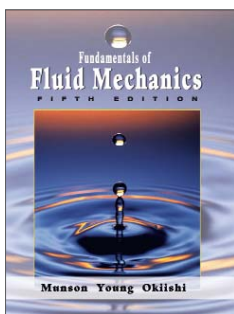


# The Emergence of CFD in the Classroom

By Shane Moeykens, FlowLab Product Manager, *Fluent Inc.*

Introductory fluid mechanics courses offered in most engineering programs are generally textbook-based with an emphasis on analytical problem solving. Traditionally, CFD has seldom been included in these courses, and the introductory textbooks have steered clear of most CFD-related subject matter. However, in the last decade many computational tools have matured and become well established in the engineering community. Recognizing the emerging widespread use of computational tools within industry, a CFD component has been introduced in the fluid mechanics curriculum at many universities, and three introductory level fluid mechanics textbooks offering a strong CFD component have been published in the last year. The books use Fluent's FlowLab educational CFD software.

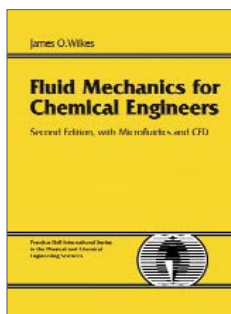
In these textbooks, CFD is introduced with less focus on sophisticated numerics and more focus on the practical capabilities and limitations of the technology. Through exposure to CFD methodology, the students' understanding of fundamental concepts is reinforced. Relative to approaching closed form problems with a hand calculator, letting a student interactively observe heat transfer and fluid flow phenomena adds a whole new dimension to the learning experience.



**Fundamentals of Fluid Mechanics**

Fifth Edition, by B. Munson, D. Young, and T. Okiishi, (<http://hecda.wiley.com/WileyCDA/HigherEdTitle/productCd-0471675822.html>).

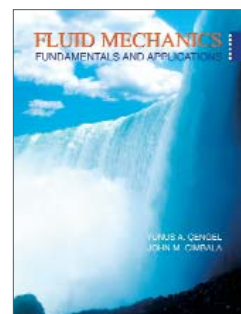
This book uses FlowLab-based exercises within several chapters to illustrate important physical concepts of flow phenomena. Dr. Wade Huebsch of West Virginia University has created a suite of solution guides for all of the FlowLab exercises, which are accessible through the book's website. These guides facilitate integrating the CFD component into an existing fluid mechanics class without significant effort on the part of the instructor.



**Fluid Mechanics for Chemical Engineers**

Second Edition, by J. Wilkes, (<http://vig.prenhall.com/catalog/academic/product/0,1144,0131482122,00.html>).

This book illustrates key concepts of CFD methodology through case studies. Four FlowLab-based cases, built around classical fluids exercises, are reviewed in this book's *Introduction to CFD* chapter. Chi-Yang Cheng, a Senior Training Engineer at Fluent, contributed significantly to the development of this chapter.



**Fluid Mechanics: Fundamentals and Applications**

By Y. A. Çengel, and J. M. Cimbala, ([http://highered.mcgrawhill.com/sites/0072472367/information\\_center\\_view0](http://highered.mcgrawhill.com/sites/0072472367/information_center_view0)).

This book provides an extensive overview of CFD methodology with a focus on the use of CFD tools in practical terms. FlowLab-based CFD problems are included with the end-of-chapter exercises in the *Introduction to CFD* chapter. To facilitate a short learning curve with the included FlowLab exercises, Dr. Cimbala developed a Quick Guide, which is available at the FlowLab website.