

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

1. Explain the nature of aerodynamic forces.
2. Define the aerodynamic center and the center of pressure for an airfoil.
3. Calculate aerodynamic forces and moments on bodies by integrating surface pressure and shear stress distributions.
4. Use flow similarity to design wind tunnel tests.
5. Classify a flow as 1-D, 2-D or 3-D, uniform / non-uniform, viscous / inviscid, compressible / incompressible, steady / unsteady, subsonic, transonic, supersonic or hypersonic.
6. Design and perform flow visualization tests to study the characteristics of the flow around 2-D and 3-D aerodynamic bodies and analyze the results from such experiments.
7. Use the momentum equation to calculate (a) lift from given pressure distributions on the top and bottom of an aerodynamic body and (b) drag from given velocity profiles ahead and downstream of an aerodynamic body.
8. Describe qualitatively and quantitatively laminar and turbulent boundary layers in terms of thickness, velocity profiles, and shear stress variation.
9. Predict transition from laminar to turbulent flow on an aerodynamic surface.
10. Calculate the skin friction drag and estimate the pressure drag of aerodynamic bodies.
11. Predict location on an airfoil surface and inside a nozzle, where boundary

<i>Grade</i>	<i>Percentage</i>
<i>A plus</i>	<i>95 to 100%</i>
<i>A</i>	<i>90 to 95%</i>
<i>A minus</i>	<i>85 to 90%</i>
<i>B plus</i>	<i>80 to 85 %</i>
<i>B</i>	<i>75 to 80%</i>
<i>B minus</i>	<i>70 to 75%</i>
<i>C plus</i>	<i>67 to 70%</i>
<i>C</i>	<i>65 to 67%</i>
<i>D</i>	<i>60 to 65%</i>
<i>F</i>	<i>59.9% or lower</i>

*The lab is a separate section but is assessed into the letter grade for the course. The grading for the lab shall be covered in the lab syllabus and shall be factored into the overall grade with a 30% weight, per above, to determine the final overall letter grade.

Late work shall at the discretion of the instructor be penalized by up to 20%. No late work shall be accepted after two weeks from the original due date. Absence during a quiz or final shall result in a zero for the score unless a suitable makeup can be mutually determined between the instructor and student.

Classroom Protocol

In class discussion is encouraged but respect for others is required and expected.

University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on [Syllabus Information web page](#) (<http://www.sjsu.edu/gup/syllabusinfo>), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Week	Date	Topics
1	08/23	Introduction to fluids, density, pressure, viscosity.
1	08/25	“
2	08/30	Aerodynamic forces and moments
2	09/01	“

Week	Date	Topics
13	11/10	Turbulent boundary layers: thickness, velocity and shear stress distribution.
13	11/15	“
14	11/17	Skin friction and pressure drag calculation
14	11/22	“
15	11/24	Boundary layer transition and separation –Boundary layer control
15	11/30	“
16	12/01	