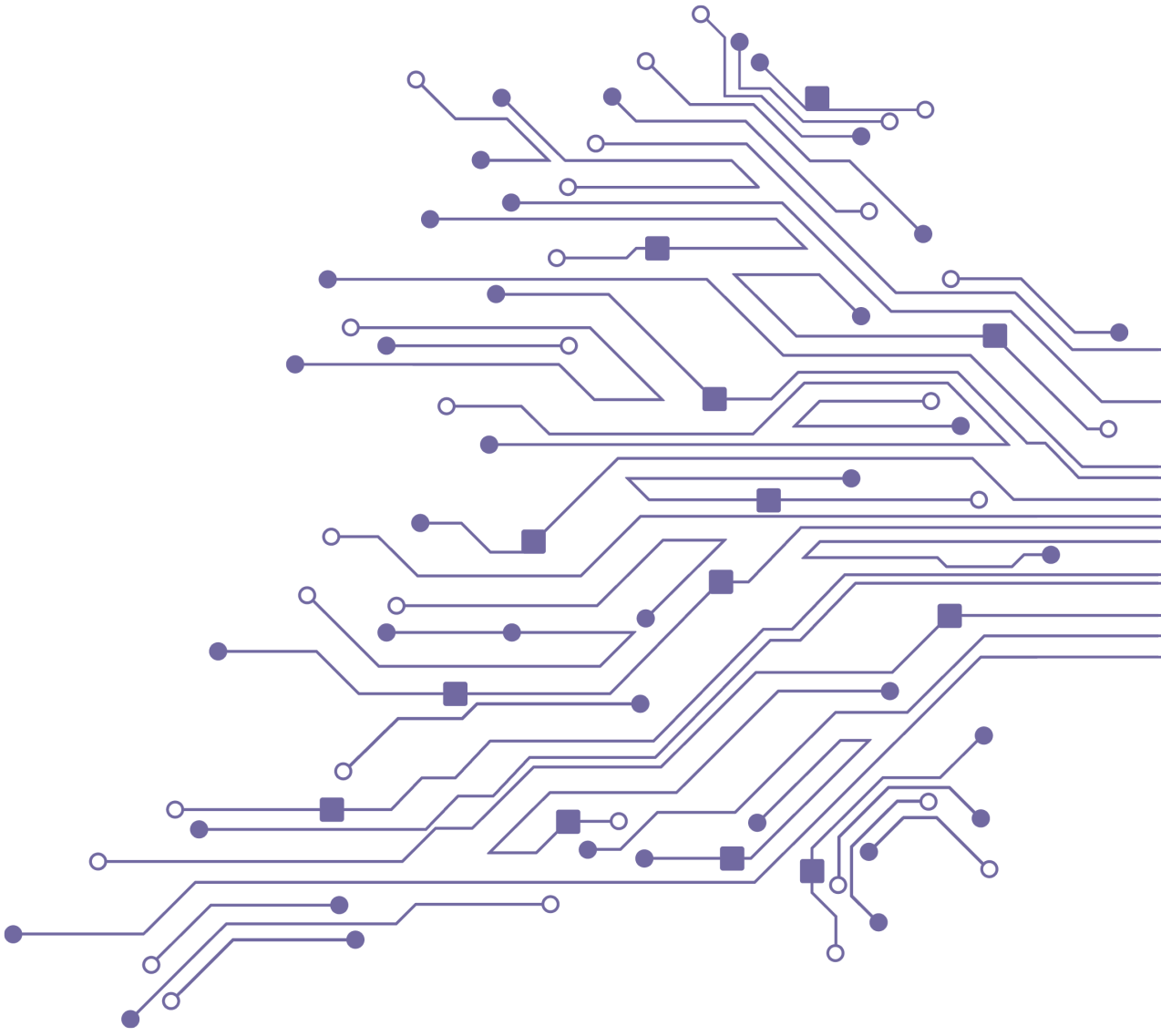
YQM.A.R.S

Mechatronics and Robotics Society

MARS Course Guide

2023



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Introduction

The 2023 UQ MARS Subject Guide has been created to guide all MARS members through their degree. This is a comprehensive guide that will present suggested program structures, enrolment plans, course profiles, and offer the chance to inform students of the specific pathways available within Mechatronics Engineering. We will aim to give specialised advice from our Exec team and various UQ MARS Alumni regarding study advice, course selection and general career advice.

