Curriculum Committee: New Course Proposal

When completed, this proposal should be submitted to the Office of the Associate Provost for consideration by the College Curriculum Committee.

1. **Department(s) proposing this course:** SCIENCE

2. **Title of the course:** CHE 102. GENERAL CHEMISTRY I-B  
   **Abbreviated title (up to 20 characters):** GENRL CHEMISTRY I-B

3. **Level of this course:**  
   
   |   | 100 Level | 200 Level | 300 Level | 400 Level |
   |
   | X |   |   |   |

4. **Course description as it is to appear in the College Bulletin:**
   (Write in complete sentences except for prerequisites, hours and credits.)

   CHE 102 is the second semester of the CHE 101-102 sequence. Topics include the hydrogen atom, electron configurations, Lewis structures, theories of bonding, thermochemistry, properties of pure liquids and solids, solutions, and colligative properties. Laboratory exercises will include small scale, semi-quantitative experiments related to the lecture topics covered in the CHE 101-102 sequence. Pre-requisite: CHE 101. 3 hours lecture, 1 hour recitation, 3 hours laboratory. 3 credits. (Offered spring semesters)

5. **Has this course been taught on an experimental basis?**
   
   | No | X Yes: Semester(s) and year(s): Spring 2007 |
   |
   |   | Teacher(s): Francis Sheehan; Nicholas Petraco |
   |
   |   | Enrollment(s): 18 + 9 = 27 (two sections) |
   |
   |   | Prerequisite(s): Completion of CHE 101 |

CHE 102 is being taught as an experimental course called CHE 192 during the Spring 2007 semester. CHE 101-102 (CHE 191-192) was originally proposed as a “one-half speed” CHE 103 course for students who do not have the math and science background necessary to successfully master the rigorous CHE 103 curriculum in one semester, but who have the potential, with early intervention, to succeed in the Forensic Science program. Ten comprehensive chapters of chemistry designed for science majors are covered in CHE 103. In CHE 101 (experimentally offered as CHE 191) the first five chapters of CHE 103 are covered; in CHE 102 (experimentally offered as CHE 192) the last five chapters of CHE 103 are covered. However, early on in teaching CHE 191 during the Fall 2006 semester it became apparent that a recitation session was necessary for CHE 101 (CHE 191) to optimize the potential benefits of the course by making it a truly “one-half speed” CHE 103 course. CHE 103 has two periods of lecture, a one period recitation and two periods of laboratory per week. The recitation sessions and, to a lesser degree, the “down time” during laboratory exercises in CHE 103 are used to reinforce lecture material, review homework assignments and conduct post-exam analysis, etc., maximizing lecture teaching time. The CHE 102 course needs a recitation session, similar to the CHE 103 course, to provide sufficient time to appropriately teach five comprehensive chapters (Chapters 6 though 10) to students identified as capable of succeeding in a
rigorous Forensic Science program but who need additional help in the first chemistry course of the program. Therefore, a one hour recitation period, which was not part of the experimental CHE 192 course, has been added to this new course proposal to make it more consistent with CHE 103.

6. **Prerequisites:**
   CHE 101.

7. **Number of:**
   
   - class hours: 4*  
   - lab hours: 3  
   - credits: 3  

   * = 3 hours lecture, 1 hour recitation

8. **Brief rationale for the course:**

   This course is the second semester of the two semester CHE 101 (General Chemistry I-A) and CHE 102 (General Chemistry I-B) sequence, which is equivalent in content to CHE 103 (General Chemistry I) but done at a slower pace with emphasis on developing needed skills. This sequence is primarily intended for students who have not taken high school chemistry or who have received a grade of less than 80% on the Chemistry Regents Examination but are interested in being a Forensic Science or Fire Science major, or are interested in developing a strong knowledge base of general chemistry principles. By splitting the one semester CHE 103 course into two cumulatively equivalent one semester courses, CHE 101 and CHE 102, more time can be given to teaching the fundamental skills and scientific principles necessary for students to succeed in the course (and, therefore, the major), and provide the students with additional time to assimilate the material.

