KIT 355/2 – Unit Operations Practical

Course Objective : To acquire skill in several unit operations in an open laboratory concept. Students are required to investigate and understand several industrial processes.

Experiment title	**Content**	**Number of laboratory hours**	**Expected outcome: upon completion of the experiments, the student should be able to:**
1. Static Mixer	• Introduction of statistical analysis in a unit operation.	3	• Understand the application of statistics in unit operations.
2. Filtration	• Introduction of a separation technique	3	• Understand the concepts of separation using the filtration technique.
3. Fractional Distillation of Crude Oil	• Separation of a local crude oil sample into its components by using a simple distillation method • Characterization of the components by GC-method • Introduction of a simple material balance	3	• Understand that crude oil contains hydrocarbons of different chain lengths, which have progressively higher boiling points.
4. Spray Drying	• Determination of flow number (FN) and mean drop diameter for a sprayed clay suspension	3	• Understand that water can be removed effectively from a suspension of solid particles by spraying the mixture into a vessel containing hot gas.

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5. Flow of Rheology	• Determination of the viscosity of polymer solutions as a function of polymer • Estimation of the molecular mass of the polymer	3	• Use a Hoeppler viscometer or falling ball viscometer for measuring viscosity.
6. Concentric Tube Heat Exchanger	• Investigation of the characteristics of concentrate tube heat exchanger	3	• Use the concentric tube heat exchanger by parallel and counter current flow.
7. Centrifugal Separation	• Introduction of the separation technique that is commonly used in industries • Discussion of the factors that influence the efficiency of separation	3	• Understand the concept that separation can be enhanced by increasing the gravitational acceleration mechanically using a centrifuge.
8. Gas Absorption Column	• Investigation of gas to liquid mass transfer using the gas absorption column	3	• Familiarize with the mass transport phenomenon across two different phases.
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