



# Important Information for your Final Year

2025

# Outline

1. Introductions
2. Enrolment Tips
3. Electives (and 'Unique' Courses)
4. Capstone
5. Graduate Studies

# Introductions



# Required Courses



1. Check your advisement report
2. MECHENG 4V03 (Thermo-fluids)
  - Pre-reqs (2W, 3O, 3R)
  - Pinch point
3. MECHENG 4P03 (Composite labs)
  - Sections fill quickly! Watch out for both terms
  - Pre-req (2Q, 3M A/B)
  - Co-op: check with instructor re. carrying over grades
4. ENGINEER 4A03 (Ethics, equity, law)
  - Take in either term

# Enrolment

## 1. Know your dates!

- Timetable released before enrolment opens
- Plan your full year at once (don't leave winter to December)

## 2. Review course outlines on website

- Check academic calendar for pre-reqs

## 3. Pick more courses than needed (*i.e.* have backups)

- No wait lists, watch for a seat
- Not all courses are conflict free
- Waivers exist but not ideal for learning
- Not all courses offered every year



# Enrolment

## 4. Streams

- General, Mechanics & Design, Manufacturing, Smart Systems, Thermofluids and Energy Systems
- Recommended grouping of electives – does not appear on your transcript
- Some streams have requirements (e.g. 4S03)

## 5. Some courses fill very quickly

- 4B03, 4Z03, 4CC3

## 6. Out of department electives

- Great option, happy to review and approve
- Check for pre-req knowledge



# For Assistance

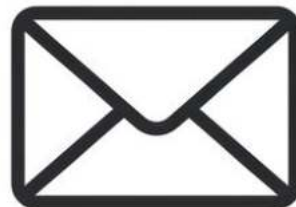
## Contacts:

Dr. Quenneville [quennev@mcmaster.ca](mailto:quennev@mcmaster.ca)

Nicole Mclean [mech@mcmaster.ca](mailto:mech@mcmaster.ca)

Sinah Lee [leesk2@mcmaster.ca](mailto:leesk2@mcmaster.ca)

\*Be aware enrolment is a hectic time it may take a bit to get a response



# **Q&A on Enrolment**



- CHEM ENG 4T03: Applications of Chemical Engineering in Medicine, 2<sup>nd</sup> term
- CHEM ENG 4X03: Polymer Processing, 1<sup>st</sup> term
- CIV ENG 3K03: Introduction to Transportation Engineering, 1<sup>st</sup> term
- COMMERCE 4QA3: Operations Modelling and Analysis, 1<sup>st</sup> or 2<sup>nd</sup> term
- ELECENG 3N03: Electronics and Instrumentation, 2<sup>nd</sup> term
- ENGINEER 4EX3: Experiential Engineering Design, both terms
- MATLS 3MF3: Materials Fabrication, 2<sup>nd</sup> term
- MATLS 4MS4: Materials Selection in Design and Manufacturing, 1<sup>st</sup> term
- MATLS 4T03: Properties and Processing of Composites, 2<sup>nd</sup> term
- ENG PHYS 3D03: Principles of Nuclear Engineering, 2<sup>nd</sup> term
- ENG PHYS 3SP3: Space Systems Engineering
- ENG PHYS 4D03: Nuclear Reactor Analysis, 1<sup>st</sup> term (Note: pre-req. is ENG PHYS 3D03)
- ENG PHYS 4NE3: Advanced Nuclear Engineering, 2<sup>nd</sup> term (Note: pre-req. is ENG PHYS 3D03)
- ENG PHYS 4P03: Nuclear Power Plant Systems & Operations, 2<sup>nd</sup> term
- SMRTTECH 4ID3: IoT Devices and Networks, 2<sup>nd</sup> term
- SMRTTECH 4AI3: Artificial Intelligence and Machine Learning, 1<sup>st</sup> term
- PROCTECH 4MH3: Machine Health & Remote Monitoring, 1<sup>st</sup> term
- SFWRTECH 4DA3: Data analytics and Big Data, virtual
- SFWRTECH 4ES3: Real-Time Systems, virtual

