EXPANDED COURSE DESCRIPTION
MECHANICAL ENGINEERING
Lassonde School of Engineering
Mechanical Engineering
LE / MECH 2202 3.0 SECTION M
HEAT AND FLOW ENGINEERING PRINCIPLES
FALL 2019 / WINTER 2020

Last Modified Date: 11/15/2019

COURSE CALENDAR DESCRIPTION
This course covers introduction to modes of heat transfer, 1D heat conduction fluids, properties of fluids, principles of fluid mechanics, fluid statics and internal flows, surface tension and capillarity. Prerequisites: SC/MATH 1013 3.00, SC/MATH 1014 3.00, and SC/PHYS 1800 3.00.

INSTRUCTOR(S)

<table>
<thead>
<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
<th>Contact Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rezai, Pouya</td>
<td>Sec. M / LECT / W</td>
<td><a href="mailto:pouya.rezai@lassonde.yorku.ca">pouya.rezai@lassonde.yorku.ca</a></td>
<td>York Ext. 44703</td>
</tr>
</tbody>
</table>

ADDITIONAL INFORMATION

LECTURES AND TUTORIALS

Lectures: Mondays, Wednesdays, and Fridays at 11:30-12:30 in Curtis Lecture Halls (CLH) H Reading week: No classes or exams on February 15-21

Tutorial 1
Tuesdays, 11:30AM-12:30AM, CC, Room 106
Mohamed Abdelhamid - mahamid2@yorku.ca & Mehran Behrouzi - mehran74@yorku.ca

Tutorial 2
Thursdays, 11:30AM-12:30AM, CC, Room 106
Arsalan Nikdoost - nikdoost@yorku.ca & Mohammad Charjouei - mcm92@yorku.ca

Tutorial 3
Fridays, 14:30PM-15:30PM, BC, Room 230
Aniket Prabhudesai - aniketuniversity@gmail.com & Ehsan Tabesh - ehsan48@yorku.ca

COURSE WEBSITE
On Moodle (https://moodle.info.yorku.ca/). All information will be posted here.

TEXTBOOK

These textbooks are used in MECH 3202 (Fluid Dynamics) and MECH 3203 (Heat & Mass Transfer) in year 3.
**Other useful textbooks:**
- Fundamentals of Thermal-Fluid Sciences; by Yunus A. Cengel, John M. Cimbala, Robert H. Turner; McGraw Hill.
- Thermal Sciences, An Introduction to Thermodynamics, Fluid Mechanics, and Heat Transfer; by Merle C. Potter and Elaine P. Scott; Cengage Learning
- Introduction to Thermal and Fluids Engineering; by Deborah A. Kaminski and Michael K. Jensen; John Wiley and Sons Inc.
- Introduction to Thermal Systems Engineering, Thermodynamics, Fluid Mechanics and Heat Transfer; by Moran, Shapiro, Munson and Dewit; John Wiley and Sons Inc.

**TOPICS AND CONCEPTS**
We will cover the course topics listed below from the textbooks (as time allows). Chapters will be taught partially or fully in the class and examples will be solved during lectures and tutorials. Additional materials will be posted on the course website (Moodle) or distributed in the class as required. **Some lectures may be done online and watching the online videos before the class is mandatory.** Your attendance at lectures and tutorials is required.

**Fluid Mechanics** (taught from Fluid Mechanics by White)

**Week 1**
Introduction – Chapter 1

**Week 2-3**
Pressure Distribution in a Fluid – Chapter 2

**Week 4-6**
Integral Relations for a Control Volume – Chapter 3

**Week 6-8**
Viscous Flow in Ducts – Chapter 6

**Heat Transfer** (taught from Heat and Mass Transfer by Cengel)

**Week 8-9**
Introduction and Basic Concepts – Chapter 1

**Week 9 -10**
Heat Conduction Equation – Chapter 2

**Week 11**
Steady Heat Conduction – Chapter 3

**Week 12**
Fundamentals of Convection – Chapter 6

**COURSE LEARNING OBJECTIVES**
Upon completion of this course, students are expected to learn and retain the following concepts and skills:
1. Convert real thermal fluid situations to physical and mathematical models.
2. Use properties of liquids like density, viscosity and surface tension in calculating pressure in a fluid.
3. Calculate hydrostatic forces applied to flat and curved surfaces submerged in fluids.
4. Apply Reynolds transport theorem for an intensive property – mass and momentum.
5. Calculate pipe flow with losses using the energy equation.
6. Analyze the conduction, convection, and/or radiation heat transfer using engineering models and an electrical analogy.

