Chemistry 303 Spring, 2011 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.

Course Assistants: Brittni Qualizza, Samuel Sarsah, and Benjamin Hill.


Places: Flanner 315 and 301.

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

This course will introduce apparatus, techniques, and analysis used in experimental physical chemistry. We will pursue the following activities via a rotation format:

1. Ye olde crash course in laboratory glassblowing.
2. Ye olde information trapping/entropy reduction measurements.
3. Ye olde crash course in laboratory electronics.
4. Ye olde evaporation kinetics, activity coefficients, and noise signature measurements.
5. Ye olde crash course in numerical integration via analogue and digital methods
6. Ye crash course in CW lasers and investigation of density fluctuations.

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. Three rotations will focus on technical skills by way of glassblowing, electronics, and numerical integration. Practicum exams will be given at the end of these rotations. Three 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 two weeks after the rotation is completed. Please respect the due dates out of consideration for all parties.

Ideally students will work in three-member teams. These will be established during the first class meeting and remain for the duration of the semester.
Grading:

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

Library Assignment:  5%
π-Day Assignment:  5%
Glassblowing, electronics, and numerical integration lab practicums:  35%
Research Style Lab Reports:  35%
Final Exam:     20%  (All Sections: Monday, May 9, 2011, 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 and individual work. The grading policy aims to encourage both forms of achievement during challenging rotations. Experimental pchem is neither easy nor a quick study, but the process is rewarding if good-faith effort is made. Students are urged to consult with the instructor to discuss problems before they become serious.

Chem 303 Schedule

Ye Olde Monday Section:

M  011711  Martin Luther King Holiday
M  012411  Course Logistics and First Rotation, First Week
M  013111  First Rotation, Second Week
M  020711  Second Rotation, First Week
M  021411  Second Rotation, Second Week
M  022111  Third Rotation, First Week
M  022811  Third Rotation, Second Week
M  030711  Ye Olde Spring Break
M  031411  Fourth Rotation, First Week plus π Day Celebration
M  032111  Fourth Rotation, Second Week
M  032811  Fifth Rotation, First Week
M  040411  Fifth Rotation, Second Week
M  041111  Sixth Rotation, First Week
M  041811  Sixth Rotation, First Week
M  042511  Ye Olde Easter Break Holiday
Ye Olde Wednesday Section:

W  011911  Course Logistics
W  012611  First Rotation, First Week
W  020211  First Rotation, Second Week
W  020911  Second Rotation, First Week
W  021611  Second Rotation, Second Week
W  022311  Third Rotation, First Week
W  030211  Third Rotation, Second Week
W  030911  Ye Olde Spring Break
W  031611  Fourth Rotation, First Week plus π Day Celebration
W  032311  Fourth Rotation, Second Week
W  033011  Fifth Rotation, First Week
W  040611  Fifth Rotation, Second Week
W  041311  Sixth Rotation, First Week
W  042011  Sixth Rotation, Second Week
W  042711  i-dotting and t-crossing

Ye Olde Friday Section:

F  012111  Course Logistics
F  012811  First Rotation, First Week
F  020411  First Rotation, Second Week
F  021111  Second Rotation, First Week
F  021811  Second Rotation, Second Week
F  022511  Third Rotation, First Week
F  030411  Third Rotation, Second Week
F  031111  Ye Olde Spring Break
F  031811  Fourth Rotation, First Week plus π Day Celebration
F  032511  Fourth Rotation, Second Week
F  040111  Fifth Rotation, First Week
The final exam for all sections is Monday, May 9, 2011, 0900 – 1100. Please bring a ruler, calculator, periodic table, and a single sheet of notes. The exam will address two-three Qs about each lab rotation.

Ye Olde Rotation Schedule: Initial Assignments

1. Glassblowing
   Benson    Eyring    Mayer
2. Information Trapping
   Pitzer    Herschbach Hirota
3. Electronics
   Herzberg  Klemperer  Johnston
4. Evaporation Kinetics
   Hirschfelder Weissman Stockmayer
5. Numerical Integration
   Ramsay    Fenn      Hildebrand
6. CW Lasers
   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 a short 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.

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**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 inevitable 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".

**The Pchem Motto:** No lies, no hate, no fear.