9a. **Knowledge and performance objectives of this course:**

   (What knowledge will the student be expected to acquire and what conceptual and applied skills will be learned in this course?)

   The course is a continuation of CHE 101 and provides students with a better understanding of the chemical world around us and is a prerequisite for more advanced chemistry courses. Topics include the hydrogen atom, electron configurations, Lewis structures, theories of bonding, thermochemistry, properties of pure liquids and solids, solutions, and colligative properties. More specific topics are listed below:

   - Light, Photon Energies & Atomic Spectra  
   - The Hydrogen Atom  
   - Quantum Numbers; Atomic Orbitals  
   - Electronic Configurations in Atoms  
   - Orbital Diagrams; Electronic Arrangements  
   - Periodic Trends in the Properties of Atoms  
   - Lewis Structures, the Octet Rule  
   - Molecular Geometry  
   - Polarity of Molecules  
   - Principles of Heat Flow  
   - Measurement of Heat Flow, Calorimetry  
   - Enthalpy  
   - Thermochemical Equations  
   - Enthalpies of Formation  
   - The First Law of Thermodynamics  
   - Liquid-Vapor Equilibrium  
   - Phase Diagrams  
   - Molecular Substances, Intermolecular Forces  
   - Network Covalent, Ionic & Metallic Solids  
   - Concentration Units  
   - Principles of Solubility  
   - Colligative Properties of Nonelectrolytes  
   - Molar Masses from Colligative Properties  
   - Colligative Properties of Electrolytes

   The primary objective of offering this slower paced alternative is to help reduce the high attrition rate in General Chemistry, which is one of the foundation courses for all Forensic Science majors, regardless of track.
As with all science courses in the Forensic Science major, critical thinking and analysis is emphasized, as well as clarity in spoken and written communication.

9b. Information literacy:
(Indicate what sorts of information seeking skills will be enhanced by this course, e.g., use of the internet, access to specialized data bases, literature search skills, etc.)

Students are expected to maintain active and accessible college E-mail and Blackboard accounts. Blackboard will be used to post announcements, handouts, additional study materials, text supplements, grades, etc. The General Chemistry 102 Blackboard site will also have a forum for students to communicate with the instructor and with each other on topics posted by the participants. The Blackboard site will also have links to sites relevant to chemistry, chemical safety, and general science topics of interest.

10. Recommended writing assignments:
(Indicate types of writing assignments and number of pages of each type. Writing assignments should satisfy the College’s requirements for writing across the curriculum.)

Homework is assigned and required. Although a significant percentage of the homework involves mathematical computations, essays and short (a paragraph or two) answers are also required to ensure the student understands the scientific concepts upon which the computations are based. Essays and short answers must be clear, concise and accurately reflect what the student desires to express. Students are expected to “write what they mean” and “mean what they write.” The importance of doing so, and the consequences of not doing so, particularly as a potential future expert witness asked to testify in an adversarial system, is emphasized. The CHE 102 course also has a laboratory component which requires students to complete “Advance Study Assignments” (ASAs) prior to coming to laboratory. Many of the questions on the ASA require written explanations and, as stated on the syllabus, the clarity of those explanations is a factor in the grade. The Writing Across the Curriculum standard of 1000 words for 100-level courses will be met.

11. Will this course be part of any major (s) or program (s)?
   ___ No
   X Yes. Major or program: Forensic Science and Fire Science
       What part of the major? (Prerequisite, core, skills, etc.)

This is a core course in the Forensic Science and Fire Science majors for students who do not qualify for CHE 103 and is a prerequisite for CHE 104.

12. Is this course related to other specific courses?
   ___ No
   X Yes. Indicate which course (s) and what the relationship will be (e.g., prerequisite, sequel, etc.).

