

Course Syllabus
University of Denver
Analysis of Equilibrium Systems II – CHEM 2010/2040
Spring 2002

(Instrumental Analysis)

COURSE DESCRIPTION: This course is currently in a redevelopment process. The current course title is misleading and could not be changed before the course catalog publication. The transitional and future focus of the course will be on techniques used in a working analytical laboratory. A specific focus will be hands-on instrumental techniques. General areas of emphasis will include Spectrophotometry, Separations (Chromatography), and Electroanalytical Chemistry. Within each area, the class will investigate the theory and practical applications of several instrumental techniques. For techniques where an instrument is available, the student will gain extensive experience in its operation.

Please read the entire syllabus as it contains all the important class and grading information for the course and laboratory.

CREDITS/CONTACT HOURS: 4 credits / 7 hours per week including recitation and one lab section

DAYS / TIME / LOCATION: **Lecture** - Tuesday and Thursday / 8:00AM – 9:30AM / Olin Rm 205
Recitation - Thursday / 1:00PM – 1:50PM / Olin Rm 205
Lab – Tuesday or Wednesday / 2:00PM – 4:50PM / Olin Rm 235

INSTRUCTOR: Mark Fagan, Ph.D.

TELEPHONE: (H) 303-745-3568

EMAIL: mfagan@du.edu

OFFICE HOURS: By appointment

COURSE MATERIALS

REQUIRED:

- Quantitative Chemical Analysis, Daniel C. Harris, fifth edition, Freeman.
- Industrial quality safety goggles are to be worn in the laboratory whenever chemicals are being used, or when glassware is being heated or manipulated.

EVALUATION PROCEDURES

This course will cover selected chapters of the book and potentially additional selected materials. Student progress will be evaluated through a possible combination of both announced and unannounced quizzes, attendance, exams, and laboratory reports, as well as a student's general attitude toward the class. Each student will be responsible for all assignments whether listed in the syllabus or assigned during a class or lab period without prior notice. In addition to quizzes and exams, prompt attendance, participation in class, laboratory discussions, and the ability to apply learned knowledge will weigh toward the student's overall grade.

I. CLASS POLICIES:

Cell phones and pagers are not permitted during class. They are a distraction to the professor and the entire class. Please make sure to silence them before class begins.

As the course is in a transitional phase, weekly changes in the schedule will most likely occur and therefore class attendance is strongly encouraged. Missing 4 or more classes will result in a 10% deduction on a student's participation grade.

Each lecture is designed to introduce a given topic and should not be thought of as a comprehensive presentation of the material. Further study from the textbook to fully understand the material will be necessary. Subject content may be covered in lecture that is not in the textbook and vice versa. Students are responsible for learning both lecture and assigned textbook material whether or not the text material is covered in the lecture.

Chapter problems may be suggested and it is strongly recommended that students complete each problem set. In general, these problem sets will not be for grading purposes, but are assigned for students to practice the concepts learned from the lecture and textbook. Many of the quiz and exam questions will be similar to these problems. Periodically, problems may be assigned with a due date and time, and subject to grading. A 10% late penalty will be assigned for assignments not handed in on the due date and time.

Attendance at the scheduled **Recitation Period** will fluctuate depending on need. When extra time is required, the recitation will serve as required additional class time, not an optional time.

II. Laboratory:

Safety is a primary focus when present in any chemistry laboratory. A teaching laboratory is no exception. Respect for the reagents, instruments, and other people in the laboratory will be strongly adhered to. Specific safety measures will be discussed as needed prior to each laboratory session. Safety instructions must be followed at all times and any disregard for laboratory safety will result in immediate expulsion from the laboratory.

In the laboratory, a student will have the opportunity to experience directly some of the concepts discussed in lecture and the textbook and to apply experimental techniques to solving chemical problems.

Work in the laboratory will be collaborative and discussion with peers and the instructor is important and enhances learning. While each student will be responsible for independent thinking, all of the laboratory sessions will involve working and communicating in groups. It is imperative that students work well together in a group, as this typifies the working environment in an industrial or research laboratory.

Subject matter covered in the laboratory may appear on exams and quizzes.

III. MAKE-UP and LATE WORK:

All assignments and labs are considered late if they are not turned in on the due date, whether the student attends class or not. Being absent from class or the laboratory does not provide a student the opportunity to extend a due date.

There are a limited number of instruments and a very tight use schedule for each piece of equipment. Therefore, missing a scheduled laboratory session is very detrimental to the flow of the laboratory experience. In addition, a missed laboratory will cause other group members an increased work load so students are strongly encourage to not miss a scheduled laboratory session.

Make-up exams are generally not possible. However, extenuating circumstances may arise. Please contact me before you are going to miss an exam so if deemed necessary, we can make arrangements for a make-up. If I am not contacted within 24 hours after the scheduled exam, a make-up will not be permitted.

There will be a 10% late penalty for assignments and lab reports that are turned in late.

IV. GRADING SCALE:

90 – 100%	A
80 – 89 %	B
70 – 79 %	C
60 – 69 %	D
below 60 %	F

Please note that grades are not curved. Students are therefore not competing against each other and are encouraged to work together and assist each other so that all students can achieve both in mastering the course material and in a final grade. This means that it is possible that all class members could receive an A for the course. Please contact the instructor at any time to discuss your current grade.

V. GRADE BREAKDOWN:

CHEM 2010:

40% of your grade will be based on chapter exams.

20% of your grade will be based on an oral & written presentation, relating an example of an analytical instrumental technique used in a real world situation. The material presented by fellow students may be included on exams or the final.

