San José State University
Department of Mechanical Engineering
ME 271 Computational Fluid Dynamics for ME (Applications)
Section 01, #27136, Spring 2018

Instructor: Dr. Ernest M. Thurlow

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Office Hours: Before Class: 7:00-7:30pm, After Class 8:45-9:15pm or by appointment

Class Days/Time: Monday and Wednesday/7:30-8:45pm

Classrooms: ENGR 339/ENGR 213/ENGR 394

Prerequisites: BSME or Instructor's Consent

Canvas and Course Messaging

Copies of the course materials such as the syllabus, assignments, exam review material, Powerpoint presentations, etc. may be found on the Canvas site for the class. This system will also show you your grades, and it allows you to have discussions or chat with the class. This feature may be especially helpful if you need assistance on a homework problem. Homework assignments and electronic classroom materials (such as Powerpoint slides) are posted on this site.

To log in, go to the Canvas URL http://sjsu.instructure.com. Log in with your 9-digit digit SJSU ID and password you use for your SJSUOne account. For questions on the use of Canvas, please check out http://www.sjsu.edu/at/ec/canvas/student_resources/index.html

ME297 CANVAS Website: https://sjsu.instructure.com/courses/1227794

You are responsible for regularly checking with the messaging system through Canvas. You can set up your Canvas account to forward all email sent to your Canvas account to any other email address you wish.

Course Description

Course provides an in-depth introduction to the methods and analysis techniques used in computational solutions of fluid mechanics and heat transfer problems. Model problems are used to

Describe the governing equations of incompressible flows and their mathematical properties.
Describe the setup of the finite volume and finite difference methods and their limitations.
Formulate a mesh that results in accurate analysis of a thermal-fluid system and demonstrate its accuracy.
Describe methods of modeling turbulence and choose an appropriate model for a given thermal-fluid system.
Apply appropriate boundary conditions for a given thermal-fluid application.
Demonstrate a systematic application of the principles and describe the limitations of techniques for the simulation of turbulent and transitional flows and thus be able to apply these in a critical manner to practical applications.
Demonstrate their acquired skills in applying commercial CFD software packages to practical engineering applications.

Required Texts/Readings

Textbook

"An Introduction to Computational Fluid Dynamics: The Finite Volume Method (2nd Edition)" by H.K. Versteeg and W. Malalasekera, Longman Scientific & Technical. (or similar)

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic calendar web page located at http://www.sjsu.edu/academic_programs/calendars/academic_calendar/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/**.** Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus."

University Policies

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University's Academic Integrity policy, located at http://www.sjsu.edu/senate/S07-2.htm, requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Policy S07-2 requires approval of instructors.

The best way to handle homework is to struggle through it in your own first. Use your book and notes to help you. Then if you're stuck, ask your instructor or friends from class for hints. You are welcome to compare homework answers or solution methods with your friends after you have completed your problems.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Disability Resource Center (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.

ME 271 Schedule Spring 2018, Section 1

Date	Topic	2nd ed. reading	HW due
24-Jan	Introduction to CFD, Numerical Methods, Flow Regimes to be Considered, Conservation Equations and Introduction to ANSYS Fluent	Chp. 1 Chp. 2, Handouts Intro_16.0_L02_IntroCFD	
29-Jan	Fluent Modeling 1, Introduction to Model Setup Requirements/SpaceClaim (Take Detailed Notes!)	Chp. 2, Handouts SpaceClaim_Intro	
31-Jan*	Fluent Modeling 1, Inctroduction to SpaceClaim and Optiions		
5-Feb	Finite Volume/Difference (PDE Equation Types) and Analytic Flat Plate Flow Modelling	Chp. 2, Handouts Cornell Confluence	
7-Feb**	Fluent Modeling 2, Flat Plate Flow Analysis (Fluent vs Blasius Soln Analytic Analysis)		
12-Feb	Finite Volume/Difference (PDE Equations), Internal Flow Analysis & Analytic Equations	Chp. 2, Handouts Cornell Confluence	
14-Feb	Fluent Modeling 3, Internal Flow Analysis and Fully Developed Length Analysis		
19-Feb	Implementation of Boundary Conditions and Initial Conditions	Chp. 9 Fluent Tutorials Intro_16.0_L08_HeatTransfer	
21-Feb	Fluent Modeling 4, JEDEC Board Natural Convection vs Rayleigh/Richardson # Analytical Thermal Calculations		