

















































Hokkaido University Syllabus								
  Course Title								
Advanced Fluid Engineering								
  Subtitle								
  Instructor (Institution)								
Nobuyuki OSHIMA(Graduate School of Engineering)								
  Other Instructors (Institution)								
Yuji TASAKA(Graduate School of Engineering) Kazumichi KOBAYASHI(Graduate School of Engineering) Hiroshi TERASHIMA(Graduate School of Engineering) Nobuyuki OSHIMA(Graduate School of Engineering) Yuichi MURAI(Graduate School of Engineering) Masao WATANABE(Graduate School of Engineering)								
  Course Type				  Open To Other Faculties / Schools		OK		
  Year		2017	  Semester		2nd Semester (Winter Term)	  Course Number		092166
  Type of Class		Lecture	  Number of Credits		2	  Year of Eligible Students		~
  Eligible Department / Class					  Other Information			
  Numbering Code		ENG 5601						
  Major Category Code		  Major Category Title						
ENG		Engineering						
  Level Code		  Level						
5		Specialized Subjects (basics) in graduate level (Master's Course and Professional Course), Inter-Graduate School Classes						
  Middle Category Code		  Middle Category Title						
6								
  Small Category Code		  Small Category Title						
0								
  Language Type								
Classes are in English.								

  Key Words

Gas dynamics, Boltzmann equation, Computational fluid mechanics, Experimental fluid engineering

  Course Objectives

Six professors give an omnibus lecture on fundamental physics in fluid mechanics. The course is divided into three parts: fundamentals of theoretical fluid mechanics, numerical methods for computational fluid mechanics, and experimental methods for fluid engineering.

  Course Goals

Understanding the advanced contents on fluid engineering.

■ ■ Course Schedule

1. Basic theory of continuum mechanics (2 sessions)
2. Basic theory of conservation equations (3 sessions)
3. Basic theory of turbulent flows (3 sessions)
4. Basic theory of micro flow in porous media (2 sessions)
5. Particle motion in arbitrary fluid flow (2 sessions)
6. Theory of quantitative flow visualization (3 sessions)

The first five sessions given by Profs. Watanabe and Kobayashi deal with fundamentals of theoretical fluid mechanics, including fundamental theory of continuum mechanics, concepts of stress tensors, constitutive equations, derivation of governing equations.

The middle five sessions given by Profs. Oshima and Tsubokura deal with theory and numerical models of turbulent flow and its application to vehicle aerodynamics, and mass transport theory and numerical models in porous media and electro-chemistry in polymer electrolyte fuel cell (PEFC).

The last five sessions given by Profs. Murai and Tasaka lecture on equation of motion of particles subject to arbitrary fluid flow, and its application to quantitative flow visualization in multi-dimensional time-dependent flow configurations.

■ ■ Homework

Lecture is based on a fundamental knowledge of fluid engineering studied in undergraduate level. Students should preliminary finish to learn it before attending the lecture.

■ ■ Grading System

based on class participation (50%), and report results (50%)

■ ■ Textbooks

■ ■ Reading List

■ ■ Websites

■ ■ Website of Laboratory

■ ■ Additional Information

Students are required a basic knowledge of fluid engineering studied in undergraduate level.

■ ■ Update

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