20% of your grade will be based on a cumulative final exam given the last day of class.

15% of your grade will be based on announced or unannounced quizzes and any homework assignments. There will be no make-up quizzes and homework assignments must be turned in on the due date and time or be assessed a 10% late penalty.

5% of your grade will be based on class participation as well as overall class and learning attitude. All class lectures and pre-lab instructions will revolve around full class discussions. In my style of instruction, I do not simply pass along information but rather guide the class along a learning path. I expect each student to participate as we together learn and master the course material.

Occasionally, the Chemistry and Biochemistry Department will host a course relevant speaker through the department's seminar series. When appropriate, these seminars will be announced and attendance encouraged. Extra credit will be assigned based on student attendance.

CHEM 2040:

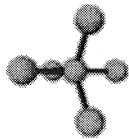
90% of the student grade will be based on several laboratory experiences and the write-up (report) of those experiences. Each laboratory report will be graded on a scale of 0 to 30. In each case, the specific laboratory procedure or experiment will be written up using the format of the Journal of Analytical Chemistry. The completed lab write-up will be due as determined by the course professor or course teaching assistant. If it is not handed in at that time, it will be assessed a late penalty of 10%.

Although students will be working in groups, laboratory reports will be an individual effort. While collaboration between group members is encouraged, each student is responsible for completing their own report. Submitting copies of the group's common report is not acceptable. Duplication of a report with group ideas will result in the report being rejected for grading.

10% of the student grade will be based on class and lab participation, as well as overall class and learning attitude.

VI. GRADING:

If a student has any questions regarding a grade for a lab, quiz, or exam, please speak with the instructor as soon as possible. Waiting until the end of the term will be too late for any possible grade changes.



As of: March 26, 02

TENTATIVE COURSE SCHEDULE

The Instructor reserves the right to change the daily teaching schedule to facilitate learning, understanding, and critical thinking. Topics, Labs, and Assignment dates and the Exam schedule may change with as much advance notice as possible. It is the responsibility of the Student to stay updated on all changes, especially when a class period is missed.

Week #	DATE	Lecture Topic	TEXT CHAPTER / Sections	LABORATORY	NOTES
1	March 26, 2002	Lec/lab	Introduction / Syllabus / Intro to Instruments	Check-in, Lab Plans, Instrument	
1	March 27, 2002	Lab		Check-in, Lab Plans, Instrument	
1	March 28, 2002	Lec/rec	Intro to Instruments / Error Analysis	Parts of Chap 4 Chap 5-2,3,4	
2	April 2, 2002	Lec/lab	Sampling / Intro to Spectroscopy	Chap 19-1,2,3,5	Groups in GC / HPLC / AA
2	April 3, 2002	Lab			Groups in GC / HPLC / AA
2	April 4, 2002	Lec/rec	Intro to Spectroscopy	Parts of Chap 20 Chap 21-1,2,3,4,5,6	
3	April 9, 2002	Lec/lab	Atomic Absorbance	Chap 22.1,2,3	Lab groups switch
3	April 10, 2002	Lab		Groups in HPLC / AA / GC	Lab groups switch
3	April 11, 2002	Lec/rec	Atomic Absorption / Molecular UV/Vis	Chap 22-4,5	
4	April 16, 2002	Lec/lab	Exam I		Lab groups switch
4	April 17, 2002	Lab		Groups in AA / GC / HPLC	Lab groups switch
4	April 18, 2002	Lec/rec	Molecular UV/Vis / Fluorescence	Chap 20-6 Chap 19-6	
5	April 23, 2002	Lec/lab	IR and NMR	Lecture only	Begin Second Level Labs
5	April 24, 2002	Lab		Advanced GC / HPLC / AA	Begin Second Level Labs
5	April 25, 2002	Lec/rec	Intro to Separations	Chap 23-2,4,5	

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6	April 30, 2002	Lec/lab	GC / GC-Mass	Chap 24	Advanced HPLC / AA / GC	Lab groups switch
6	May 1, 2002	Lab			Advanced HPLC / AA / GC	Lab groups switch
6	May 2, 2002	Lec/rec	GC / GC-Mass / HPLC	Chap 24 / Chap 25-1,2		
7	May 7, 2002	Lec/lab	HPLC	Chap 25-3,4,	Advanced AA / GC / HPLC	Lab groups switch
7	May 8, 2002	Lab			Advanced AA / GC / HPLC	Lab groups switch
7	May 9, 2002	Lec/rec	Ion Chrom / Cap electrophoresis	Chap 26-1,2,3,4,5		Recitation: Student presentations
8	May 14, 2002	Lec/lab	Exam II		Advanced AA / GC / HPLC	Extra Session
8	May 15, 2002	Lab			Advanced AA / GC / HPLC	Extra Session
8	May 16, 2002	Lec/rec	Intro to Electrochemistry	Chap 14-1,2,3,4,6		Recitation: Student presentations
9	May 21, 2002	Lec/lab	Potentiometry / Coulometry	Parts of Chap 15, 16, 27	Capillary Electrophoresis	
9	May 22, 2002	Lab			Capillary Electrophoresis	
9	May 23, 2002	Lec/rec	Voltammetry	Chap 18-1,2,3,4,6		Recitation: Student presentations
10	May 28, 2002	Lec/lab	Student presentations		Polarography	
10	May 29, 2002	Lab			Polarography	
10	May 30, 2002	Lec/rec	Student presentations			Recitation: Student presentations
11	June 4, 2002		Final			