



TEMPLE  
UNIVERSITY

## CHEMISTRY DEPARTMENT

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**SYLLABUS FOR FIRST SEMESTER  
HONORS GENERAL CHEMISTRY  
(Chemistry H093)**

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**Fall Semester 2006**

- Laboratory Section 001, Monday, 4:40 - 7:30 PM BE 211
- Laboratory Section 002, Wednesday, 1:40 - 4:30 PM BE 211
- Laboratory Section 003, Wednesday, 4:40 - 7:30 PM BE 211
- Laboratory Section 004, Friday, 8:40 - 11:30 AM BE 211
- Laboratory Section 005, Tuesday, 4:40 - 7:30 PM BE 211
- Laboratory Section 006, Thursday, 4:40 - 7:30 PM BE 211

Instructor: Dr. J. Scovill, BE 240, Voice 215-204-7341; Facsimile 215-204-1532  
e-mail: [john.scovill@temple.edu](mailto:john.scovill@temple.edu);  
Office Hours: MW 10:30 - 11:30 AM

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There has been a general dissatisfaction among some faculty at many institutions for some time in the more-or-less traditional "cookbook" type of General Chemistry course. A common thread suggests that "the opportunity to excite students and show them how real science is done is squandered".<sup>1</sup>

This Honors and Majors course is the first at [Temple University](http://Temple University) to engage the problem at the Freshman level.

Additionally, there is now a great deal of evidence that the process of "Cooperative Learning" profits most students. It is hoped that this class will provide the [Chemistry Department](#) with some evidence for its value here. The text book chosen for the laboratory is [M. M. Cooper Cooperative Chemistry](#), 3rd edition [McGraw-Hill 2006](#) which is available at the [T.U. Bookstore](#). You must also bring a **hard bound** laboratory notebook and safety glasses to class and a Safety Release Form found in the **Student**

**Guide to CST Laboratory Safety.** The **Guide** can be obtained from the Copy Center in Conwell Hall, Room 601.

In addition to the textbook ( M. M. Cooper Cooperative Chemistry, *McGraw-Hill*) library resources found in the [Chemistry Department Library](#) and on the World Wide Web may prove useful in this course. Use should be made of the site for [Honors and Majors Chemistry Students](#) (which will only work from on campus or using point-to-point protocol [ppp] access). Simulated experiments can be found there. Some web resources<sup>2</sup> which you might find useful include (but are not limited to):

- [Science learning network](http://www.sln.org/) ...http://www.sln.org/
- [Webercises \(Wiley\)](http://www.wiley.com/college/webercises/) ... http://www.wiley.com/college/webercises/
- [Education Index](http://www.educationindex.com/chem/) ...http://www.educationindex.com/chem/
- [General Chemistry Online](http://antoine.frostburg.edu/chem/senese/101/) ...http://antoine.frostburg.edu/chem/senese/101/
- [NCSA ChemViz](http://www.ncsa.uiuc.edu/Edu/ChemViz/curr.html) ...http://www.ncsa.uiuc.edu/Edu/ChemViz/curr.html
- [Online Data bases from the NIST](http://www.nist.gov/srd/online.htm) ...http://www.nist.gov/srd/online.htm
- [Chem-help at Temple](http://www.temple.edu/chem-help) ...http://www.temple.edu/chem-help.

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Any student who has a need for accommodation based on the impact of a disability should contact me privately to discuss the specific situation as soon as possible. (S)he should also contact Disability Resources and Services at 215-204-1280 in 100 Ritter Annex so that we can attempt to coordinate reasonable accommodations for their documented disabilities.

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## COURSE ORGANIZATION

The laboratory work in this course is divided into a series of projects. As outlined below there will be four (4) projects to be completed in the first semester. The first laboratory period will be devoted to a discussion of the goals and objectives of the course, checking into the laboratory, investigating some of the equipment available in the laboratory, and organizing the class into teams. Team members will be introduced to each other and roles in the team assigned. (Although you will stay with the group throughout the semester, your role in the group will vary with each assignment.) Subsequent laboratory sessions will adhere to the schedule appended below.

## THE TEAM APPROACH<sup>1</sup>

As our society becomes more complex, it is becoming clear that most problems that beset us can no longer be solved in a reasonable amount of time by single individuals working alone. So, learning to work as part of a team is an important undertaking.

