

## **AE 4801 Applications in Fluid Dynamics (1-0-1)**

**Fall 2019**

**August 19, 2019 – Sept 20, 2019**

**MWF 4:30 – 5:20 PM**

**Location TBD**

**Instructors: Lakshmi N. Sankar and Srujal Patel**

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This is a one credit hour minimester course, to be taught during the first five weeks of the fall 2019 term. This course is open to AE, ME, CEE, and BME students. This class is limited to 25 students. **We are using wait lists on Oscar to admit students**, in order to ensure that students from all units have an opportunity to take this course.

This is a hands-on course, where we will use commercial CFD software (Fluent and Star-CCM+) to model the following problems (Choose 2). Students will learn grid generation, boundary condition set up, convergence monitoring, scientific visualization, and post-processing techniques.

- Subsonic airfoil aerodynamics
- Hypersonic flow over blunted cones and nose cones, with and without real gas effects
- Steady Non-Newtonian Viscous Flow through an axisymmetric duct with an assumed stenosis shape
- Pulsatile Non-Newtonian Viscous Flow through an axisymmetric duct with/without an assumed stenosis shape
- Convective cooling of heated turbine vanes
- Vertical axis wind and hydrokinetic turbines

The lecture on Monday will be devoted to tutorials where the instructors will work through sample problems. The sessions on Wednesday and Friday will be devoted to hands-on working sessions - students working individually under the supervision of the instructors.

Students will bring their own laptops – Windows, Mac (CFD software will run on a Compute server), or Linux. Students will be able to download their own student version of ANSYS Fluent, or use the version available on the Institute machines. We will supply the license for Star-CCM+, as needed.