CHEMISTRY 444: SEPARATIONS

Fall 2013, Prof. Jorgenson
Venable G307  9:30 - 10:45 Tuesday/Thursday

Office: A-308 Kenan Labs
Tel: 966-5071
Email: jj@unc.edu
Office Hours: by appointment

Course Prerequisites: Chemistry 441, and Chemistry 480 or 481. Reminder: It is an honor code violation to be enrolled in a course while lacking the proper pre- and corequisites.

Grades: will be based entirely upon three equally-weighted exams. There will be no comprehensive final exam.

Honor Code: The University of North Carolina at Chapel Hill has had a student-administered honor system and judicial system for over 100 years. The system is the responsibility of students and is regulated and governed by them, but faculty share the responsibility. If you have questions about your responsibility under the honor code, please bring them to your instructor or consult with the office of the Dean of Students or the Instrument of Student Judicial Governance. This document, adopted by the Chancellor, the Faculty Council, and the Student Congress, contains all policies and procedures pertaining to the student honor system. Your full participation and observance of the honor code is expected.

Reference Books: The books listed below are on reserve in the Undergraduate Library Reserves Reading Room. The class schedule on the next page lists the topic for each class period. The numbers in parenthesis following each topic refer to the books numbered below; in each case this is the recommended reference for each topic.


## Chemistry 444
### Schedule, Fall 2013

### Fundamentals
- **Aug. 20** Distribution equilibria and the thermodynamic basis of separations (1)
- **Aug. 22** Intermolecular forces (1)
- **Aug. 27** Hildebrand solubility parameter theory (1)
- **Aug. 29** Diffusion and flow (1,2)

### Chromatographic Theory
- **Sept. 3** Equilibria and retention, band spreading, van Deemter equation (1,2)
- **Sept. 5** Band spreading: random walk model (1,2)
- **Sept. 10** Coupling theory, reduced parameters, optimization, measuring plates (1,2)
- **Sept. 12** Resolution, statistics of peak overlap, two dimensional separations (1,2)

### Liquid Chromatography
- **Sept. 17** Chemistry of silica surfaces, characterization of porous media, adsorption (8)
- **Sept. 19** Liquid chromatography modes: adsorption, partition, ion exchange (3,4,5)
  - **Sept. 24** 1st Exam (Fundamentals, Chromatographic Theory)
- **Sept. 26** LC modes: size exclusion, affinity, chiral, column hardware, injectors (3,4,5)
- **Oct. 1** Pumps, recycling chromatography, detectors (3,5)
- **Oct. 3** Capillary LC, UHPLC, superficially porous particles, monolithic columns, high temp LC, hydrodynamic chromatography (4)

### Gas Chromatography
- **Oct. 8** Gas chromatography columns (6)
- **Oct. 10** Stationary phases, retention indices (6)
  - **Oct. 15** 2nd Exam (Liquid Chromatography)
- **Oct. 17** Fall Break
- **Oct. 22** Injectors and detectors (6)
- **Oct. 24** Detectors (6)
- **Oct. 29** Capillary gas chromatography, supercritical fluid chromatography (6)

### Separation by External Fields
- **Oct. 31** Sedimentation (centrifugation) (1)
- **Nov. 5** Electrophoresis (1)
- **Nov. 7** Capillary Electrophoresis (5,7)
- **Nov. 12** No Class
- **Nov. 14** No Class
  - **Nov. 19** 3rd Exam (Gas Chromatography, Separation by External Fields)