The CHE 101 and CHE 102 sequence is equivalent to CHE 103, which is a prerequisite for CHE 104, which is a prerequisite for all other chemistry courses in the major.

13. It is strongly advised to meet with a member of the library faculty before answering question 13.
If this course was taught on an experimental basis, were the existing library, computer, lab or other resources adequate for this course?

X Yes

No. With whom has this been discussed? What has been recommended?

YES. The primary computer resources needed for this course are computers with Internet access so Blackboard can be used. Special software is not needed. The cyber lounges are fine for this purpose. How to access and use Blackboard will be taught by the CHE 102 instructor. No special library resources or materials are needed for this course.

If this course was not taught on an experimental basis, are library, computer, lab or other resources necessary for this course?

No

Yes. With whom has this been discussed? What has been recommended?

N/A

14. Syllabus and bibliography:

Attach a sample syllabus for this course. It should be based on the College’s model syllabus. The sample syllabus must included a week by week or class by class listing of topics, readings, other assignments, tests, papers due, or other scheduled parts of the course. It must also include proposed texts. It should indicate how much various assignments or tests will count towards final grades. (If this course has been taught on an experimental basis, an actual syllabus may be attached, if suitable.)

See attached.

In addition, a bibliography in APA format for this course must be attached to this proposal.

N/A

15. This section is to be completed by the chair(s) of the department(s) proposing the course.

Name(s) of the Chairperson(s): Dr. Lawrence Kobilinsky

Has this proposal been approved at a meeting of the Department Curriculum Committee?

X Yes: Meeting date: 02/07/2007

Signatures of Department Curriculum Committee Members:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

When will this course be taught?

Every semester, starting N/A

One semester each year, starting Spring 2008

Once every two years, starting N/A

Starting Spring 2008, CHE 102 will be offered every spring semester. By taking CHE 101 in the fall, CHE 102 in the spring and CHE 104 in the summer, students taking the CHE 101-102 equivalent to CHE 103 will stay on pace for graduation with students who qualified for CHE 103-104.

How many sections of this course will be offered? 2

Who will be assigned to teach this course? Full-time faculty and adjuncts
Is this proposed course similar to or related to any course or major offered by any other department(s)?

X No

___ Yes. What course(s) or major(s) is this course similar or related to?

Did you consult with department(s) offering similar or related courses or majors?

X not applicable  ___ No  ___ Yes

If yes, give a short summary of the consultation process and results.

Will any course be withdrawn if this course is approved?

X No  CHE 100, Preparation for General Chemistry, was considered for withdrawal. However, although CHE 100 will no longer be offered during the fall and spring semesters should CHE 101-102 be approved, it will continue to be offered as part of a Forensic Science Institute program offered to entering freshman in preparation for their first semester in the Forensic Science program. The program runs during the summer in specially designed sessions that do not coincide with typical summer semester courses. Therefore, the course will remain in the course catalog.

___ Yes, namely:

Signature (s) of chair of Department (s) proposing this course:

Date: ____________________

Signature(s) of other department members proposing this course:
COURSE DESCRIPTION AND OBJECTIVES:
This course is primarily intended for Forensic Science and Fire Science majors, as well as others interested in developing a strong knowledge base of general chemistry principles. Che 102 is the second semester of the Che 101-102 sequence, which, together, are equivalent to Che 103. Topics include the hydrogen atom, electron configurations, Lewis structures, theories of bonding, thermochemistry, properties of pure liquids and solids, solutions, and colligative properties. Upon completion of the sequence, students will have been introduced to the basic properties and reactions of elements and compounds which will be further explored in greater detail in Che 104. The accompanying laboratory exercises stress principles of qualitative and semi-quantitative experimentation related to the topics covered in the Che 101-102 sequence, and ensures the necessary foundation skills are developed to successful work in a scientific laboratory safely and effectively. 3 hours lecture, 1 hour recitation, 3 hours laboratory. 3 credits. Pre-requisite: Che 101.

