ME422: Fluids and Environments [2019 Spring]

Overview

This class covers various examples of environmental fluids, such as small scale fluids in a coffee cup, turbulence in van Gough's Starry Night, and vortex shedding in a bridge, along with relevant background physics and applications. Note that ME221 or an undergraduate-level Fluid Mechanics class is the prerequisite course. Copied homework assignments and exams will be not evaluated.

Grading

Attendance and class participation (10%); Homework assignments (40%); Mid-term (20%); Final (30%)

References

[1] Kundu & Cohen, Fluid Mechanics, Academic Press (5th ed./6th ed.)
[2] R. Stewart (2003) Introduction to Physical Oceanography
[3] Lynne D. Talley, George L. Pickard, William J. Emery, and James H. Swift (2011) Descriptive physical oceanography: An Introduction, Elsevier, Amsterdam
[4] F. White (2009). Fluid Mechanics, McGraw-Hill (7th ed.)

Lecture & Office Hours

10:30 – 11:45 on MON and WED at Creative Learning B/D (E11) Rm. 211
13:00 – 14:00 on MON and WED at Mechanical Eng. B/D (N7) Rm. 6111 (email for scheduling is required in advance.)

Lecturer & Teaching Assistant

Lecturer: Professor Sung Yong Kim (syongkim@kaist.ac.kr; x1523)
Teaching Assistant: Mr. Eun Min Ko (kom0918@kaist.ac.kr)

Course Schedules

No.	Week/Date	Topics	Note
1	1 / Feb. 25	Course Introduction I	
2	1 / Feb. 27	Course Introduction II	
3	2 / Mar. 4	Review of Fluid Mechanics I	
4	2 / Mar. 6	Review of Fluid Mechanics II	
5	3 / Mar. 11	Density: Which ice melts quicker? I	Experiment
6	3 / Mar. 13	Density: Which ice melts quicker? II	
7	4 / Mar. 18	Fluids in a coffee cup I	
8	4 / Mar. 20	Fluids in a coffee cup II	HW1 due
9	5 / Mar. 25	Turbulence in van Gogh's Starry Night I	
10	5 / Mar. 27	Turbulence in van Gogh's Starry Night II	

11	6 / Apr. 1	Rip current, a treadmill in the water I	
12	6 / Apr. 3	Rip current, a treadmill in the water II	
13	7 / Apr. 8	Riding over the hydraulic jump I	HW2 due
14	7 / Apr. 10	Riding over the hydraulic jump II	
15	8 / Apr. 15	Mid-term	09:00-11:45
16	8 / Apr. 17	No class	
17	9 / Apr. 22	Resonance in a bridge I	
18	9 / Apr. 24	Resonance in a bridge II	
19	10 / Apr. 29	An intrinsic frequency in nature I	
20	10 / May 1	An intrinsic frequency in nature II	
21	11 / May 6	Children's day (No class)	
22	11 / May 8	Cool weather in California I	HW3 due
23	12 / May 13	Cool weather in California II	*Recorded class
24	12 / May 15	Cool weather in California III	*Recorded class
25	13 / May 20	Lumbering giants in underwater I	
26	13 / May 22	Lumbering giants in underwater II	
27	14 / May 27	Microplastics and garbage patch	
28	14 / May 29	Environmental sensing	
29	15 / Jun. 3	Environmental numerical simulations I	HW4 due Course evaluation
30	15 / Jun. 5	Environmental numerical simulations II	Course evaluation
31	16 / Jun. 10	Final	09:00-11:45
32	16 / Jun. 13	No class	