# Electives (will be updated mid-spring)

- ME 4AA3: Aerodynamics, 2<sup>nd</sup> term (Dr. Tullis)
- ME 4AI3: Applied Artificial Intelligence, 2<sup>nd</sup> term (Dr. Ahmed)
- ME 4B03: Topics in Product Development, 1<sup>st</sup> term (Dr. Hassan)
- ME 4BB3: Biomechanics, 1<sup>st</sup> term (Dr. Wohl)
- ME 4BF3: Biofluid Mechanics Systems (Dr. Motamed)
- ME 4CC3: Experimental and Computational Biomechanics, 2<sup>nd</sup> term (Dr. Quenneville)
- ME 4D03: Manufacturing Processes (Metal Removal), 2<sup>nd</sup> term (Dr. Koshy)
- ME 4DD3: Introduction to Surface Engineering in Manufacturing, 2<sup>nd</sup> term (Dr. Aramesh)
- ME 4ES3: Energy Storage, 2<sup>nd</sup> term (Dr. Trowell)
- ME 4FM3: Advanced Instrumentation and Sensing for Fluid Mechanics, 2<sup>nd</sup> term (Dr. Morton)
- ME 4H03: Mechatronics, 2<sup>nd</sup> term (Dr. Bone)
- ME 4I03: Noise Analysis and Control, 1<sup>st</sup> term (TBD)
- ME 4J03: Intro to Computational Fluid Dynamics & Heat Transfer (Dr. Hamed)
- ME 4K03: Robotics, 1<sup>st</sup> term (Dr. Yan)
- ME 4N03: NanoBio Engineering (Dr. Didar)
- ME 4O04: Sustainable Energy Systems, 2<sup>nd</sup> term (Dr. Cotton)
- ME 4SS3: Smart Systems, 1<sup>st</sup> term (Dr. Gadsden)
- ME 4S03: Incompressible flow, 1<sup>st</sup> term (Dr. Salaudeen)
- ME 4T03: Finite Element Applications, 1<sup>st</sup> term & 2<sup>nd</sup> term (Dr. Wu)
- ME 4U03: Compressible Flow and Turbomachinery, 1<sup>st</sup> term (Dr. Tullis)
- ME 4W03: Air Conditioning and Refrigeration Systems, 2<sup>nd</sup> term (Dr. Shankar)
- ME 4X04: Independent Research Project, both terms
- ME 4Y03: Internal Combustion Engines, 1<sup>st</sup> term (Dr. Yan)
- ME 4Z03: Computer Aided Design, 2<sup>nd</sup> term (TBD)

# Some Unique Courses

- MME 4490: Engineering in Global Context: Advanced Manufacturing
  - Through Western U, held at Karlsruhe Institute of Technology, Germany
  - Topics: automated manufacturing systems, machining of fiber reinforced composites, modeling and simulation in mech eng, manufacturing of composite parts for automotive applications, functional composite films, thin film manufacturing
  - Runs in May of each year (take prior to final year, register in Feb)
  - Includes things like trip to Mercedes plant, Porsche Museum
  - Contact Dr Tutunea-Fatan for info [rtutunea@eng.uwo.ca](mailto:rtutunea@eng.uwo.ca)



# Some Unique Courses

- **MECHENG 4X04: Independent Project**
  - A fun opportunity to get in-depth experience in your area of interest
  - Good prep if you're considering a Master's
  - Recommended GPA of 9.5, need to secure a supervisor
  - Available through all streams, full year course
  - Evaluated based on two presentations and reports
  - Contact me for more info
  
- **ENGINEER 4EX3: Experiential Engineering Design**
  - For members of clubs/teams, full year course
  - Contact Dr Hassan for more info



# **Q&A on Electives**



# Projects

- Provide students with projects that involve developing a solution to an “**open ended**” mechanical engineering design problem in the context of a senior year 2-term project course.
- Projects can be either faculty-proposed or student-proposed
  - Come up with your own project ideas **well in advance!**
- **RECOMMENDATION:** Attend Capstone Showcase on April 8<sup>th</sup> to see examples

# Faculty-Proposed Projects

- Many faculty in the department participate in 4M06
  - E.g. 14 this year
- Over the summer, each submits several project ideas
  - Often related to research interests
- These are approved and posted to Avenue in September
- Projects include design, analysis, building and testing
  - Department has budget for prototyping
- Groups submit preferences
- Projects allocated by course coordinator

# Student-Proposed Projects

Requirements:

- Major emphasis on **design** in every project
- Most projects involve not only design but build and test phases
- The only way to get a 'reserved' project

Process (**must complete by July 31<sup>st</sup>**):

- Form a group, develop your idea
- Reach out to either Dr Bone (coordinator) or a faculty member who would be appropriate to advise (based on expertise)
- Work together to complete a full proposal, which advisor will submit



# Student-Proposed Projects

Start planning early!

- e.g. Dr Veldhuis *currently* putting together MCA competition team

Find a supervisor with relevant expertise.