**COURSE EVALUATION**
Participation - 6% - Participation in discussions in classes and tutorials
Assignments (4) - 8% (2% each) - Provided in-class and due in 1 week
Quizzes (4) - 16% (4% each) - Times will be announced 1-2 weeks in advance
Midterm Exam - 30% - To Be Determined
Final Exam - 40% - To Be Determined

Notes about Evaluation

Evaluation will be based on mandatory assignments, quizzes, a midterm and a final examination. Practice questions (not graded) will be provided to prepare students for quizzes and exams. Solutions to practice questions will be posted on Moodle. Students are welcome to discuss their solutions with TAs and the instructor of the course during or outside the office hours.

- **Assignments:** Students are expected to work on assignments independently (submit own solutions dissimilar to others and to solution manuals). Assignments must be submitted on-time based on due dates on top of the assignment pages. The only accepted submission method is in hard copy format, to the instructor, and in the classroom. Illegible and messy solutions may receive significant mark deductions. For each day of late assignment submission after the due date (which includes weekend days and holidays), a 20% deduction of the maximum grade per day will be applied. Late assignments should only be submitted to the course instructor. Marked assignments will only be handed back in the class and tutorials. All assignment grade appeals should be made to the TAs in writing and within 24hr of receiving the grade. Appeal responses will also be provided in writing.

A logical correlation between the assignment and quiz grades must exist. For instance, a student with excellent marks on assignments is expected to have very good to excellent grades on quizzes, under normal circumstances. Otherwise, the assignment grades may be adjusted by the instructor based on the quiz grades.

- **Quizzes:** Quizzes will be held during tutorials or Assignments, problems solved in the class and practice questions posted on course website are the best ways to prepare for quizzes. Each student should attend the quiz in his/her registered tutorial.

- **Midterm exam:** The midterm exam will cover the sections taught from Chapters 1, 2, 3 and 6 of the Fluid Mechanics book and Chapters 1, 2, 3, and 6 of Heat and Mass Transfer

- **Final exam:** The final exam will cover the sections taught from Chapters 3 and 6 of Fluid Mechanics textbook and Chapters 1, 2, 3, and 6 of Heat and Mass Transfer

- **Missed Quizzes and Exams:** Students with a documented reason for missing a course test (quiz and exam), such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., doctor’s letter and other required documents by the department, faculty and York U) may request accommodation from the Course Instructor. Supporting documents for being absent at a test should be submitted to the course instructor within 48hrs of the test. Further extensions or accommodation will require students to submit a formal petition to the Faculty. If approved by the instructor, they may be allowed to write a make-up test on an agreed date or transfer grade weight to other evaluation components. If a student leaves the midterm examination after 25 minutes, the midterm will be graded, and that mark will be applied. In addition to university policies on granting a deferral final exam, the granting of a deferral final exam also requires that the student has performed satisfactorily in the course according to the evaluation scheme established in this course outline, excluding the final examination for which deferral privileges are requested. Appeals for test regrading should be made during a review session that the instructor will arrange. Appeals are only accepted during this review session, and must be done in writing, with the understanding that the test will be regraded in whole. Responses to grade appeals will also be made in

OTHER INFORMATION

**Classroom Etiquette**

Photography, movie making, voice recording and use of electronic devices during the class is only permitted with permission from the course instructor. Arriving on-time and keeping the noise level down in the class is respectful to others and expected.

**NETiquette**

In all online communications (e.g., email, online discussion, or other forms of online communications), please consider the guidelines from the Core Rules of Netiquette by Virginia Shea (http://www.albion.com/netiquette/corerules.html). Sometimes, online behaviour can appear to be inappropriate or disrespectful that it requires attention and follow up. In this case, please make sure you let your instructor know immediately so that the right resources can be identified to help.
Copyright

All the course materials including outline, PowerPoint presentations, lecture notes, videos, tutorial notes, etc. belong exclusively to the course instructor (Dr. Pouya Rezai) and are copyright protected. Notes can be taken for your education purposes but sharing, distributing and reproducing the course materials for commercial and non-commercial purposes can only be done by a written permission from Dr. Pouya Rezai. Violating these terms may result in change of grade to F even after the completion of the course.

ACADEMIC INTEGRITY LINKS
- Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
- Academic Integrity - http://lassonde.yorku.ca/academic-integrity

STUDENT LINKS
- Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
- Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
- Student Accessibility Services (SAS) - https://accessibility.students.yorku.ca/
- York University’s Policies on Gender/LGBTQ*/Positive Space - http://rights.info.yorku.ca/lgbtq/

LAND ACKNOWLEDGEMENT
- We acknowledge our presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, the Huron-Wendat, and the Métis. It is now home to many Indigenous Peoples. We acknowledge the current treaty holders, the Mississaugas of the New Credit First Nation. This territory is subject of the Dish With One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.
- The Indigenous Framework for York University: A Guide to Action can be found here: http://indigenous.info.yorku.ca/
- Meaning of a land acknowledgement: http://healthydebate.ca/opinions/indigenous-land-acknowledgements

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.
Moodle @ York University