In our individualistic society, working as part of a team is often found to be difficult because members of the team are expected to rely upon each other to solve problems cooperatively. Today, widespread cooperation is particularly true in the sciences where an individual laboratory often cannot house all of the equipment necessary for the solution to every problem. Therefore, although this is a course in problem solving, it

enjoys the added complexity of attempting to utilize a team approach to solve the problems. Thus, each team will be presented with a problem and the members of the team will need to devise their own experiments, test their own hypotheses and evaluate their own data. Although all of the teams will have the same problems, it is anticipated that different teams will find different solutions. Part of your mark will reflect your contribution to the success of the team as a group as well as your contributions to creating a quality working environment which promotes the likelihood of success. In this regard, the following characteristics are critical to the effectiveness of groups: inclusion, creativity, adaptability, connectivity, communication, intuition, and collaboration.

As noted above your role in the team will change. At some time you are expected to assume the role of:

- **A Team Leader** : responsible for overall supervision of the team and (s)he assures that all members contribute equally.
- **An Assistant Team Leader** : assumes the role of the Team Leader when (s)he is absent and is responsible for completion of all materials to be submitted by the group in a way that reflects the thinking of all team members
- **A Record Keeper**: keeps records of all materials discussed and is responsible for informing absent team members of progress made.
- **A Team Counselor**: assumes the role of the Record Keeper if (s)he is absent and is responsible for making sure all team members agree on a proposed course of action.

## PROCEDURAL OUTLINE

During the first week of lab, you will be assigned to a group. You will then spend some time getting to know the members of your group and acquainting yourselves with the laboratory and various places in the building where facilities to support your enquiries are housed (library, computer room , *etc.*). You will also be given your first project and will spend whatever time remains of the rest of the laboratory period working on your project. At the beginning of the next laboratory period your group will hand in a brief (200 - 400 words) written preliminary proposal describing how your team anticipates carrying out the project. The proposal should explain what you intend to do, why you intend to it, and how you will deal with the results. It has been suggested<sup>1</sup> that you will almost certainly need to modify your preliminary proposal during the work. This preliminary plan will count for 10 points of the total grade of the first project and, along with an oral report and final summary, will be the only portion of your grade which will be assigned to the group as a whole.

During the next two weeks, your group will continue investigations into your project and at the beginning of week four, you will **each** hand in a separate report on the progress made to date. Each member of the group will write a separate report and will receive feedback the following week. The final report for the project will be due from each member of the group the week following the final lab period of each project.

Each project is evaluated separately. The total grade for the course is the average of the project grades.

## GRADING:

Each project will be graded along the following outline:

ASSIGNMENT	VALUE
Proposal	10 points (group grade)
Weekly Summary	5 points (group grade)
Preliminary Report	10 points (individual grade)
Final Report	40 points (individual grade)
Technique and Notebook	10 points (individual grade)
Oral Report	15 points (group grade)
Peer evaluation	10 points (individual grade)
<b>TOTAL</b>	100 points

### NOTE:

- All grades except as noted are individual grades. **Please** keep in mind the University policies on academic honesty. The reports you write and submit, even though they are based on the experimental work of the group, must be your own work.
- Keeping a laboratory notebook is discussed in your laboratory text (**Cooperative Chemistry**). You must keep in mind that the notebook should be written in ink and alterations affected by drawing a single line through what you wish to have ignored and rewriting new observations, *etc.* below or next to that which was crossed out. Notes on scraps of paper are too easily lost or confused with other things to be of lasting value and your grade for technique will suffer if the laboratory instructor observes that bad habit forming.
- You will be given forms to evaluate your peers in the middle and at the end of the course. Anonymous evaluation of the course and the instructor can be made at any time by filling out the form to be found [here](#) and on a different form at the end of the term. Comments concerning course improvement are welcome at any time and in any format.
- Details on preparation of oral and written reports are given in the laboratory manual.
- The weekly report is a summary of your progress and will be typed up and handed in by noon of the day following the laboratory class.

## ATTENDANCE

Attendance in the laboratory is required. If you must miss a laboratory for some reason, you should inform the members of your group and the instructor ([john.scovill@temple.edu](mailto:john.scovill@temple.edu)). Your group members will have the option of requesting that you do extra work (*e.g.*, looking things up in the library, *etc.*). If you have more than two unauthorized absences, the instructor may encourage you to withdraw from the course. In any event, each of you will have the opportunity to evaluate the members of your group at the end of each project.

## INCOMPLETES/WITHDRAWAL

**Withdrawal:** Please note that a withdrawal (W) is an institutional procedure which is not complete until the withdrawal form has been signed and submitted to the Registrar's office. This course is governed by the Temple University Policy (#02.10.14) on Withdrawal. Please click [here](#) to view the policy.

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**Incomplete:** Please note that an Incomplete (I) is only to be given in accord with institutional procedures and which is not complete until the specific requirements and forms have been met, signed and submitted. Additionally the grade "I" (Incomplete) will be given only to students who have finished three of the four assigned experiments. This course is governed by the Temple University Policy (#02.10.13) on Incompletes. Please click [here](#) to view the policy.

