

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ON**

**CQUBSE OUTLINE**

**COURSE TITLE:** MECHANICS OF FLUIDS

**CODE NO.:** MCH - 203                      **SEMESTER:** three

**PROGRAM:** CIVIL ENGINEERING TECHNOLOGY

**AUTHOR:** G. DISANO

**DATE:** JUNE 1995              **PREVIOUS OUTLINE DATED:** OCTOBER 1993

**APPROVED:**              ^P^^A^tL.  
DEAN                              /

<JS~'06 ~ 13  
DATE

MECHANICS OF FLUIDS  
COURSE NAME

MCH 203-4  
CODE NO.

TOTAL CREDITS     5

PREREQUISITES: PHYSICS PHY-105: APPLIED MECHANICS - STATICS MCH-100

I. **PHILOSOPHY/GOALS:** This is a basic course in fluid statics and dynamics. It gives the student the tools necessary for the understanding and design of fluid flow systems. The course is designed to place emphasis on basic principles and their applications, in a practical way, as opposed to a theoretical approach.

**II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):**

Upon successful completion of this course the student will:

- 1) in his/her own words write definitions for the concepts introduced;
- 2) answer questions requiring a knowledge of the concepts presented;
- 3) respond to questions requiring extrapolation of the course content;
- 4) solve problems requiring an understanding of the course theory.

**III. TOPICS TO BE COVERED:**

Approximate Time  
Frames (Optional)

- |  |       |
|--|-------|
| 1) Fundamental Concepts and Fluid Properties | _____ |
| 2) <u>Fluid Statics</u>                      | _____ |
| 3) <u>Fluid Dynamics</u>                     | _____ |
| 4) <u>Energy Losses due to Friction</u>      | _____ |
| 5) Open Channel Flow                         | _____ |

Continued ....

MECHANICS OF FLUIDS  
COURSE NAME

MCH 203-4  
CODE NO.

**V. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS, ETC.)**

See attached sheet: GRADE REQUIREMENTS

**VI. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

**VII. REQUIRED STUDENT RESOURCES**

Mott, Robert L.; APPLIED FLUID MECHANICS, Fourth edition. Maxwell Macmillan Publishing Company, Toronto, Canada. 1994.

**VIII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:**

**Book Section** You will find the college's collection of fluid mechanics books on the second floor of the college library. They are located on the shelves under the Call Number TA 357.

**Periodical Section**

Audiovisual Section

**IX. SPECIAL NOTES**

Students with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

Continued \_\_\_\_

COURSE OUTLINE  
MECHANICS OF FLUIDS  
MCH 203

Civil Engineering Technician/Technology

Reference Text: 'Applied Fluid Mechanics', 4th edition  
by Robert L. Mott

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
I		<u>Fundamental Concepts &amp; Fluid Properties</u> a) differences between 'liquids' & gases b) Force and Mass c) the S.I. system of units d) the U.S. Customary system of units e) the definition of Pressure f) Compressibility g) Density, Specific Weight and Specific Gravity h) Dynamic Viscosity i) Kinematic Viscosity j) variation of viscosity with temperature k) viscosity measurement	Chapters 1 c 2
II		<u>Fluid Statics</u> a) Absolute and Gauge Pressure b) Manometers c) Barometers d) Pressure Gauges and Transducers e) pressure expressed as the height of a column of liquid f) forces on submerged plane and curved areas g) Buoyancy h) Archimedes' principle	Chapters 3,
III		<u>Fluid Dynamics</u> a) fluid flow rate b) the 'continuity equation' <sup>1</sup> c) conservation of energy - Bernoulli's equation d) applications of Bernoulli's equation e) Torricelli's equation f) flow due to a falling head g) energy losses and additions h) the general energy equation i) 'laminar' flow and 'turbulent' flow j) Reynolds' numbers k) velocity profiles	Chapters 6,

Continued ....

Energy Losses Due to Friction

Chapter 9

- a) Darcy's & Darcy-Weisbach equations
- b) friction loss in laminar flow
- c) friction loss in turbulent flow
- d) Friction Factor
- e) Roughness Coefficient
- f) Hazen-Williams formula for water flow

Open Channel Flow

Chapters 13  
& 14

- a) Hydraulic Radius
- b) classification of open channel flow
- c) Reynolds' numbers in open channel flow
- d) kinds of open channel flow
- e) uniform steady flow in open channels
- f) Manning's formula
- g) the most efficient shape for open channels
- h) open channel flow measurement

GRADE REQUIREMENTS

MCH 203

MECHANICS OF FLUIDS

(Civil Engineering Technician/Technology)

Your final grade in MCH203 will be determined on the basis of four tests to be administered during the semester. Each test will examine your knowledge of a number of topics and will be administered within one week of completing those topics. The topics covered in each of the four tests are as follows:

Test #1\_\_\_\_\_Topic No. I

Test #2\_\_\_\_\_Topic No. II

Test #3\_\_\_\_\_Topic No. III

Test #4\_\_\_\_\_Topics No. IV & V

The four tests are of equal weight (i.e. each of the four tests is worth 25% of your final grade). As a result, provided you have received a passing grade in each of the four tests, your final grade will simply be an average of your four test results. In order to obtain your letter grade the following percentage-letter grade equivalents will be used:

A <sup>+</sup>	:	90% - 100%	( <u>Consistently</u> outstanding achievement)
A	:	80% - 89%	(Outstanding achievement)
B	:	70% - 79%	( <u>Consistently</u> above average achievement)
C	:	55% - 69%	(Satisfactory or acceptable achievement)
X or R	:	0% - 54%	(Incomplete or Repeat)

If your final average is below 55%, or if you have received a failing grade in one or more of the unit tests, whether you receive an 'X' (Incomplete) or an 'R\*' (Repeat) grade is entirely at the instructor's discretion. The decision will be based upon your final average (e.g. 32% would result in an R grade while 50% might result in an X grade); your attendance during the semester; your attitude while in the classroom; your perceived level of effort during the semester; etc..

In any case, should you find yourself with an X grade at the end of the semester, in order to upgrade your mark to a passing grade you will be required to write a make-up examination covering the entire course content. Should you receive a passing grade on the make-up examination (55% or higher) your X grade will be upgraded. The best you can do after receiving an X grade as a result of a failing average is a C! If you were required to write the make-up examination as a result of having failed one test you may substitute the exam result for this test result.

Prior to administering any test you will be notified a full week in advance. Should you for any reason not be able to be in attendance on a day for which a test has been scheduled it is your responsibility to notify the instructor prior to the test! If your reasons are acceptable a date will be set during which you may write a substitute test for the one you have missed.