Project will go through several iterations as you refine it with supervisor and ensure meets course requirements.

Ideas:

Big push for entrepreneurial efforts at McMaster. Do you want a startup?

Did a project develop out of summer job? Helps keep link with employer?

# Capstone (5P06)

1. Multidisciplinary design project reinforcing both mechanical and biomedical engineering
2. Fall lectures (and quizzes); no lectures in winter
3. Groups of 2-5 members
  - If a single discipline, 2-4 students
  - If two disciplines, up to 5 students
  - Pick people you work well with, with similar interests
  - As with 4M06, individuals may be added if necessary
4. Supervised by a Lead Instructor (bio) and Disciplinary Instructor(s) (mech + other)
  - Minimum monthly meetings with each



# Project Definition

- Projects can be student developed or externally developed
- Each project has a 'stakeholder', defines the problem (user needs)
- Meet monthly with them for feedback

## Process:

- Over summer we solicit projects from faculty, clinicians, other partners, complete a scoping description
  - Student groups may complete description and get it approved
- Posted and updated regularly on Avenue thru September
- Groups contact stakeholder to get information and express interest
- Form completed to pick and stakeholder approval obtained

# Deliverables

- Written:
  - Disciplinary justification, 3 project reports (in chapters) and final report
- Oral:
  - Proof of concept demo, final demo, expo poster presentation
- Budget available for prototyping
- Mech&ibio students have access to technical staff and mech shop
- Also have access to ibio labs & techs

# **Q&A on Capstone**

Apply now for  
**NSERC Undergraduate  
Student Research  
Awards (USRA)**



- Email was circulated today!
- \$6,000 award + top up from supervisor
- Full time, 14-16 weeks
- Canadian citizen or PR
- cGPA of B- (realistically higher)
- Unlimited self-identified Black and/or Indigenous students
- Need a supervisor to agree, fill out simple form

# Graduate Studies

- Research intensive program provides more advanced training in an area of interest – more depth and breadth of knowledge
- Doing something new, problem solving, write and defend a thesis
- Prepare for technical leadership and specialization
- Grad co-op program available

## Admissions:

- Need a supervisor: oversees research, funds work
- B- average (can be waived), can start any semester
- Best graduate students have problem solving skills, resilience, self drive, curiosity, communication skills

# Tips

- Research experience great (summer job, 4X04) but not required
- A good supervisor / lab group is **so** important
  - Meet their current graduate students
- Reach out usually early in New Year
  - Ability to accept students often depends on funding
- Emphasize what you bring that's unique
  - Hands on skills? Organized multi-tasker?
- Know what they do (generally), articulate how aligns with your goals
- Line up good references (need 2 typically)
- Application is often last step – make that connection first



# Research Areas – on mech website

## Areas of specialization

The department of Mechanical Engineering is home to excellent faculty members and researchers with expertise in various areas of specialization.

[Discover our research](#) →



Advanced Manufacturing



Biomechanics



Energy & Fluid Systems



Mechanics & Design



Smart Systems

YouTube video for each area!

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### Departments

- [Chemical Engineering](#) ▾
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- [Computing & Software](#) ▾
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Degree options

Courses

[Research](#) ▲



Check out this video about Biomechanics at McMaster Engineering and scroll down to learn about the faculty involved in this research.

# M.A.Sc. Degree

- Thesis-based
- Generally 2 years full-time (can do part-time)
- Can continue or transfer to Ph.D. studies

## Degree Requirements:

- 4x Level 700 courses (1 Level 600 course is allowed)
- Seminar attendance & presentation, Supervisory Committee Meeting

Receive funding from TA-ing, research supervisor, scholarship(s)

- Varies by status, but minimum total funding ~\$25k
- May be eligible for top ups or larger scholarships



# Accelerated M.A.Sc. Degree

- Marketed as a M.A.Sc. in 12 to 16 months
  - This varies
- Undergraduate research counted towards M.A.Sc. Thesis
- One Class counts for both B.Eng and M.A.Sc.
- Same academic requirements & funding as regular, full-time M.A.Sc. students

# Ph.D. Degree

- Thesis-based
- Generally ~4 years full-time



## Degree Requirements:

- 2x Level 700 courses
- Seminar attendance & presentation, Supervisory Committee Meetings
- Comprehensive exam

Receive funding from TA-ing, research supervisor, scholarship(s)

- Varies by status, but minimum total funding ~\$27k
- May be eligible for top ups or larger scholarships

Industrial PhD, Direct to PhD -> options

**Questions?**