

# MEC364 – Introduction to Fluid Mechanics

The State University of New York, Korea

Course Syllabus

Fall 2020

**Instructor:** Hamid Hefazi , B619 Academic Building ([hamid.hefazi@sunykorea.ac.kr](mailto:hamid.hefazi@sunykorea.ac.kr))

**Lectures:** TUTH 2:00 – 3:15 (B313 Academic Building)

**Recitation:** REM 12:30 -1:20 (B313 Academic Building)

**Textbook:** P. M. Gerhart, A. L. Gerhart and J. I. Hochstein, "Munson's Fluid Mechanics", Wiley, 8th ed., 2017 (Global Edition)

<https://www.wiley.com/en-ad/Munson%27s+Fluid+Mechanics%2C+8th+Edition%2C+Global+Edition-p-9781119248989>

**Class hours: TR: 2:00 – 3:20 (Even weeks 2,4, 6...in person) Odd weeks**

**Office Hours:** Wednesday 2:00 - 4:00 (or by appointment)

**Grading:**

Homework	20%
Midterm 1	20%
Midterm2	20%
Final Exam	40%

**Grading Scale:** Grading on the Curve and normalized to 100

A [100, 95] % A- (95, 90] % B + (90, 85] % B (85, 80] % B - (80, 75] % C+ (75, 70] % C (70, 65] % C- (65, 60] % D+ (60, 55] % D (55, 50] % F (50, 0] % Note: Percentages will be rounded up to the next number.

**Policies:**

- Homework are assigned on Tuesdays and are the next Tuesday
- The Blackboard can be accessed at <https://blackboard.stonybrook.edu/>.
- The time and details about the exam will be announced in the class (and also posted on the Blackboard).
- It is the responsibility of students to make sure that they can access the Blackboard and they have a working email registered with it. The Blackboard should be checked frequently for new materials.
- Exams will be closed book and notes. Only calculators and blank paper are allowed.
- Exams include several "Competency Questions". These include basic questions testing the following Course Learning Objectives. Regardless of your total score, student who fails to get a

full credit on these questions cannot pass the course. Student may ask to re-take a competency question with the instructor's consent. Retaking the competency exam questions does not change your original grade.

**Course Learning Objectives:**

- An ability to quantitatively represent fluid flow variables using dimensions and units. (Sections 1.1, **1.2**, **1.3** and **1.4**)
- An understanding of the concept of viscous flow, including pressure, viscosity, and surface and body forces. (Sections **1.5**, **1.6** and **1.9**)
- An understanding of the principle of manometer as a measuring instrument and determining the hydrostatic force on submerged surfaces. (Sections **2.6** and **2.8**)
- Applying mass conservation and the integral method to determine the force between fluid flow and surfaces of hydraulic machinery. (Sections **5.1** and **5.2**)
- An ability to use velocity field representation to determine the incompressibility, irrotationality, and acceleration of a fluid flow. (Sections **4.2**, **6.1** and **6.2**)
- An understanding of Navier-Stokes equations. (Sections 6.8 and **6.9**)
- An ability to apply Bernoulli Theorem. (Section **3.6**)
- An understanding of the concept of boundary layers (Section **9.2**)

**Course Outline:**

Week 1 (Aug. 25, Aug. 27) On-line	Introduction, Dimensions, Fluid Properties	1.1—1.5
Week 2	Viscosity, Surface Tension	1.6,1.7,1.9
Week 3	The basic equation of hydrostatics, Manometry	2.1–2.3, 2.5–2.7
Week 4	Hydrostatic pressure on surfaces	2.8, 2.10
Week 5	Pressure Prism	2.9
Week 6	Buoyancy, Rigid Body motion	2.11—2.12
Week 7	Review	4.1, 4.2
Week 8	Midterm 1, Bernoulli Equation	6.1
Week 9	Applications of Bernoulli Equation, Control Volumes	3.1, 3.2, 3.4, 3.5
Week 10	Conservation of Mass, Balance of Linear Momentum	3.6, 4.3, 4.4
Week 11	Differential Analysis, Continuity, Equations of Motion	5.1, 5.2.1—5.2.2
Week 12	Review , Midterm 2	6.2, 6.3
Week 13	Potential Flows, Viscous Flows	6.5, 6.6, 6.8
Week 14	Viscous Flows, External Flows	6.8, 9.1
Week 15	Drag and Lift, Prandtl Boundary Layer	9.3, 9.2
Week 16	Transition and Turbulent Boundary Layer, Drag & Lift	9.2

### **Disability Support Services (DSS):**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact One-Stop Service Center, Academic Building A201, (82) 32-626-1117. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

### **Academic Integrity Statement:**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website:

[http://www.stonybrook.edu/commcms/academic\\_integrity/index.html](http://www.stonybrook.edu/commcms/academic_integrity/index.html)

### **Critical Incident Management Statement:**

The State University of New York, Korea expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

### **Attendance Policy of SUNY Korea**

1. All students of SUNY Korea are required to attend every class.
2. Unexcused absences will affect seriously the student's final grade in the course.
3. If a student has over 20% unexcused absence, the student's final course grade will be an 'F'.

Example)

- If the class is a 150-minute class, and is held once a week, the 4th unexcused absence of a student will lead to an F grade of the course.
  - If the class is a 75-minute class, and is held twice a week, the 7th unexcused absence of a student will lead to an F grade of the course.
  - If the class is a 50-minute class, and is held three times a week, the 10th unexcused absence of a student will lead to an F grade of the course.
  - In Intensive English Course (IEC), if a student misses the class more than 40 hours in a semester, the student will receive an F grade on the course.
4. Students should report the reason of absence to the instructor in advance, or immediately after the absence.
  5. When a student excuses his/her absence, the student must provide documentation of the reason for the absence to the instructor.
  6. The instructor of the course reserves the right to excuse absences.
  7. The course instructor may excuse the absence if the submitted documentation fulfills the conditions below.
    - Extreme emergencies (e.g. death in the family)
    - Severe medical reasons with doctor's note (Not a slight illness)
    - Very important events (e.g. national conference, official school event)
  8. At the end of semester, the course instructor should submit a copy of the attendance sheet to the Academic Affairs Office.