BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
HYDERABAD CAMPUS
INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017

Course Handout (Part II)

Date: 01/08/2016

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

Course No : **CE F212**
Course Title : **Transport Phenomena**
Instructor-in-charge : **Murari R R Varma**
Instructor : **K Srinivasa Raju**

1. Course Description and Scope & Objective

This course is an introduction to the field of fluid mechanics. The study covers basic fundamentals of fluid transport which would include our understanding of governing laws of conservation of mass, energy and momentum. The emphasis in this course will be to stress more on the above governing laws and their various applications. The unified approach will enable students to tackle the real life problems in more comprehensive manner and provide a broader view on the subject.

2. Text Books :

T1. Modi, P.N. and Seth, S.M., *Hydraulics and Fluid Mechanics including hydraulic machines*, Standard Book House, New Delhi, 2015

T2. Fox, R.W, Pritchard, P.J, and A.T McDonald, *Introduction to Fluid Mechanics*, Wiley India, New Delhi, 2010.

3. Course Plan:

Lecture No	Learning Objectives	Topics to be covered	Reference
1-3	Study of fluid properties	Fundamental fluid properties such as mass density, specific weight, viscosity, surface tension etc	CH-1 (T-1) CH-2 (T-2)
4-6	Study of pressure measuring devices	Pascal's law, Manometer and its variations	CH-2 (T-1) CH-3 (T-2)
7-10	Study of hydrostatic forces on various surfaces, Buoyancy	Computation of pressure force, center of pressure on various surfaces, Metacentric height, stability analysis	CH-3,4(T-1) CH-3 (T-2)

10-12	Study of fundamentals of fluid flow	Study of various flow pattern, Stream line, path line, streak line, Stream function, velocity potential, Flownet	CH-6 (T-1) CH-5,6 (T-2)
13-17	Study of equations of motion and energy equation	Bernoulli's equation and its applications i.e., venturimeter, orifice meter, pitot tube etc.	CH-7 (T-1) CH-4,5,6 ,8 (T-2)
18-19	Impulse momentum and applications	Momentum principle, pipe bends etc.	CH-8(T-1) CH-4,5,6,8 (T-2)
20-22	Study of flow pattern through orifices and mouthpieces	Various types of orifices and mouthpieces	CH-9 (T-1) CH-6,8(T-2)
23-25	Study of flow pattern over notches and weirs	Various types of notches and weirs	CH-10 (T-1) CH-6,8(T-2)
26-31	Study of flow pattern through pipes	Darcy-Weisbach equation, pipes in series, parallel, Branching of pipes etc.	CH-11 (T-1) CH-8 (T-2)
32-36	Laminar Flow	Hagen-Poiseuille Law for circular pipes, flow between two parallel plates.	CH-13(T-1) CH-8(T-2)
37-42	Dimensional Analysis	Buckingham pie method, Model analysis etc	CH-17(T-1) CH -7 (T-2)

4. Evaluation Scheme

EC No.	Evaluation component	Duration	Weightage (%)	Date, Time and Venue	Nature of component
1	Test 1	60 min.	15	13/9, 4.00--5.00 PM	CB
2	Test 2	60 min.	15	21/10, 4.00--5.00 PM	CB
3	Quiz@	TBA	10+10	To be announced	CB+OB
4	Project	Continuous	10	To be announced	OB
5	Comprehensive	180 min	40	13/12 FN	CB

@ 10% of the weightage will be for open book component of surprise quizzes conducted in classroom.

5. **Chamber Consultation Hour:** To be announced in the class

6. **Notices:** All notices concerning the course will be displayed on CMS/Google Classroom.

7. **Make-up Policy**: No make-ups are entertained. Make-up will be granted for genuine cases only.

Instructor-in-charge
CE F212