Subject to the restrictions of the University as noted above, please keep in mind that there are other people relying upon you in this course. The members of your group will need to plan to make arrangements to accommodate your loss from the group. Please make every effort to show consideration for those who are staying with the course. Note that you **must check out of the laboratory before a drop authorization is signed** or you will be charged a fee and your grades will be withheld pending its payment.

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## LABORATORY SCHEDULE

### NOTICE:

**If you do not wear your safety glasses in the laboratory you will not be permitted to stay.** (Persons wearing contact lenses must remove them and replace them with eye glasses for the laboratory period.) You must read and agree to abide by the Safety Rules provided for you in your laboratory text (pp 13 - 14) and you must bring to class a **signed Safety Release Form** found in the **Student Guide to CST Laboratory Safety** that is obtained from the Copy Center in Conwell Hall, Room 601.

At this stage it is important to learn to "dress like a chemist". **Eating and drinking in the laboratory are prohibited.** It should be your plan to wear clothing in the laboratory that will provide sufficient body coverage. **Shorts, mini-skirts, bare midriffs etc. are inappropriate. Wearing open-toed shoes and sandals is also not permitted in the laboratory.** Long hair should be securely tied back. If you choose to dress inappropriately you will be asked to leave the laboratory. Students will wear the laboratory coats furnished by the Chemistry Department.

## Chemistry H093 (September - December 2006)

Week beginning:	Topic	Comments <sup>3</sup>
28 Aug.	Introduction	Assign groups, assign roles, <i>etc.</i>
4 Sept.	Experiment 11, Identification of Unknown Ionic Compound	Submit written proposal.
11 Sept.	Experiment 11. Continued	Weekly summary of progress due by noon of the day after class.
18 Sept.	Experiment 11. Continued	Weekly summary of progress due by noon of the day after class.
25 Sept.	Finish Experiment 11. Plan Experiment 12. Hot and Cold	<b>Oral Reports on Experiment 11</b> presented. Final Reports due by noon of the day after class. Submit proposal for Experiment 12.
2 Oct.	Experiment 12. Continued	Weekly summary of progress due by noon of the day after class.
9 Oct.	Experiment 12. Continued	Weekly summary of progress due by noon of the day after class.
16 Oct.	Finish Experiment 12. Plan Experiment 13. Analysis of Colas	<b>Oral Reports on Experiment 12</b> presented. Final Reports due by noon of the day after class. Submit proposal for Experiment 13.
23 Oct.	Experiment 13. Continued	Weekly summary of progress due by noon of the day after class.
30 Oct.	Experiment 13. Continued	Weekly summary of progress due by noon of the day after class.
6 Nov.	Finish Experiment 13. Plan Experiment 6. Properties of Matter and Separations	<b>Oral Reports on Experiment 13</b> presented. Final Reports due by noon of the day after class. Submit proposal for Experiment 6.
13 Nov.	Experiment 6. Continued	Weekly summary of progress due by noon of the day after class.
20 Nov*.	Experiment 6. Continued	Weekly summary of progress due by noon of the day after class.
27 Nov**.	Finish Experiment 6 and checkout	Weekly summary of progress due by noon of the day after class.
4 Dec.	Finish checkout	<b>Oral Reports on Experiment 7</b> presented. Final Reports due by noon of the day after class. Reports on your experience (positive and

		negative) and suggestions are due.
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\*Tuesday November 21- Follow your Thursday class schedule.

\*\*Wednesday November 22 – Follow your Friday class schedule

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<sup>1</sup> M. M. Cooper, **Cooperative Chemistry**, 3rd edit. [\*McGraw-Hill\*](#), 2006.

<sup>2</sup> At this writing (26 August 2005) all of the www sites quoted are "up-and-running". However, it is the current nature of the www to be somewhat ephemeral and therefore, of course, there are no guarantees that the sites now present will be there when you need them. Additional sites can be added should members of the class find them particularly useful.

<sup>3</sup> Laboratory reports (group and individual) will be considered submitted if they have been placed in the instructors' mail box in the Department office (BE201) by the time specified in the **Schedule**. Students in the laboratory scheduled to meet on Friday afternoon have the option of submitting their report by email ([john.scovill@temple.edu](mailto:john.scovill@temple.edu)) before noon on the Saturday following their laboratory or submitting it as noted above by 9:00 AM on the Monday following their laboratory.

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Comments: [Dr. Scovill's Mail Box](#).

