

Chemistry 303 Spring, 2009 Course Guidelines

Instructor: Daniel Graham, Flanner Hall Room 401 (office, 773 508-3169); Loyola Chemistry Office: 773 508-3100; FAX: 773 508-3086; Email: dgraha1@luc.edu.

Laboratory Assistants: Jessica Greminger, Eric Andrews

Lab Times: M, 0830 – 1230; W, F 1340 - 1730

Places: Flanner 315 and 301.

DJG Office Hours: M, W, F 1230 - 1330, or by arrangement.

This course will introduce apparatus, techniques, and analysis for experimental pchem. Each student will pursue the following activities via a rotation format:

- (1) Ye olde crash course in laboratory glassblowing.
- (2) Ye olde machine shop design and cookbook electronics project.
- (3) Ye olde information trapping/entropy reduction measurements.
- (4) Ye olde evaporation kinetics, activity coefficients, and noise signature measurements.
- (5) Ye olde measurement of density fluctuations using laser light scattering.
- (6) Ye olde measurements of thermoelectric power generation.

In addition, there will be a library assignment for the first week, a celebration of π -day during the middle of the semester, and a final exam at the end of the semester.

Course Structure:

The core of Chem 303 will consist of six rotations, each lasting two weeks. Two of the rotations will focus on technical skills by way of machine shop design, cookbook electronics, and glassblowing. A practicum exam is given at the end of the glassblowing rotation. Four rotations will be experimental in nature, although technical matters will also be involved. Hand-outs, library materials, and on-site instructions will be part of each exercise. Research-style lab reports will be written for each team following each experimental rotation. Every team lab report is due no later than ten days after the rotation is completed.

Students will work in three-member teams. These will be established during the first class meeting and remain in effect for the duration of the semester.

Grading:

Grades will be determined on the basis of three areas and weight factors:

Library and π -Day Assignment: 10%

Design Project, Cookbook Electronics and Glassblowing Practicum: 25%

Research Style Lab Reports: 40%

Final Exam: 25% (**All Sections: Friday, May 1, 2009, 0900 – 1100**).

The following scale will be used:

90% - 100% A ; 80% - 89% B; 70% - 79% C; 60% - 69% D; < 60% F

Points assigned in Chem 303 will be due to a combination of team work and individual work. The grading policy aims to encourage both team and individual achievement during challenging rotations. Experimental pchem is not a quick study, but the process is rewarding if good-faith effort is made. Students are urged to contact the instructor to discuss problems before they become serious.

Chem 303 Schedule

Ye Olde Monday Section:

M	011209	Course Logistics
M	011909	Martin Luther King Holiday
M	012609	First Rotation, First Week
M	020209	First Rotation, Second Week
M	020909	Second Rotation, First Week
M	021609	Second Rotation, Second Week
M	022309	Third Rotation, First Week
M	030209	Ye Olde Spring Break
M	030909	Third Rotation, Second Week
M	031609	Fourth Rotation, First Week plus π Day Celebration
M	032309	Fourth Rotation, Second Week
M	033009	Fifth Rotation, First Week
M	040609	Fifth Rotation, Second Week
M	041309	Ye Olde Easter Break Holiday

M 042009 Sixth Rotation, First Week

We need to squeeze in the second week of the Sixth Rotation somewhere.

Ye Olde Wednesday Section:

W 011409 Course Logistics

W 012109 First Rotation, First Week

W 012809 First Rotation, Second Week

W 020409 Second Rotation, First Week

W 021109 Second Rotation, Second Week

W 021809 Third Rotation, First Week

W 022509 Third Rotation, Second Week

W 030409 **Ye Olde Spring Break**

W 031109 Fourth Rotation, First Week

W 031809 Fourth Rotation, Second Week plus π Day Celebration

W 032509 Fifth Rotation, First Week

W 040109 Fifth Rotation, Second Week

W 040809 Sixth Rotation, First Week

W 041509 Sixth Rotation, Second Week

W 042209 i-dotting and t-crossing

Ye Olde Friday Section:

F 011609 Course Logistics

F 012309 First Rotation, First Week

F 013009 First Rotation, Second Week

F 020609 Second Rotation, First Week

F 021309 Second Rotation, Second Week

F 022009 Third Rotation, First Week

F 022709 Third Rotation, Second Week

F 030609 **Ye Olde Spring Break**

F	031309	Fourth Rotation, First Week
F	032009	Fourth Rotation, Second Week plus π Day Celebration
F	032709	Fifth Rotation, First Week
F	040309	Fifth Rotation, Second Week
F	041009	Easter Break Holiday
F	041709	Sixth Rotation, First Week
F	042409	Sixth Rotation, Second Week

The final exam for all sections is Friday, May 1, 2009, 0900 – 1100. Please bring a ruler, calculator, periodic table, and a single sheet of notes. The exam will address one or two Qs about each lab rotation.

Ye Olde Rotation Schedule: Initial Assignments

1. Glassblowing	Benson	Eyring	Mayer
2. Design/Cookbook	Pitzer	Herschbach	Hirota
3. Information Trapping	Herzberg	Klemperer	Johnston
4. Evaporation Kinetics	Hirschfelder	Weissman	Stockmayer
5. Light Scattering	Ramsay	Fenn	Hildebrand
6. Thermoelectrics	Hochstrasser	Pauling	Moore

Ye Olde Monday Teams:

Team Benson, *ARPC 39*.
 Team Pitzer, *ARPC 38*.
 Team Herzberg, *ARPC 36*.
 Team Hirschfelder, *ARPC 34*.
 Team Ramsay, *ARPC 45*.
 Team Hochstrasser, *ARPC 57*.

Ye Olde Wednesday Teams:

Team Eyring, *ARPC 28*.
 Team Herschbach, *ARPC 51*.
 Team Klemperer, *ARPC 46*.
 Team Weissman, *ARPC 41*.
 Team Fenn, *ARPC 47*.
 Team Pauling, *ARPC 16*.

Ye Olde Friday Teams:

Team Mayer, *ARPC 33*
Team Hirota, *ARPC 42*
Team Johnston, *ARPC 43*
Team Stockmayer *ARPC 35*
Team Hildebrand, *ARPC 14*
Team Moore, *ARPC 58*

First Assignment Due in One Week:

Each Chem 303 team is named after a top flight physical chemist. Each chemist has written an abbreviated memoir appearing in the *Annual Reviews of Physical Chemistry*.

The first assignment is for every Chem 303 individual to (1) read the memoir associated with one's team name, (2) type a one page, double-space paper describing the most interesting pchem idea/experiment, in your own opinion plus words, in the memoir. Please aim for clarity of thought and conviction in writing. Chem 303 teams should coordinate reading logistics of their particular ARPC volume.

The Ten Commandments of Physical Chemistry (adapted from SU handout)

- I. Thou shalt have an Open Mind.
- II Thou shalt never take anything for granted; thou shalt check up early and often and make repeatedly sure of absolutely everything.
- III. Thou shalt have a pretty good time and thy work shall be interesting.
- IV. Thou shalt respect the intelligence of all parties.
- V. Thou shalt not gather in small and divisive groups, nor do violence upon one another.
- VI. Thou shalt fear no pchem problem. Yet shall ye fear and despise sloth, dullness, tastelessness, and gutlessness, for these will surely bring down the wrath of Mother Nature.
- VII. Thou shalt hacketh awayeth at pchem problems with dignity and helpeth thy associates to doeth likewise.
- VIII. Thou shalt bendeth over backwards to recordeth data, observations, and questions that cometh to mindeth.
- IX. Thou shalt admiteth thy mistakes, for they shall be forgiven.

X. Thou shalt rolleth and bounceth over the potholes. When everything aroundeth thee wirleth and creameth and seemeth to falleth aparteth, thou shalt adjusteth and sayeth to thyself calmly, "This too shall pass".