ME 461 – Fluid Mechanics

Hour: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.
Coordinator: Mohamed Elsayed

Text Book:

- F. M. White, "Fluid Mechanics", McGraw-Hill, 1994, 3rd edition.
- Musson, Young & Okishi, "Fundamentals of Fluid Mechanics", John Wiley, 1994, 3rd edition

Reference Books:

- Joseph B. Franzini, and E. John Finnemore, "Fluid Mechanics", McGraw-Hill, 1997, 9th international edition.
- Irving H. Shames, "Mechanics of Fluids", McGraw-Hill,1992, 3rd edition.

Specific course information

a. Differential analysis of fluid flow – Kinematics of fluid flow – Linear motion, angular motion and deformation – Conservation of mass and stream function – Velocity potential and irrotational flows – General equations of motion (Navier-Stokes equations) – Euler's equations of motion – Basic two-dimensional potential flows – Superposition of plane potential flows – Introduction to compressible fluid flow - Mach Number and speed of sound – Isentropic and Non-isentropic flow of an ideal gas – Normal shock waves.
b. Prerequisite: ME 362
c. Designation: Required

Specific goals for the course:

- Design and conduct experiments, and collect, analyze and interpret data.
- Identify, formulate, and solve engineering problems. Make appropriate and necessary assumptions. Suggest and evaluate new approaches.
- Understand global effects of practices, products, and events, and the impact of engineering solutions on society
- Ability to visualize the impact of the Mechanical technological development on the environment
- Ability to put forward the design requirements and considerations and manage the different design steps for any mechanical systems.

Course instruction outcomes:

- The student will be able to have a systematic and easily understood account of the basic principles of fluid Mechanics.

Student outcomes:

B, E, H

Topics Covered:

- Differential analysis of fluid flow
- Kinematics of fluids flow
- Linear Motion, Angular Motion and Deformation
- Conservation of Mass and Stream Function
- Velocity potential and irrotational flows
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- Euler's equations of motion
- Basic two-dimensional potential flows
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- Introduction to compressible fluid flow
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Course / credit hours	Math & Basic Sciences	Engineering Topics	General Education
Fluid Mechanics(ME461)/3		3	