

ChE 716

Advanced Fluid Dynamics

Spring 2009

- Instructor: Dr. Rakesh K. Gupta
Room 421 ESB (304-293-2111 ext 2427)
Rakesh.Gupta@mail.wvu.edu
- Guest Instructor: Dr. Isaac K. Gamwo
NETL, Pittsburgh
Gamwo@netl.doe.gov
- Class: 11:00 – 12:50 Tu, Th Room 449 ESB
- Office Hour: Wednesday 11 am – noon
- Prerequisite: ChE 615 or equivalent. It will be assumed that students are familiar with The Navier-Stokes equation
- Textbook: S. Middleman, An Introduction to Fluid Dynamics, Wiley, New York, 1998
- Objectives: To solve fluid flow problems. The emphasis will be on the derivation of relevant models and explanation of phenomena
- Grading:
- | | |
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| Mid-term exam | 40% |
| Homework | 20% |
| Final exam | 40% |

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Course Outline

Derivation of the Cauchy equation of motion

Some solutions to the equation of motion

Exact solutions to the Navier-Stokes equation

Approximate solutions to the Navier-Stokes equation

Stability of flows

Two-phase flows and their numerical simulation

Flow through porous media

Note: The order of presentation of the topics may not correspond exactly to the order shown above. Also, additional topics may be covered depending on the interests of the class and time constraints.