CHE F212: Fluid Mechanics

In addition to Part-I (General Handout for all courses appended to the time table), this portion gives further specific details regarding the course.

Instructor In-charge	: Dr. Rajagopal Vellingiri
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Teaching Assistant	: Mitali Arun Waghmare
Lecture Room & Time	: Mon/Wed/Fri 10:00 – 10:50 at A-605 (Lecture)
	Sat 08:00 – 08:50 at A-602 (Tutorial)

Prerequisites

Differential and integral calculus, partial derivatives, ordinary differential equations, elementary knowledge of mechanics.

Scope and Objective

This is a first level course on fluid mechanics for undergraduate students in chemical engineering. The course begins by introducing the fundamental principles of fluid mechanics, and proceeds to cover both macroscopic (i.e. integral balances) and microscopic (i.e. differential balances) approaches to analyze several fluid flow phenomena encountered in chemical engineering applications.

Suggested Text Books

T1. R. Fox, A. McDonald and P. Pritchard, *Introduction to Fluid Dynamics*, John Wiley & Sons, 7$^{\text{th}}$ ed., 2008.

T2. W. L. McCabe, J. C. Smith and P. Harriot, *Unit Operations in Chemical Engineering*, McGraw-Hill, 2001.

References

R1. R. B. Bird, W. E. Stewart and E. N. Lightfoot, *Transport Phenomena*, John Wiley & Sons, 2$^{\text{nd}}$ ed., 2002.

R2. P. K. Kundu and I. M. Cohen, *Fluid Mechanics*, Academic Press, 2005.

R3. Y. A. Çengel and J. M. Cimbala, *Fluid Mechanics: Fundamentals and Applications*, McGraw-Hill, 2006.

R4. V. Gupta and S. K. Gupta, *Fluid Mechanics and its Applications*, New Age International, 2015.

R5. G. M. Homsy et al, *Multimedia Fluid Mechanics-CD-ROM*, Cambridge, 2000.

Course Plan

Lec. No.	Topic	References
1–2	Introduction and overview of the course	T1: Ch. 1
3–5	Fluid statics & applications	T1: Ch. 3.1-3.6
6–7	Fundamental concepts	T1: Ch. 2.1-2.6
8–12	Basic equations of fluid flow	T1: Ch. 4, 5
13–16	Incompressible inviscid flows	T1: Ch. 6.1-6.4, 6.7
17–19	Dimensional analysis & similitude	T1: Ch. 7.1-7.6
20–24	Internal incompressible viscous flow	T1: Ch. 8.1-8.8
25–27	External incompressible viscous flow	T1: Ch. 9.1-9.2, 9.4-9.8
28–32	Flow past immersed bodies	T2: Ch. 7
33–37	Transportation & metering of fluids	T1: Ch. 8.10-8.11 T2: Ch. 8
38–40	Agitation & mixing of liquids	T2: Ch. 9

Evaluation Scheme

Component	Weightage (%)	Date & Time	Remarks
Midsem exam	30	09/10/2018 (11:00 – 12:30 hrs)	Closed book
Assignments/ Quizzes	20	To be announced	Closed book/ Open book
Attendance	10	Entire session	–
Comprehensive exam	40	03/12/2018 (Afternoon)	Closed book + Open book

Office consultation hours

To be announced in the class.

Notices

All notices concerning this course will be uploaded on the Moodle.

Make-up policy

Make-up is granted only for genuine cases. Prior permission of Instructor In-charge is compulsory.

Instructor In-charge
CHE F212