA3001	Machine Element Design	BDE				
MA4002	Fluid Dynamics	BDE				

This specialisation will enable graduates to apply for registration as Professional Engineers, if other requirements (4 years of relevant practical experience in engineering, FEE & PPEE examinations, interview) are also fulfilled. Please see the following [extract](#):

The Professional Engineers Board registers professional engineers in the branches of civil, electrical mechanical and chemical engineering. A person applying for registration as a professional engineer to the Professional Engineers Board is required to hold an approved degree or qualification listed in the [Professional Engineers \(Approved Qualifications\) Notification / Amendment Notification 2016](#) and acquired relevant practical experience. The applicant is required to sit and pass the Fundamentals of Engineering Examination and the Practice of Professional Engineering Examination or the oral examination (for a person previously registered as a professional engineer or is an experienced applicant). In addition, the applicant is required to attend a professional interview. Further details on Professional Engineer registration from PEB can be found [here](#).

List of Major Prescribed Electives offered to AERO students as BDE:

Course Code	Course Title
MA4814	Computational Fluid Dynamics
MA4878	Autonomous Flight
MA4880	Airport Operations and Systems
MA4881	Air Traffic Management
MA4804	Optimisation Theory & Applications
MA4811	Psychrometry & Air Conditioning
MA4813	Building Services Engineering
MA4819	Energy Technologies for Sustainability
MA4822	Measurements and Sensing System
MA4829	Machine Intelligence
MA4825	Robotics
MA4842	Engineering Metrology
MA4845	Additive Manufacturing in Industry 4.0
MA4849	Operations Research
MA4850	Supply Chain & Logistics Management
MA4853	Manufacturing Systems
MA4854	Quality Assurance & Management
MA4870	Mechanics of Composite Materials
MA4871	Non-Destructive Testing
MA4882	Advanced Manufacturing and Materials Processing
MA4884	Systems Thinking and Systems Engineering
MA4890	Autonomous Driving
MA4891	AI/ML to Engineering Applications
MA4892	Engineering Project Management: Principles and Practice