



SECOND SEMESTER 2019-2020

Course Handout Part II

Date: 06-01-2020

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 F341
Course Title : CHEMICAL ENGINEERING LAB-II
Instructor-in-Charge : **I SREEDHAR**
Instructors : Dr. I Sreedhar, Dr Karthik Chethan

Objective of the Course:

The objective of this lab course is to expose the students to the application of fundamental concepts learnt in their Discipline Courses like Transport phenomena, Selected Chemical Engineering Operations, Process Control and Reaction Engineering.

Outcome of the Course:

- Hands-on experience on controller tuning parameters and its effects on process output
- Finding parameters value from the hands-on experiments and validate it with the theoretical value

Textbooks:

- o Unit Operations by Mc Cabe and Smith
- o Mass Transfer by Treybal
- o Process control by Seborg
- o Chemical Reaction Engineering by Fogler

Course Plan:

| Lab Name | Experiment Name & Objective |
|----------|---|
| SCEO lab | <u>Emissivity</u> : To study of radiation heat transfer by black body & Test plate. |
| SCEO lab | <u>Pool Boiling & Critical Heat Flux</u> : To study the pool boiling heat transfer phenomena & critical heat flux. |
| SCEO Lab | <u>Centrifugal Pump</u> : To study of centrifugal pump in series & parallel mode & to find pump characteristics. |
| SCEO Lab | <u>Water Cooling Tower</u> : To study mass transfer operation in water cooling tower for different flow and thermodynamic conditions. |
| SCEO Lab | <u>Natural Draft Tray Dryer</u> : To study the drying characteristics of a solid material under natural draft condition. |
| SCEO Lab | <u>Adsorption In Packed Bed</u> : To study of adsorption in a packed bed for a solid liquid system. |
| SCEO Lab | <u>Fluidized Bed Dryer</u> : To study the operation of fluidized bed dryer. |
| SCEO Lab | <u>Sedimentation Studies</u> : To study of batch sedimentation process. |
| SCEO Lab | <u>Batch Crystallizer</u> : To study the crystallization of $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ in a batch crystallizer. |
| SCEO lab | <u>Ball mill</u> : to study the cumulative & differential plots of sieve analysis & find out |



| | |
|----------------|--|
| | <u>various diameters.</u> |
| PC Lab | <u>Pressure Control Trainer</u> : To study the control system in Pressure Control Trainer. |
| PC Lab | <u>pH Control Trainer</u> : To study the control system in pH Control Trainer. |
| PC Lab | <u>Level Control Trainer</u> : To study the control system in Level Control Trainer |
| PC Lab | <u>Temperature Control Trainer</u> : To study the control system in Temperature Control Trainer. |
| CRE lab | <u>Batch Reactor</u> : To study the order and rate constant for the reaction between sodium hydroxide and ethyl acetate in a batch reactor. |
| CRE lab | <u>Continuous Stirred Tank Reactor</u> : To study the order and rate constant for the reaction between sodium hydroxide and ethyl acetate in a CSTR. |
| CRE lab | <u>Plug Flow Reactor</u> : To study the order and rate constant for the reaction between sodium hydroxide and ethyl acetate in a PFR. |
| CRE lab | <u>Cascaded CSTR (CSTR In Series)</u> : To compare the conversion of reactants between a single CSTR and CSTRs in series. |
| CRE lab | <u>CSTR & PFR in Series</u> : To compare the conversion of reactants between PFR and CSTR & PFR in series. |
| CRE Lab | <u>Spectrophotometer</u> : To find unknown concentration of a color solution using spectrophotometric method. |
| SCEO Lab, demo | <u>Rotary Drum Vacuum Filter</u> : To study the performance of a rotary drum filter operating under Vacuum |
| SCEO Lab, demo | <u>Plate & Frame Filter Press</u> : To study the operation of plate and frame filter press. |
| SCEO Lab, demo | <u>Double Effect Evaporator</u> : To concentrate the sodium carbonate solution |

Evaluation Scheme:

| Component | Duration | Weightage (%) | Date & Time | Nature of Component |
|---------------------|----------|---------------|-------------|---------------------|
| Lab. Expt (SCEO) | 32 hrs | 20 | | Open book |
| Lab. Expt (PC& CRE) | 32 hrs | 20 | | Open book |
| Skill Test -1 | 3 hrs | 20 | | Closed Book |
| Skill Test -2 | 3 hrs | 20 | | Closed book |
| Written test | 1hr | 20 | | Closed Book |

Chamber Consultation Hour: To be announced in the class.

Notices: All notices concerning this course will be displayed on the Notice Board of Chemical Engineering or CMS

Make-up Policy: Make-up for the tests may be granted only with prior permission and valid justification from the Instructor-in-charge.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE

