BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
INSTRUCTION DIVISION
FIRST SEMESTER 2015-2016

Course Handout (Part II)

Date: 03/08/2015

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.	: CHE F312
Course Title	: Chemical Engineering Laboratory - I
Instructor-in-Charge	: SURESH GUPTA
Instructors	: Amit Jain

1. Course Description

The course comprise of experiments from various subjects: fluid mechanics, heat transfer and mass transfer. The course involves rigorous experiments related to the theory of fluid mechanics: flow past immerse solids, major and minor losses, flow characteristics, continuity principle, boundary layer theory, fluid moving machinery; heat transfer: theory of conduction, convection and radiation, heat exchange equipments such as heat exchangers, condensers, evaporators etc.; mass transfer: VLE studies, separation based on volatility, mass transfer equipments such as crystallizer, distillation column, absorber, adsorber, mass transfer with reaction and other relevant concepts.

2. Scope and Objective

The main objective of this course is to educate the students with different aspects of chemical engineering experiments. The students will carry out the set of experiments that will expose them to experimental methods and to integrate theoretical knowledge and concept to practical experience. Students will also learn the operation of some scientific equipment for performing experiments.

3. Text Book

Lab Manual for Chemical Engineering Laboratory - I @ Nalanda BITS Portal.

4. Reference Books

1. Lab Manual supplied by Vendors.
2. www.che.iitb.ac.in/courses/uglab/manuals/labmanual.pdf

5. Course Plan

The students will perform the following twenty experiments with an emphasis on individual planning and execution of the experiments.

CYCLE - I		
S. No.	**Experiment**	**Marks**
1.	a. Flow through Fluidized Bed (Gas and Water) b. Flow through Packed Bed (Gas and Water)	9
2 .	a. Losses due to pipe fittings b. Losses due to friction in pipes c. Drag Coefficient determination	9
3.	a. Bernoulli's Theorem verification b. Discharge through venturi, orifice and rotameter c. Flow through tubular pipe	9
4.	a. Pitot tube experiment (Air and Water) b. Reynolds Apparatus	9
5.	a. Centrifugal pump characteristics b. Reciprocating pump characteristics	9
6.	a. Heat Pipe demonstrator b. Thermal Conductivity of solids c. Thermal conductivity of liquids	9
7.	a. Drop wise and film wise condensation b. Unsteady state heat transfer unit	9
8.	a. Heat Transfer in agitated vessel b. Fluidized bed heat transfer unit	9
9.	a. Parallel flow & Counter flow heat exchanger b. Shell and Tube heat exchanger	9
10.	a. Plate type Heat Exchanger b. Finned tube heat exchanger	9

CYCLE - II		
S. No.	**Experiment**	**Marks**
11.	Double effect evaporator	9

12.	a. b.	Stefan-Boltzmann Apparatus Cross-circulation drying appratus	9
13.	a. b.	Vapor in air diffusion Open pan evaporator	9
14.		Sieve plate distillation column	9
15.		Batch crystallizer	9
16.	a. b.	Simple batch distillation setup Vapor liquid equilibrium setup	9
17.		Two phase flow	9
18.		Mass transfer with chemical reaction	9
19.		Adsorption in packed bed	9
20.		Absorption in wetted wall column	9

5. Evaluation Scheme

EC No.	Evaluation Component	Duration	Weightage % (Marks)	Date & Time	Nature of Component
1.	Continuous Evaluation	3 hrs/lab	60 (180)	Regular Laboratory Hours	Open book
2.	Mid-semester Examination	3 hrs	20 (60)	Laboratory Hours	Experiment Performance, Closed Book Theory, and Viva
3.	Comprehensive Examination	3 hrs	20 (60)	Laboratory Hours	Experiment Performance, Closed Book Theory, and Viva

Chamber Consultation Hour : Saturday, 12:10 – 1:00 P.M. @ 1224-B & 1126

Notices : Notices concerning the course will be displayed on the Chemical Engineering Department Notice Board.

Instructor-in-Charge
CHE F312