

SMS 204: IMS Physics Module Spring 2020

SYLLABUS

Date 2020	Lecture	Lab
1/27/2020	Dimensions; uncertainty in measurements; continuum mechanics of simple fluids and solids	Volume, mass, and density; the no-slip condition; Stokes settling
2/3/2020	Volume, density, mass; mass conservation and continuity; momentum; Newton's laws; body and surface forces in fluids	Static pressure, manometers, Pascal's press
2/10/2020	Pressure, buoyancy, Archimedes principle; Energy, power, Bernoulli's principle	Buoyancy
2/17/2020	Heat and temperature; diffusion; infrared radiation	Heat and temperature
2/24/2020	Swimming at low and high Reynolds number (Re)	Drag and swimming at high and low Re
3/2/2020	Optics and acoustics	Optics and acoustics
3/9/2020	Final exam	

Emails for inquiry:

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Homework will be graded by Faith Hoyle (faith.hoyle@maine.edu)

Lab TAs: Josephine Roussel (josephine.roussel@maine.edu) and Gretchen

Spencer(gretchen.spencer@maine.edu)

Goals of this module are to:

- introduce you to the pervasive power of dimensional analysis in physical thinking;
- develop your understanding of fluid behaviors, *i.e.*, their static, kinematic and dynamic properties;
- develop your appreciation for the unusual nature of water as a fluid and liquid.
- develop your understanding and communication of error in measurements (*cf.* rubric);
- continue development of your facility with unit conversions;

Grading will be based on participation (20%), weekly assignments and quizzes (when applicable) (50%) and a final exam (30%). There will be no make-up/retake/rescheduled exams. Late assignment will suffer an automatic 10% decrease in grade (for one week. Afterwards it is 0). Conversion from numerical to letter grade is conducted as follows:

Letter grade	Numerical grade

A	95.00-100
A-	90.00-94.99
B+	86.67-89.99
B	83.34-86.66
B-	80.00-83.33
C+	76.67-79.99
C	73.34-76.66
C-	70.00-73.33
D+	66.67-69.99
D	63.34-66.66
D-	60.00-63.33
F	<60.00

All students are expected to adhere to the University of Maine's policy on Academic Honesty and Dishonesty, which can be found at: <http://www.maine.edu/about-the-system/board-of-trustees/policy-manual/section501/> . Any attempt to represent the work of another as your own is grounds for failure. The University of Maine policy states: *an instructor who has probable cause or reason to believe that a student has cheated may act upon such evidence.*

There is reading material for each week which provides background to the material and references for those wanting to get even deeper. I expect you to read them before class, and if you do, they will help you have better understand the class and the lab.

Some of the labs have been published and can be found at: http://misclab.umeoce.maine.edu/boss/classes/SMS_204/teaching_phys_concepts.pdf. Class materials are self contained, but just as in real life you can always improve your understanding by working with some of the additional material that is cited and by further library and internet research. Each week viewing of movies on fluid dynamics will be assigned to provide you with some pertinent knowledge on the subject.

The instructor is Emmanuel Boss. His schedule involves teaching two classes and several out-of-town trips. The fastest way to reach him is by e-mail <emmanuel.boss@maine.edu>. We are packing a lot into a short time: Feedback is appreciated during the semester, especially on things that you find unusually dull, interesting, confusing or clear. We have a large class (5 lab

sessions). Instructor (E. Boss), TAs (Faith Hoyle – who will check the homework, Josephine Roussel and) and Jim Loftin will help you in the lab and/or homework.

All class materials will be available at blackboard as well as at:
http://misclab.umeoce.maine.edu/boss/classes/SMS_204/syllabus.htm