

ME 482 Gas Dynamics

2nd semester 1440/1439 AH

Instructor

Dr. Khaled S. Al-Salem

Lecture Hours

8:00 to 8:50 Sunday, Tuesday, and Thursday (at 1C52).

Textbook

Fundamentals of Gas Dynamics, 2nd edition, R. Zucker and O. Biblarz.

Objective

To introduce the students to compressible flow concepts and learn to derive and apply compressible flow equations through a collection of fundamental gas dynamics problems including: compressible flow in varying cross section pipes, one-dimensional compressible flow with friction, one-dimensional compressible flow with heat addition, and normal and oblique shock waves.

Topics

1. Introduction to gas dynamics (3 hours)
2. Basic equations in compressible flows (3 hours)
3. Wave propagation(3 hours)
4. Isentropic flow of a perfect gas(6 hours)
5. Normal shock waves (3 hours)
6. Oblique shock waves (6 hours)
7. Prandtl-Meyer flow (6 hours)
8. Flow with friction; Fanno line (6 hours)
9. Flow with heat addition; Rayleigh line (6 hours)

Assessments

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| • Term project | 10% |
| • Quizzes | 10% |
| • Two midterm exams | 40% |
| • Final Exam | 40% |