The **UQ Mechatronics and Robotics Society** is also commmited to not just Mechatronics Engineering students, but also various student engineers studying in adjacent fields; This includes Electrical, Mechanical, Computer, Software specialisations, as well as people in similar degrees such as Computer Science and I.T.

The guide will be divided into the following sections:

The **Recommended Enrolment Plan** is a template made by the MARS execs to provide a simple enrolment plan and leaves rooms for electives as desired.

Course Reviews and Advice contains specific details and advice for courses required in the BE(Hons) in Mechatronic Engineering and the BE/ME programs, alongside some courses in the Computer Engineering Major; as a lot of our members take these as electives.

About MARS

The *UQ Mechatronics And Robotics Society* is a student-led hub for passion and innovation in robotics and automation. Connecting members across disciplines and year levels, the society aims to foster a strong community centered on the practical development of robotics. Aspiring engineers have the opportunity to connect through our hosted workshops, seminars and competition teams.

If you're studying mechatronics or have an interest in topics such as robotics, embedded systems, computer vision, or AI/ML, then MARS is the club for you.

Events 2023

MARS have a number of events scheduled for 2023. If any of these strike your interest, be sure to follow us to keep up to date:

- Launch Party
- Mechatronics Skills Workshops
- Micromouse Competition
- Arduino Hackathon
- Droid Race Competition
- Talks and Seminars

Memberships

You can become a 2023 MARS member for just $xx on QPAY.

Follow Us

You can follow UQ MARS through any of the following channels.

uqmars.com
UQ Mechatronics and Robotics Society
UQ MARS
UQ Mechatronics and Robotics Society (UQ MARS)

UQ Mechatronics And Robotics Society
UQ MARS
uq.mars

Recommended Enrolment Plan

We understand that it can be confusing and/or time consuming to plan out how to best structure the courses in your program. To make the process as simple as possible, we've provided a recommended enrolment plan for the Mechatronics course plans available at UQ. Please note that this is just a suggestion, and you may need to adjust the plan to account for the electives that you choose.

Bachelor of Engineering (Honours)

Program Structure

First Year					
Semester 1	MATH1051 or MATH1071	ENGG1100	CSSE1001	ELECTIVE	
Semester 2	MATH1052 or MATH1072	ENGG1300	ENGG1700	CSSE1001	

Second Year					
Semester 1	MATH2001	MECH2300	ELEC2300	MATH2010	STAT2201
Semester 2	MECH2100	MECH2210	ELEC2004	METR2800	

Third Year				
Semester 1	METR3100	MAJOR	MAJOR	MAJOR
Semester 2	METR4810	MAJOR	MAJOR	MAJOR

Fourth Year				
Semester 1	METR4201	METR4202	MAJOR	MAJOR
Semester 2	ENGG4900	METR4911 or METR4212		ELECTIVE

Major Options

Within the Bachelor of Engineering (Honours) Mechatronics specialisation, there are 2 majors to choose from:

- Computer Engineering
- Mining Engineering

Computer Engineering

To complete the computer engineering major under mechatronics, you must take the following 8 courses:

- COMP3506
- CSSE2002
- CSSE2310
- CSSE3010
- ELEC3004
- MECH3200
- CSSE4010
- CSSE4011

Mining Engineering

To complete the mining engineering major under mechatronics, you must take the following 8 courses:

- ELEC3004
- MECH2300
- MINE3110
- MINE3122
- MINE3123
- MINE3129
- MINE4124
- MINE4129

Minor Options

If the majors don't meet your goals, there are 3 minors to choose from. Each minor pathway consists of a 4 course minor, plus the following 4 courses:

- ELEC2400
- ELEC3004
- MECH3200
- METR6203

Data Science Minor

The data science minor consists of both:

- DATA2001
- INFS1200

plus two of:

- COMP4702
- INFS2200
- INFS3208
- INFS4203
- STAT2003
- STAT2004

Computing Minor

The computing minor consists of both:

