CHE 113 Chemical Process Analysis Fall 2009

Lecturer	Monday 12:30 pm, Gavett 312 Wednesday
Recitation	Friday 3:25-4:40 pm, Georgen 109
Instructor	J.H. David Wu Email: davidwu@che.rochester.edu Tel: x5-8499 Office hours: After each class
Teaching Assistants	Sean Parlia Email: sean.parlia@rochester.edu Office hours: Tuesday 4:00 – 6:00 pm Location: 247 Gavett Hall Sharif Khan Email: sharif.khan@rochester.edu Office hours: Monday 2:00 – 4:00 pm Location: 247 Gavett Hall
Textbook	Elementary Principles of Chemical Processes 3rd Edition Richard M. Felder Ronald W. Rousseau John Wiley & Sons, New York, 2000
Exams	Exam 1 (30%) October 12 (Monday) Exam 2 (30%) November 11 (Wednesday) Exam 3 (30%) December 9 (Wednesday)
Problem Sets	Problem sets (10%) There will be about 10 problem sets. At least 50% of the problems will be graded. * You will be asked to use Excel (a computer program) to solve some of the homework problems. **Homework is due on Wednesday before the class.** **No late submission will be accepted or graded.** **No handouts will be available after the class.**

Topics

I. Basic Principles

A. An introduction: material and energy balances in chemical process design
B. Process and process variables
C. The simplest chemical process, with flow streams in and out plus accumulation
Concepts of equilibrium, steady-state and unsteady-state; batch and continuous

II. Material Balances

A. Overall balances
B. Species balances
C. Rates of accumulation
D. Recycle streams

III. Phase Changes and Multiple Stages

A. Thermodynamic: simple distillation
B. Kinetic: well-mixed reactor
C. Physical: entrainment of a solution in filter cake
D. Concept of using multiple stages

IV. Gas and Vapor-Liquid Behavior

A. Vapor-liquid equilibrium from an empirical viewpoint (related to distillation above)
B. Concept of vapor pressure, Raoult's law and non-ideal solutions
C. Phase diagrams and the lever rule

V. Energy Balances

A. Conservation of energy for closed systems
B. Friction: interconversion of mechanical to thermal energy
C. Thermal energy equation
D. Mechanical energy equation
E. Resistances to fluid flow, friction factors, and pipe network