MAE 433 Computational Fluid Dynamics
Mechanical and Aerospace Engineering Department
West Virginia University
Fall 2018

Course Description/Syllabus
TR 11:00 AM, Room 749 ESB

Pre-Requisites
- MAE 316 (Analysis-Engineering Systems), Minimum Grade of C
- MAE 331 (Fluid Mechanics), Minimum Grade of C or MAE 335 (Incompressible Aerodynamics), Minimum Grade of C
- Some experience with a common programming language (MATLAB, C) and CAD software

Instructor Email Office Location & Hours
Stéphane D’Urso stdurso@mix.wvu.edu ESB 1010, 12:15-13:15 PM on TR.
Make an appointment (email) for other times.

Text:

Course Topics
- Introduction to Modern CFD
- CFD Solution Procedures
- Governing Equations of Fluid Dynamics
- Mesh Generation and Boundary Conditions
- Basic Numerical Methods and Solution Techniques
- CFD Solution Analysis
- Turbulence Modeling
- Practical Guidelines for Specific Applications
- Advanced Topics in CFD

Course Description:
This is an introductory course on modern CFD methods focused on the topics outlined above. An emphasis will be placed on learning practical skills to solve real world fluid dynamics problems using the CFD tools introduced in this course. Fundamental background information will be presented where appropriate. Commercially available software, namely ANSYS Fluent, will be used to demonstrate industrial solution approaches, complimented by basic coding assignments using MATLAB to better understand numerical techniques.

Learning Outcomes:
Students will understand the fundamentals of computational fluid dynamics and the basics of numerical methods and solution techniques.

Course Policies:
Professional and ethical behavior is expected in class and in carrying out assigned tasks and coming to class on time. Disruptive behavior such as talking, using smart phones or other electronic devices is not permitted in class.

Attendance will not be taken, but attendance is strongly encouraged. Material will usually be taken from the text, and the same notation will be used, but material that is not in the text will also be presented and this material will be covered on exams.
All homework and projects must be your own individual work. If it is determined that a student has cheated on individual assignments or tests, a course grade of “unforgivable F” will be issued.

Some homework and/or project work will include programming and/or spreadsheets. All homework, programs and spreadsheet assignments will be due at the beginning of the announced class period and they must be typed. Sloppy formatting will be penalized. Late homework will be accepted up to 24 hours beyond the deadline with a penalty of 10%.

No make-up of any exam will be allowed, except as required by official WVU policy. Missed exams need prior approval or a score of zero will be recorded.

Exams will be closed book and notes. The final exam will be comprehensive. The use of programmable calculators, smart phones and/or text storing devices will not be allowed during exams and quizzes.

Your overall numerical course grade will be determined according to the following weighting:

- Homework: 15%
- Project: 25%
- Midterm Exam: 30%
- Final Exam: 30%

Letter grades will be assigned as follows based final numerical averages:

- A : 90-100
- B : 80-89
- C : 70-79
- D : 60-69
- F : <60

There will be no curving and there will not be any bargaining over the any assigned grade.

Inclusivity Statement:
The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see http://diversity.wvu.edu

Integrity Statement:
The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud.
Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at https://studentconduct.wvu.edu/. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

Policy of Zero Tolerance in Academic Dishonesty:
It is an MAE Departmental Policy that cheating of any kind or form in exams, quizzes, project or assignments will result in formal disciplinary action that may include an unforgivable F (UF) course grade, suspension, or dismissal from the program. Note also that the Statler College has established policies of no access to cell phones during examinations, and (at the discretion of the course instructor) use only of simple, non-programmable calculators during exams.