GRADING POLICY:
This three credit course has three components—lecture, recitation and laboratory. Each component has a separate grading policy which contributes a percentage to the overall course grade. In general, the course grade is the sum of the grades earned on lecture exams (65%), on lecture/recitation quizzes (10%) and for laboratory (25%). However, since the lab sessions are an integrated component of the course, where lab safety skills and dexterity are taught for use in subsequent science courses, for safety reasons, a minimum lab grade of 55% is required to pass the course. Unethical/unprofessional conduct will result in a failing course grade and referral for additional action. Due to the disruption at the beginning of exams to clear their memory and the unfair advantage they provide those who can afford them, programmable devices are not permitted in this course. See the box on the following page.

Lecture/Recitation: During the lecture/recitation sessions, four exams are given. The lowest grade on the first three exams is dropped and each of the grades on the remaining two exams constitute 20% of the course grade (40% for both). There are no make-up exams. The policy of dropping one exam was instituted to accommodate absence and extraneous circumstances resulting in an uncharacteristically poor performance. During final exam week a fourth exam is given that counts as 25% percent of the course grade. The grade on the fourth exam cannot be "dropped." 10% of the course grade is based on periodic quizzes given during lecture and/or recitation sessions. A non-programmable, scientific calculator may be used during exams if it is removed from its case. Programmable devices are not permitted in this course without penalty. Attendance and participation are NOT optional. Each excessive absence (more than four) or failure to meaningfully participate in lecture and/or recitation sessions will result in a 5% reduction in the lecture grade per occurrence.

Laboratory: The final laboratory grade is based on two factors: (1) the comprehensive lab final (which tests mastery of the theoretical and practical aspects of the assigned laboratory exercises) and (2) a "performance" factor (0.00 - 1.00). The lab grade is calculated by multiplying the lab exam score (0-25.0 pts) by the performance factor. To be objective, the performance factor will be 1.00 unless a safety rule is violated, instructions are not followed, there are excessive absences (more than three), lab equipment is lost or broken, or a completed ASA is not submitted when requested. There is a severe (10%) performance factor penalty for each excessive absence and for each ASA that is not completed on time. The clarity of any written explanations needed to answer questions on the ASA will be graded. The lab grade (25.00 pts max) is added to the lecture grade (75.00 pts max), producing the final course grade.

ATTENDANCE POLICY:
Students enrolled in this course are required to attend all lecture/recitation and laboratory sessions of the section for which they registered. In general, there are two lecture/recitation sessions and one laboratory session per week. Excessive absences (defined above) will result in a reduction in the grade. Attendance is taken solely from roll sheets circulated at the beginning and/or end of each session. Lateness or early departure counts as ½ absence. Students missing more than 30 minutes of a session will be counted as absent. If the college is officially closed, thereby canceling all classes, an announcement will be found on 237-8000, and broadcast on AM stations WINS (1010), WOR (710), WCBS (880), WADD (1280), WMCA (570), WLIB (1190), and WFAS (1230), as well as FM stations WCBS (101.1) and WBLS (107.5).
**ACTIVE COLLEGE E-MAIL/BLACKBOARD ACCOUNT REQUIRED:**
Students are expected to maintain active and accessible college email and Blackboard accounts. Blackboard will be used to post announcements, handouts, additional study materials, text supplements, grades, etc. If you forgot your password, please promptly contact DoIT, 212-237-8200, to change or restore your password. While on Blackboard verify that your email address is correctly listed. Occasionally we will email the entire class using the email addresses posted on Blackboard.

**TUTORING:**
Although a considerable amount of remediation is done during the course, when necessary the science department generally provides— on a first come, first served basis— tutoring to students requesting such help. Scheduled weekly or biweekly appointments are encouraged. “Crash” sessions immediately before a quiz or exam are discouraged. Although participation in these sessions is not required, most students find them helpful. There is no charge for this tutoring.

