

SPC 307 Aerodynamics (3 Cr)

Spring 2017

Prerequisite: Fluid Mechanics - ENGR 207

Course Contents

1. Introduction to Aerodynamics
2. Review on the Fundamentals of Fluid Mechanics
3. Dynamics of an Incompressible and Inviscid flow field
4. Viscous Boundary Layers.
5. Characteristic Parameters for Airfoil and Wing Aerodynamics.
6. Incompressible Flows around Airfoils of Infinite Span
7. Incompressible Flows about Wings of Finite Span
8. Aerodynamic Design Considerations
9. Introduction to Compressible Flows
10. A brief Introduction to Computational Fluid Dynamics (CFD).

Homework

Ten homework assignments distributed throughout the semester.

Fluent Assignment

Four Fluent assignments distributed throughout the semester.

Quizzes

Four Quizzes distributed throughout the semester.

Surveys:

Five Surveys about topics in Aerodynamics throughout the semester.

Fluent Assignment

Four Fluent assignments distributed throughout the semester.

Textbooks:

Bertin, "Aerodynamics for Engineers", 6th Edition, published by Pearson

ANSYS Software

ANSYS Student version can be downloaded from: <http://ansys.com/student>

Approximate Grading Weights

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|----------------------|---|
| Homework Assignments | : 5% |
| Fluent Assignments | : 10% |
| Quizzes | : 10% (4 Quizzes) |
| Surveys | : 5% |
| Midterms | : 20% (2 Midterms) |
| Project | : 20% |
| Final Exam | : 30% (Have to score at least 50% in final to pass) |

Project

Topics

The project should include the simulation of a subsonic flow around airfoils and wings. The simulation results should be compared with experimental result.

Teams

The team should include 4 students.

Project Evaluation

- Two Follow up reports should be submitted by April 2 and May 7. Each report grade weight is 10% of the project.
- Oral Presentation will be conducted. Each group should present its project within 15 minutes. (50% of the project grade).
- Final report should be written in a scientific paper format (you can download a word template from this [link](#)). (30% of the project grade).

Office Hours

Dr. Ahmed Elmekawy: Sunday 12:00 to 1:00 pm

Eng/ Ahmed Sabry: Tuesday 1:00 to 4:00 pm