

**ME3O04 –Fluid Mechanics
Fall 2018**

Instructor: Prof. Mohamed Hamed
Email: hamedm@mcmaster.ca
Tel: 905-525-9140 ext. 26113
Office hour: Thursdays 2:00-3:00 PM
Personal website: <http://mechfaculty.mcmaster.ca/~hamedm/>

Course Website: Go to <http://mechfaculty.mcmaster.ca/~hamedm/>
Click on Courses
Click on *ME3O04 course site*

Textbook: “Introduction to Fluid Mechanics”, by R. W. Fox, A. T. McDonalds, and P. J. Pritchard, 9th edition, John Wiley, 2015.

- The textbook will be used to assign problems.
- The textbook supplements lectures and class discussions.
- The textbook is not a substitute for lectures.

Important

Announcements: Important announcements will be posted on course website.
It is the student’s responsibility to check the “Important Announcement” section on course website at least once a week.

Downloads Lecture notes and other material will be posted on the course website in a password protected section. All material is copyright protected and should not be shared with and/or distributed to others.

Assessment: The following distribution of marks will be used, unless there is a valid and compelling reason to use an alternative weighting scheme. Quizzes and tests missed without legitimate and documented reason will have a grade of zero.

Two term tests	40% (20 % each)
Quizzes	10%
Final exam	50%

Lectures:

- **Laptops, Tables, Cell Phones, and the like are not allowed** during lectures and tutorials.
- Class discussions might include points that are not necessarily included in the textbook.
- All exams (two term tests and final) will include questions on theory and concepts covered in lectures and class discussions.
- Assignments might include questions based on lectures and class discussions.
- Attending lectures is very important!

Tutorials

- Tutorials start the week of Sept 10.
- Laptops, cell phones, tables, etc. **are not allowed** during tutorials
- The following will be conducted during tutorials: -
 1. TAs will solve additional problems similar to the assigned ones.
 2. TAs will address any unclear points.
 3. Help students solve the assigned problems.
 4. Provide and administer quizzes.

Quizzes Quizzes will be provided during tutorials, roughly every two weeks.

Assignments:

Roughly, every week, textbook problems and questions based on class discussions will be assigned and posted on the course website. Students are strongly encouraged to solve these problems to prepare for the two term tests and final examination.

Term tests: There will be two, closed-book, term tests.

- First term test will be on **Friday October 5 at 7:30 PM** in LRW-B1007.
- Second term test on **Friday November 9 at 7:30 PM**. Location is based on last name, as follows:

Student Last Name	Location
A - H	T34-103
I - R	T34-104
S - Z	T13-125

- Students arriving after 20 minutes from the start of the test will not be allowed to write the test.
- An equation sheet will be included with the exam paper, a copy of which will be posted on the web before the tests.
- It is recommended that you write your answer during the term tests in PEN. However, if pencil is used, you will not be able to discuss your mark.

Final Examination: The final exam is a closed-book exam that covers all course material. An equation sheet will be included with the exam paper, a copy of which will be posted on the web before the exam. Only formulas provided on this sheet will be included in term tests and final examination papers. Other formulas that are not included here and covered in class and course material are to be studied and memorized.

Calculator Use: Only a Casio FX-991 MS or MS+ calculator is allowed.

Laptops, Cell Phones, and Tablets Use: Not allowed during lectures, tutorials, and exams.

Course Objectives:

This course is an introduction to the subject of fluid mechanics. It includes the following topics: fundamental concepts, fluid statics, conservation laws, incompressible inviscid flows, dimensional and similarity analysis, internal incompressible viscous flows, introduction to boundary layers, and lift and drag. While covering the basics and fundamentals of fluid mechanics, the emphasis in this course will be on using those basic principles to analyze various engineering systems.

Course Topics:

1. Introduction and Fundamental Concepts.
2. Fluid Statics.
3. Integral Analysis.
4. Differential Analysis.
5. Incompressible Inviscid Flow.
6. Dimensional Analysis.
7. Internal Incompressible Viscous Flow.
8. External Incompressible Viscous Flow.

Learning Outcomes: Upon successful completion of the course the student will be expected to have demonstrated the ability to:

1. Understand and use force analysis in static and moving fluids to analyze fluid flow systems.
2. Understands and knows how to apply the various methods of analysis in fluid mechanics (the Reynolds Transport Equation -Control Volume Analysis and differential approach) to solve real-life fluid flow problems.
3. Select and use flow visualization tools (e.g., Streamline, Pathlines, and Streaklines) to analyze and understand the main features of a certain fluid flow.

4. Comprehends the concepts of boundary layer, displacement thickness, and flow separation and be able to use these concepts to simplify the analysis of real flows.
5. Understand the concept of similarity and dimensional analysis and be able to use it to develop and carry out model-prototype analysis.
6. Estimate friction loss in fluid flow networks.

Graduate Attributes: This course provides the students opportunity to develop the following measures of graduate attributes

Graduate Attributes	Learning Outcomes where it is measured
Knowledge base for Engineering (Indicator 3)	1-6

Policy Reminders:

1. Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](https://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf) (<https://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>), located at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:

- Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
- Improper collaboration in group work.
- Copying or using unauthorized aids in tests and examinations.

2. McMaster Student Absence Form (MSAF)

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

The weight of any missed work reported using MSAF will be automatically added to the weight of the final examination.

3. Academic Accommodation for Religious, Indigenous or Spiritual Observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

4. Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact [Student Accessibility Services \(SAS\)](#) to make arrangements with a Program Coordinator. [Student Accessibility Services](#) can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University's [Academic Accommodation of Students with Disabilities](#) policy.

5. Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.