215-204-7129 (VOICE)

215-204-1532 (Fax)

## Chemistry Laboratory Report Evaluation

Review the Evaluation section of your laboratory manual for a detailed discussion of this grade sheet. When your laboratory reports are returned to you, your instructor will attach a copy of this grade sheet, showing exactly how the points which make up your score for the report are distributed. Use the grade sheet to pinpoint trouble spots in your reports. Instructors will include suggestions in the "Comments" section. Check the text of the report itself for additional comments and evaluations.

**Laboratory Report Evaluation:**

**Grade:**

**Name:**

**Project Title:** *Identification, Properties, and Synthesis of an Unknown Ionic Compound.*

**Title:** Identifying Report (**5 points**) including all information in the required order.

- Separate page (1)
- All required information (2)
- Correct format (2)

**Abstract:** (**5 points**).

- Between and 200 words. (2)
- Report the major results. (3)

**Introduction:** (**10 points**):

- Understanding basic concepts (**5 points**)
  - Gives succinct explanation of the problem (3)
  - Gives relevant background information for chosen experiments (2)
- General format (**5 points**)
  - Goals are clearly stated (1)
  - Goals are relevant to project (2)
  - Sources for information are cited (2)

**Comments:**

**Results:** (**20 points**)

- General format (**6 points**)
  - Data is clearly summarized with no raw data (2)
  - Includes numerical data rather than descriptions of data (2)
  - Describes results in text without providing interpretation of results (2)
- Presentation (**8 points**)
  - Includes all necessary charts and graphs (2)
  - Graphics are neat and clearly labeled (2)
  - All units of measurement are identified (2)
  - All Tables and figures include a title and descriptive caption (2)
- Quality points (**6 points**)
  - Data is presented in easily readable (2)
  - Written in clear, logical style (1)
  - All important results are mentioned (1)
  - Employs scientific style [past tense, passive voice, third person, impersonal] (1)
  - No interpretation of results (1)

**Discussion:** (**20 points**)

- Understanding basic concepts (**10 points**)
  - Workings of experiment are explained (2)
  - Scientific explanations are given (6)
  - Unexpected events identified and explained (2)
- General format (**6 points**)
  - All results which support conclusions are identified (1)
  - Results which do not support conclusions are explained (1)
  - Identify problems in conducting experiments (1)

Literature information necessary for completing goals is included (2)

Quality points (**4 points**)

Data is intelligently and accurately used to support conclusions (1)

Sources are used to discuss meaning of results and conclusions (1)

Scientific principles behind experiments and results are clearly explained (2)

**Conclusion: (5 Points)**

All goals from *Introduction* are addressed (2)

Restate import results to support conclusion (1)

No new information (1)

Conclusion is limited to summary – no arguments from *Discussion* are restated (1)

**Experimental Procedure: (15 points)**

General format (**10 points**)

Step by step account (2)

Complete details (2)

Scientific style [past tense, passive voice, third person, impersonal] (2)

No unnecessary details (2)

No results are reported (2) ?

Quality Points (**5 points**)

Detailed enough to be duplicated (3)

No discussion of results is included (2)

**References: (5 points)**

List all references

Format for references

**Quality Points: (15 points)**

Quality & clarity of prose (**5 points**)

Use of scientific style [past tense, passive voice, third person, impersonal] (**5 points**)

Logical/coherent/readable (**3 points**)

Accurate description & logical analysis (**2 points**)

## Laboratory Note Book

### Mechanics:

- (1) Use a composition notebook with sewn pages. Staples has these for \$0.79, the bookstore also has them. Quadrille ruled is best.
- (2) Save the first four pages for *the Contents*.
- (3) Notes are taken in permanent ink.
- (4) Mistakes are crossed out – not eradicated.
- (5) Each page should have a date and title at the top.
- (6) Use enough room.
- (7) Only one experiment per page
- (8) You can continue an experiment after another has begun. Write a note on the previous page of the experiment so you can find the page where the experiment follows on.
- (9) Label chemicals or samples you make put into bottles like this:  
H093/001\_JPSX023 – that would be from p. 23 of a notebook of a student enrolled in H093 section 001 whose initials are JPS. Ordinary solutions (like 6M HCl) should be labeled with the name of the person who made it and a notebook reference as well.

### Philosophy:

- (1) Procedures should be recorded in complete enough detail to allow the experiment to be repeated by another scientist – even years after the fact.
- (2) Neatness is not a prime consideration but the notes do need to be legible.
- (3) Cite procedures and sources of data with a reference to the source complete enough to allow someone else to find it.
- (4) You should show calculations in the notebook – you might want to double check them later on.
- (5) Observations are important – color of solutions, changes in temperature, pH, evolution of a gas, appearance of a precipitate.
- (6) Record data accurately – temperature, pH, mass, volume of solutions, etc
- (7) You can draw pictures, flow charts, and tables if these make your results clearer.