

Fluid Mechanics Summer School 2020

July 18th, 2019

Time and Location

Time: Summer 2020, TBD

Location: Jade University of Applied Sciences, Germany, Wilhelmshaven, Bldg. TBD, Room TBD

The syllabus is adjusted to reflect special circumstances related to the international experience. The table of contents is a guideline; we will try to follow it closely, but be prepared to adjust to changes in pace dictated by our collective experience.

The detailed course schedule will be published after the completion of the Summer School 2020 program.

Instructor

Prof. Dr.-Ing. Holger Sass
Professor for Industrial Engineering

Department of Management, Information, Technology
Jade University of Applied Sciences
Friedrich-Paffrath-Straße 101
Westgebäude Room W123
26389 Wilhelmshaven

phone +49 4421 985 2468
mobile +49 176 41750550
holger.sass@jade-hs.de
www.jade-hs.de/fachbereiche/mit

Office Hours

Open door – we can meet after each day for questions

Catalog Description and Prerequisites

CE 3305: Mechanics of Fluids (3:3:0). Prerequisite: CE2301. Hydrostatics; dynamics of viscous and nonviscous fluids; resistance to flow; flow in pipes and open channels.

Course Textbook

DF Elger, BC Williams, Crowe, CT and JA Roberson: Engineering Fluid Mechanics 10th edition, John Wiley & Sons, Inc., 2013
Massey, Bernard: Mechanics of Fluids, eight edition, New York: Taylor & Francis, 2006

Course Syllabus Fluid Mechanics Summer School 2020 – CE 3305

Course Content

- basic knowledge of technical fluid mechanics;
- professional analysis of functionality and interaction of practice-relevant fluidic problems;
- quantitative determination of necessary physical-technical parameters for simple fluidic problems;
- evaluation and selection of suitable fluidic components and systems

Course Objectives

Upon completion of this course, students should be able to:

- apply conservation laws (mass, energy);
- apply the energy equation (Bernoulli);
- apply the momentum equation (Newton)
- analyze pipe flow of viscous fluids in steady flow
- analytically penetrate application-related requirement profiles in the field of fluid mechanics;
- determine the technical parameters and their relationships;
- apply principles to find solutions to simple practical problems
- select and evaluate suitable fluidic components and equipment to design system solutions;

Outline of Table of Content / Schedule

- Organization, introduction, motivation, examples
- Notation, dimensions, units and related matters
- The characteristics of fluids
- Fluid Statics
- Aero Statics (short overview)
- Incompressible flow of Fluids
- Principles of Conservation
 - Mass
 - Energy
 - Momentum
- Physical Similarity
- Flow and Losses in Pipes and Fittings
 - Reynolds number
 - Moody diagram
 - Pipes in combination (series, parallel)
- Air Flow around a car and a wing
- Compressible flow of Gases (short overview)

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Assessment Instruments

Homework

Homework will be due at the beginning of class on the second class day after it is assigned.

Homework should be scanned, photographed, or otherwise produced digitally – bundled into a single file in pdf-format and e-mailed to me by the due date. I will confirm receipt and then electronically spot-check the homework. My solutions will be posted after the homework due date.

Quiz

Five (5) quizzes are anticipated which will replace the usual mid-term exam. These quizzes will be comprised of several problems, possibly verbatim from the homework, and conceptual questions derived from lecture and homework materials.

Examinations

There will be one final examination, comprehensive, but similar to homework problems. The examination will be open-notes, open-book.

Grading Policy

Final grades are determined based on performance during the course. Letter grades will be assigned using University standards. The approximate weighting of graded material in determining the final grade is as follows:

Homework	25%
Quizzes	25%
Written Examination	50%

Academic Misconduct

Refer to the Texas Tech University Catalog and operating policies (OP 34.12) regarding academic integrity, cheating, and plagiarism. Academic dishonesty will not be tolerated.

Disability Policy

“Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructors office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806- 742-2405.”

Students from Jade University find information about this issue here:

<https://www.jade-hs.de/fileadmin/Barrierefreiheit/Nachteilsausgleich-November-2016.pdf>