

## **MAE 598/494 Topic: Applied Computational Fluid Dynamics**

Fall 2017 Tuesday/Thursday 1:30-2:45, Classroom: SCOB 152

Instructor: Huei-Ping Huang (hp.huang@asu.edu), ERC 359  
Office hours: Monday 4-5 PM, Tuesday 3-5 PM, or by appointment

**Course website** <http://www.public.asu.edu/~hhuang38/ACFD2017.html>

**Course Outline:** We will run two threads concurrently through the semester. One of them ("Lectures") fills the background knowledge on computational fluid dynamics. The other ("Projects") focuses on the execution and analysis of specific projects using Ansys-Fluent.

### ***I. Lectures***

1. Survey of basic fluid mechanics and thermodynamics as preparation for the projects (4 weeks)
2. Survey of numerical methods to deepen the understanding of the functionality of Ansys-Fluent and similar industrial software (6 weeks)
3. Discussion on more advanced topics in CFD (e.g., turbulence modeling) (3 weeks)

### ***II. Projects***

1. Tutorials for Ansys-Fluent (2 weeks)
2. Main projects (12 weeks)

*At least four of the following projects (3 weeks each) will be chosen for this semester. The list is tentative and the detail of the individual project is subject to further adjustments.*

Project 1: Fluid system with heat transfer

Project 2: External flow (calculation of drag and lift; Reynolds number dependence)

Project 3: Compressible flow system

Project 4: Low Reynolds number flow; Microfluidics

Project 5: Moving boundary and moving grid

Project 6: Flow with an interface (two-phase or multi-phase)

The required work for the projects will be different for participants of MAE598 and MAE494. Details will be given in the individual assignments.

Textbook: No required textbook. Instructor will provide tutorials, slides, and lecture notes as needed.

**Attendance is mandatory for this class. Excessive absence without a proper reason may result in a failing grade.**

**Grade:** Projects & homework 90% (regular tasks = 75%, credit from bonus pool = 15%)

Final exam (in-class test) 10%

Specific rules concerning collaboration for projects will be released along with the release of each individual project.

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### **Useful links**

**Please make sure that you are familiar with ASU policies on academic integrity and campus safety:**

ASU policy on academic integrity: <https://provost.asu.edu/academicintegrity>

Campus safety and security: <https://provost.asu.edu/University-Safety-Security>

**Grade and grading policies, contacts of SEMTE advising office:**

Grade and grading policies: <https://students.asu.edu/grades>

SEMTE advising: <http://semte.engineering.asu.edu/advising/>

**Useful website for software other than Ansys-Fluent:**

ASU common software/applications portal: <https://apps.asu.edu> (login required)