



ME491: Special Topics in Mechanical Engineering <Introduction to Environment and Ocean Physics>

🕒 **Class Time** MTWTh 9 – 12am

📍 **Location** To be announced

🎓 **Credit** 3

👤 **Instructor** Professor Sung Yong Kim (syongkim(at)kaist.ac.kr)
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📖 **Required Materials** Fluid Mechanics

Course Summary

★ Description

This class covers various examples of environmental fluids, such as small scale fluids in a coffee cup, turbulence in van Gogh's Starry Night, thread mill in the water, microplastics, underwater communications, and vortex shedding in a bridge, along with relevant background physics and applications.

★ Course Outline

No.	Topics	Note
1	Course Introduction I	
2	Course Introduction II	
3	Review of Fluid Mechanics I	
4	Review of Fluid Mechanics II	
5	Density: Which ice melts quicker? I	Experiment
6	Density: Which ice melts quicker? II	
7	Fluids in a coffee cup I	
8	Fluids in a coffee cup II	HW1 due
9	Turbulence in van Gogh's Starry Night I	
10	Turbulence in van Gogh's Starry Night II	
11	Ocean waves I	
12	Ocean waves II	
13	Rip current, a treadmill in the water I	
14	Rip current, a treadmill in the water II	HW2 due
15	Riding over the hydraulic jump	

16	Mid-term	TBD
17	Resonance in a bridge I	
18	Resonance in a bridge II	
19	An intrinsic frequency in nature I	
20	An intrinsic frequency in nature II	
21	Cool weather in California I	
22	Cool weather in California II	
23	Underwater communication I	
24	Underwater communication II	HW3 due
25	Lumbering giants in underwater I	
26	Lumbering giants in underwater II	
27	Garbage patch & microplastics	
28	Power generation using environmental fluids	
29	Visualization of environmental fluids I	HW4 due
30	Visualization of environmental fluids II	
31	Review	
32	Final	TBD

Course Evaluation

Grading Attendance and class participation (10%); Homework assignments (40%); Mid-term (25%); Final (25%)