- CSSE2002
- COMP3506

plus two of:

- COMP4702
- COSC2500
- COSC3000
- COSC3500
- INFS1200
- INFS3208
- MATH3202

Design Minor

The design minor consists of:

- DSGN1500

plus three of:

- DSGN1100
- DSGN1200
- DSGN2100
- DSGN2200
- DSGN3100

Open Major

If none of the major or minor options live up to your expectations, the open major is what you're after. The open major pathway consists of the following 4 courses:

- ELEC2400
- ELEC3004
- MECH3200
- METR6203

plus four courses consisting of at least two of the following:

- AERO4300
- AERO4450
- AERO4470
- AERO4800
- COMP3702
- COMP3710
- COMP4702
- CSSE3010
- CSSE4010
- CSSE4011
- ELEC3100
- ELEC3310
- ELEC4310
- ELEC4410
- ELEC4620
- ELEC4630
- ENGG4103
- ENGY4000
- MECH3301
- MECH3250
- MECH4304
- MECH4950
- TIMS3309

Bachelor of Engineering (Honours) and Master of Engineering

Program Structure

First Year				
Semester 1	MATH1051 or MATH1071	ENGG1100	CSSE1001	ELECTIVE
Semester 2	MATH1052 or MATH1072	ENGG1300	ENGG1700	CSSE2010

Second Year					
Semester 1	MATH2001	MECH2300	ELEC2300	MATH2010	STAT2201
Semester 2	MECH2100	MECH2210	ELEC2004	METR2800	

Third Year				
Semester 1	METR3100	ELEC2400	ELEC3004	METR4201
Semester 2	METR4810	MECH3200	ADVANCED	ADVANCED

Fourth Year				
Semester 1	METR4202	ADVANCED	ADVANCED	ELECTIVE
Semester 2	ENGG4900	METR6203	ADVANCED	ELECTIVE

Fifth Year			
Semester 1	ENGG7291		
Semester 2	ENGG7701	ADVANCED or MASTERS	MASTERS

Advanced Electives

As part of the BEME program, you must take between five and seven of the following courses:

- AERO4300
- AERO4450
- AERO4470
- AERO4800
- COMP3702
- COMP3710
- COMP4702
- CSSE3010
- CSSE4010
- CSSE4011
- ELEC3100
- ELEC3310
- ELEC4310
- ELEC4410
- ELEC4620
- ELEC4630
- ENGG4103
- ENGY4000
- FIRE3700
- MATE4302
- MECH3301
- MECH3250
- MECH4304
- MECH4950
- TIMS3309

Masters Electives

As part of the BEME program, you must take between two and three of the following courses:

- CSSE7610
- ENGG7302
- ENGG7811
- MATE7013
- MATE7014
- MATE7015
- MATE7016
- MECH7101

Electives

If you are undertaking another degree but are still interested in the field of mechatronics, there are some options available to you.

Electrical Engineering

If you are more interested in the electrical systems of mechatronics and robotics, there are a plethora of electives you can take as an Electrical Engineering student.

- METR3100
- COMP3702
- COMP3710
- ELEC4630
- COMP4702
- METR4202
- METR6203

Mechanical Engineering

If you are more interested in the mechanical systems and physical properties of mechatronics and robotics, there are a wide selection of potential electives.

- MECH2700
- METR3100
- MECH3780
- METR4202
- AERO4800
- MECH4950

Software Engineering

The most appropriate electives you could take as a Software Engineering student interested in Mechatronics is the following

- CSSE3010
- CSSE4011
- COMP3702
- COMP3710
- COMP4702
- ELEC4630
- METR3100
- METR4202

Computer Science

The most appropriate electives you could take as a Computer Science student interested in Mechatronics is the following

- ENGG1300
- CSSE2310
- COMP3702
- COMP3710
- COMP4702

Course Profiles

AERO4300 - Aerospace Composites

AERO4450 - Aerospace Propulsion

AERO4470 - Hypersonics

AERO4800 - Space Engineering

COMP3506 - Algorithms & Data Structures

Feedback TBD

COMP3702 - Artificial Intelligence

COMP3710 - Pattern Recognition and Analysis

COMP4702 - Machine Learning

COSC2500 - Numerical Methods in Computational Science

COSC3000 - Visualization, Computer Graphics & Data Analysis

COSC3500 - High-Performance Computing

CSSE1001 - Introduction to Software Engineering

CSSE2002 - Programming in the Large

CSSE2010 - Introduction to Computer Systems

Based AF, highly recommend.

