



9-17 ME 304- Fluid Mechanics –F-17- Florio

Text: Munson, etal, *Fundamentals of Fluid Mechanics*, 7th Ed, John Wiley

" The text , Book and Lecture, will 'teach' you little unless are willing to put an active, organized effort into the learning process. **Active-** directed work is necessary to understand and remember the material."

Technicians are told “how”, engineers know “why” as well as how.

Week(s)	Chapter	Topic	HW
1	Chapt 1 Pg 2-22	Introduction	1-62,66,69,81,74
2	Chapt 2 Pg. 40-69	Fluid Statics	2-27,37,40,61,86,87,116,140
3	Chapt 3. Pg. 101-131	Bernoulli.s eq	336,45,61,67,118
	Test 1		
4	Chapt 4. Pg. 157-187	Fluid kinematics	4-13,22,36,56,73
5	Chapt. 5 Pg. 200-210	Control Vol-mass	5-12,15,19,23
6	Chapt 5 Pg. 211-236	Control vol-momentum	5-40,45,46,57,61,70,101
	Test 2		
7	Chapt 5. Pg. 237-250	Control vol- energy	5-108
8	Chapt 7,Pg. 347-382	Dimensional Analysis	7-17,17,25,58,60
9	Chapt 6, Pg. 276-296	Differential analysis	6-4,10,14,86,90,92,93,102
10	Pg 319-329		
	Test 3		
11	Chapt. 8 Pg. 400-422;426-455	Pipe flows	8-9,18,22,48,77,91,97,100
12-13	Chapt 9 . Pg 480-537	External flows	9-13,21,27,46,53,48
14		Drag	68
	Final Exam		

Course Grading Information.

ME 304 17F- All Tests and short quizzes are closed book and notes. As necessary, a formula sheet will be provided. **A standard calculator , with no storage of equations or information permitted. Cell phones, laptops, tablets and any other electronic communication devices are not permitted.**

No sharing of any material or calculator is permitted. All solutions must be complete and logical. (See Homework section) All solutions begin with the problem defined, and a system definition with interactions indicate by symbol as well as direction. This must be followed by the development of the modeling equation from the basic laws and if required numerical substitution.

Graded tests will be brought to class only once, and tests must be returned to the instructor.

It is the student's responsibility to notify the instructor of any possible errors in grading of the test on the day the test is returned to the class.

Any possible test conflicts must be reported one week prior to the date of the test/exam and will not be accepted after the test is given. Any reported conflicts must be consistent with the NJIT policy or procedure.

Integrity: "A student signature is required on any exam or assignment and is understood as compliance with the academic integrity policy. No unauthorized aid was given or received. *Work copied or obtained through the use of unauthorized (only by the instructor) aid will not be accepted.* For general homework problems to be submitted for credit -the only authorized aid includes discussing the problem statement, approaches for problem solving, and basic concepts related to the problem with other students in your class. Unauthorized aid includes but is not limited to solutions manuals or other solution materials or other individual's work." LAF

Cell phones, tablets and laptops, etc must be turned off during class. Use of any communication device or improper use of a calculator during a exam, test(quiz) is prohibited.

Assignment Sheet usually available at: [moodle and web.njit.edu/~florio/FLORIO.htm](http://moodle.andweb.njit.edu/~florio/FLORIO.htm)

The instructor reserves the right to modify this syllabus as needed

ME 304

Course Grading Information. –
a. Tests – 18 Pts each ; Grade for any missed test will be recorded as a grade of zero
b. *All work submitted must be in pencil. Any required homework problem must be in the format specified–Any problems due must be submitted at the start of class. No Make-up.
c. Class participation –you are expected to sign the attendance sheet at each class and actively participate. Class participation - If your average grade on tests is at least 60 % and an active class participation score, a max of 5 Pts could be added to your score.
d. Comprehensive Final Exam - 36 Pts - No make-up without the approval of the Dean of Students.
e. Short quiz- HW tests-- maximum 5Pts
Grade based on a curve and course objectives
f. Work copied or the use of unauthorized aid will not be accepted or graded. See Integrity

Homework Format

"Homework is an important part of this course. It is a necessary part of understanding and learning of the course material. You are expected to have solved every assigned problem. For special problems, usually numerical results or expressions will be given after the assignment is due. It is the student's responsibility to learn how to arrive at the final solution." LAF

It is not necessary to memorize numerous equations, for problems are best solved by use of the definitions and the applications of the laws applicable to material systems as well as proper property relations and evaluation.

Format for work submitted for grading: Solutions in pencil. Each problem starts on a separate page, 8.5 x11, with all pages stapled together.

- 1. Known: A brief summary of the problem, “in your own words”.**
 - 2. Find: Quantities to be determined.**
 - 3. Sketch: Properly labeled and indicated- the physical system , interactions and directions of exchanges .**
 - 4. Assumptions: Modeling assumptions that are used in solving the problem are listed and clearly indicated as a constraint.**
 - 5. Properties: Substance identified and needed properties, value (units) and source of property values.**
 - 6. Analysis: The problem is solved in a systematic and logical manner, showing all steps, starting from the fundamental equation(s) from which the analysis begins [and numerical values (with units) are shown]. (Usually the modeling constraints are woven in the analysis portion) Final results clearly indicated.**
 - 7. Discussion: Evaluate the solution -Any comments relative to the results , effects or modeling assumptions**
- A. Short tests:-** There could be periodic, short quizzes covering assigned homework problems and lecture material . Any missed quiz will be recorded as a grade of zero.
- B. General Tests.** Generally 3-4 problems which are similar to the Class problems, Text Problems, HW, or Short quiz Problems. Tests stress the following levels: **knowledge, comprehension, application, and analysis and will be graded accordingly.**
- C. Attendance:** You are expected to attend all classes and to sign the daily attendance sheet.

Specific Course Objectives: The students will be asked to demonstrate their knowledge of the material covered in this Fundamental Fluid’s course through their mastery of the following course objectives. Through the study of this material the student will be able to:

1. Evaluate surface forces and pressure differences in a static fluid.
2. Apply the mechanical energy equation-modified Bernoulli equation- to a variety of systems.
3. Apply the integral form of the conservation equations to flow problems and obtain design information.
4. Form dimensionless groups and apply the resulting modeling laws to a engineering problems.
5. Apply the differential form of the momentum equation to plane and pipe flow problems.
6. Determine design parameters for laminar and turbulent pipe flows.
7. Evaluate drag for laminar and turbulent external flows.

