**Tentative Schedule of Topics for**

**Separation Processes I CHE06 312 1 2016**

Polymath: Nonlinear Equation Solver (NLE)

Polymath: Differential Equation Solver (DEQ) & COMSOL

**ASPEN**

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| Date | Topics |
| **September** 9/2/16 Friday | Introduction to mass transfer and separations Equipment: <http://encyclopedia.che.engin.umich.edu/>  Phase Equilibrium and rate of mass transfer Empirical Correlation of Diffusion: Eugen Fick’s 1855 experiments: NaCl in water |
| 9/7/16 Wednesday | Continuation of NaCl in water problem  Unimolecular Diffusion  Review of material balances; Intro to diffusion |
| 9/9/16 Friday | Chapter 6: Diffusion of gaseous components and fermentation  C&S 10.1 One-Dimensional Binary Mass Transfer in a Stefan tube |
| 9/14/16 Wednesday | Measurement of Diffusivity using a Stefan Tube (Example 6.2-3) |
| 9/16/16 Friday | 6.2D Diffusion Through a Varying Cross-Sectional Area  Vapor Deposition on a Solid  C&S 10.3 Slow Sublimation of a Solid Sphere  Multicomponent Diffusion  Shrinking Core Model (Catalyst Regeneration/Coal Combustion) |
| 9/21/16 Wednesday | Correlations to Predict Diffusivity (6.2E, 6.3D, 6.5)  Permeability (Example 6.5-2)  6.5C Diffusion in Porous Solids that depend on structure |
| 9/23/16 Friday | Chapter 7: Unsteady state mass transfer  C&S 10.13 Unsteady-State Mass Transfer in a Slab |
| 9/28/16 Wednesday | Chapter 7: 7.2 Convective mass transfer coefficients Table 7.2-1 Mass Transfer Flux Equation Games |
| 9/30/16 Friday | Convective mass transfer  Exam Review |
| **October** 10/5/16 Wednesday | 7.3 Mass Transfer Coefficients for Various Geometries 7.3D Flow inside pipes |
| 10/7/16 Friday | **Exam 1 (Chapter 6)** |
| 10/12/16 Wednesday | 7.3E **packed beds**  C&S 10.2 Mass Transfer in a Packed Bed with Known Mass Transfer Coefficient |
| 10/14/16 Friday | Mass Transfer of a lozenge C&S 10.4 Controlled Drug Delivery by Dissolution of Pill Coating  Bubble Columns  7.3E Flow parallel to flat plates, single spheres  7.4 Mass Transfer in Stirred Tanks |
| 10/19/16 Wednesday | 10.6 Gas Absorption Equipment  Review of Phase equilibrium (Felder & Rousseau 6.4)  Models of Absorption Column: Equilibrium and Rate Based |
| 10/21/16 Friday | 10.6E Rate Based Model of Absorption Column  Mass transfer coefficients in absorption processes  Solution using POLYMATH for 10.6F dilute  Minimum solvent flows for tray tower design |
| 10/26/16 Wednesday | Solution using POLYMATH for 10.6F dilute (continued) |
| 10/28/16 Friday | Solution using POLYMATH for 10.6F dilute and with G and L allowed to vary  Exam review |
| **November**  11/2/16 Wednesday | **Exam 2 (Chapter 7)** |
| 11/4/16 Friday | Solution using POLYMATH for 10.7 concentrated mixtures in packed towers h=HOGNOG  **Computer Lab – Bring Laptops** |
| 11/9/16 Wednesday | 11.2 Equilibrium Based Absorption Model |
| 11/11/16 Friday | Graphical method for multiple stage absorption and stripping  **ASPEN Absorber Models: Bring Laptops** |
| 11/16/16 Wednesday | AIChE Annual Meeting – San Francisco 13-18 November  Assignments – work on optional challenge problems |
| 11/18/16 Friday | AIChE Annual Meeting – San Francisco 13-18 November  Assignments – work on optional challenge |
| 11/23/16 Wednesday | Out of Class Assignment: Non-Newtonian fluid video |
| 11/25/16 | **NO CLASS – Thanksgiving recess!!** |
| 11/30/16 Wednesday | **Gas Absorption Continued: Equilibrium Stage Models** |
| **December,** 12/2/16 Friday | Chapter 12.5 Liquid-Liquid Extraction  12.6 Equipment for Liquid-Liquid Extraction  12.7 Continuous Multistage Countercurrent Extraction  **ASPEN Extraction Model: Bring Laptops** |
| 12/7/16 Wednesday | Graphical and analytical methods for multiple stage Liquid-Liquid Extraction  Limiting solvent flows in immiscible extraction |
| 12/9/16 Friday | Final Exam Review |
| 12/14/16 Wednesday | **Comprehensive Final Exam W 1230 1430 ROWAN 102** |
| Finals Week | 14-20 December |