CSSE2310 - Computer Systems Principles and Programming

CSSE3010 - Embedded Systems Design & Interfacing

CSSE4010 - Digital System Design

CSSE4011 - Advanced Embedded Systems

CSSE7610 - Concurrency: Theory and Practice

DATA2001 - Fundamentals of Data Science

DSGN1100 - Design: Interaction

DSGN1200 - Design: Experience

DSGN1500 - Design for a Better World

DSGN2100 - Design: Organisation

DSGN2200 - Design: Environment

DSGN3100 - Design: Infrastructure

ELEC2004 - Circuits, Signals & Systems

Not bad

ELEC2300 - Fundamentals of Electromagnetism and Electromechanics

ELEC2400 - Electronic Devices and Circuits

ELEC3004 - Signals, Systems & Control

ELEC3100 - Fundamentals of Electromagnetic Fields & Waves

ELEC3310 - Electrical Energy Conversion & Utilisation

ELEC4310 - Power Systems Analysis

ELEC4410 - Advanced Electronic & Power Electronics Design

ELEC4620 - Digital Signal Processing

ELEC4630 - Image Processing and Computer Vision

ENGG1100 - Professional Engineering

A warm introduction to ENGG

ENGG1300 - Introduction to Electrical Systems

ENGG1700 - Statics and Materials

ENGG4103 - Engineering Asset Management

ENGG4900 - Professional Practice and the Business Environment

ENGG7302 - Advanced Computational Techniques in Engineering

ENGG7811 - Research Methods

ENGY4000 - Energy Systems

FIRE3700 - Introduction to Fire Safety Engineering

INFS1200 - Introduction to Information Systems

Seems *highly useful*

INFS2200 - Relational Database Systems

INFS3208 - Cloud Computing

INFS4203 - Data Mining

MATE4302 - Electrochemistry and Corrosion

MATE7013 - Advanced Manufacturing

MATE7014 - Advanced Materials Characterization

MATE7015 - Additive Manufacturing

MATE7016 - Materials for Energy Conversion and Storage

MATH1051 - Calculus & Linear Algebra I

MATH1052 - Multivariate Calculus & Ordinary Differential Equations

MATH1071 - Advanced Calculus & Linear Algebra I

Oof

MATH1072 - Advanced Multivariate Calculus & Ordinary Differential Equations

MATH2001 - Calculus & Linear Algebra II

MATH2010 - Analysis of Ordinary Differential Equations

MATH3202 - Operations Research & Mathematical Planning

MECH2100 - Machine Element Design

MECH2210 - Intermediate Mechanical & Space Dynamics

MECH2300 - Structures & Materials

Hope you like chemistry

MECH3200 - Advanced Dynamics and Vibrations

MECH3250 - Engineering Acoustics

MECH3301 - Materials Selection

MECH3780 - Computational Mechanics

MECH4304 - Net Shape Manufacturing

MECH4950 - Advanced Manufacturing in Practice

MECH7101 - Design of Experiments

METR2800 - Mechatronic System Design Project I

You're in for a time.

METR3100 - Control System Implementation

METR4201 - Control Engineering 1

METR4202 - Robotics & Automation

METR4810 - Mechatronic System Design Project II

METR4911 - Thesis/Design Project

METR4912 - Thesis/Design Project

METR6203 - Control Engineering 2

Seems pretty solid

MINE3110 - Integrated Orebody Knowledge

MINE3122 - Mining Systems

MINE3123 - Mine Planning

MINE3129 - Applied Mining Geomechanics

MINE4124 - Hard Rock Mine Design & Feasibility

MINE4129 - Mine Process Optimisation

STAT2003 - Mathematical Probability

STAT2004 - Statistical Modelling & Analysis

STAT2201 - Analysis of Engineering & Scientific Data

TIMS3309 - Technology and Innovation Management

Sponsors

Acknowledgments