**HOMEWORK:**
The problems at the back of each chapter in the text are grouped by topic. Do as many even numbered textbook problems in each group as possible. Start by doing one from each group, then two, etc. The *homework problems listed on the next page are required*. The answer book should only be used after a thorough attempt at answering each problem has been made. Much is learned from the struggle to derive the correct answer. Much is lost by simply seeing “how the book does it”. Most students find the workbook to be quite helpful. You may do the workbook problems before or after the textbook problems. We have made great effort to ensure that ample tools are available to help students succeed in this course, if the tools are used diligently.

**WRITING ACROSS THE CURRICULUM (WATC):**
Reports written by Forensic Scientists and Fire Investigators must be clear, concise, and unambiguous. Consequently, where a homework assignment requires a written explanation, spelling, grammar and clarity of expression will be considered in determining the “correctness” of the answer proffered. It is important that careful attention is directed to writing what you mean and meaning what you write.

**ACADEMIC INTEGRITY:**
Students who succeed in this course and graduate with a degree in Forensic Science may be hired by government or private agencies to analyze evidence and testify in a court of law, placing in jeopardy another person’s reputation and/or liberty. Dishonesty of any kind cannot and will not be tolerated. Students are expected to become thoroughly aware of the “John Jay College Policy on Academic Integrity,” available on the college’s Web site. Sanctions to the extent permitted by the policy will be imposed and any written material submitted may be transmitted by the instructor to Turnitin.com to help analyze its originality.

**STUDENTS WITH DISABILITIES:**
Every effort will be made to help physically challenged students work effectively in this course. A confidential meeting with the instructor and Farris Forsythe (Disabled Students Services, 3110N, 237-8122) should be arranged at the beginning of the semester.

**LECTURE AND RECITATION READING/MISC MATERIAL:**
Lecture Text (must be bought to each lecture session):

Recitation Study Guide/Workbook and Solutions manual (both must be bought to each recitation session, along with the textbook):

**OWL Software (included in kit)**
A non-programmable scientific calculator is required at each session. Scientific calculators have the following function keys: log, 10^x, e^x, ln, √, EXP or EE, or their equivalents. These functions are used in this course. An inexpensive model is fine. (Divide 2 by 7 and then multiply the result by 7; if the product is not 2, pick another calculator.) Programmable calculators are prohibited. The use of cell phones, PDA’s, watches, or similar devices as a calculator is also prohibited. Students who bring programmable calculators to exams/quizzes will not be allowed to use them.
<table>
<thead>
<tr>
<th>SESSION</th>
<th>TOPICS</th>
<th>READINGS</th>
<th>HOMEWORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Light, Photon Energies &amp; Atomic Spectra</td>
<td>6.1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>The Hydrogen Atom</td>
<td>6.2</td>
<td>9, 14</td>
</tr>
<tr>
<td>3</td>
<td>Quantum Numbers; Atomic Orbitals</td>
<td>6.3; 6.4</td>
<td>17, 21, 28, 41, 45</td>
</tr>
<tr>
<td>4</td>
<td>Electronic Configurations in Atoms</td>
<td>6.5</td>
<td>50a, 50d, 52d</td>
</tr>
<tr>
<td>5</td>
<td>Orbital Diagrams; Electronic Arrangements</td>
<td>6.6; 6.7</td>
<td>54</td>
</tr>
<tr>
<td>6</td>
<td>Periodic Trends in the Properties of Atoms</td>
<td>6.8</td>
<td>58, summary problem</td>
</tr>
<tr>
<td>7</td>
<td>Lewis Structures, the Octet Rule</td>
<td>7.1</td>
<td>3, 5, 19, 22, 29</td>
</tr>
<tr>
<td>8</td>
<td>Molecular Geometry</td>
<td>7.2</td>
<td>41</td>
</tr>
<tr>
<td>9</td>
<td>Polarity of Molecules</td>
<td>7.3</td>
<td>43</td>
</tr>
<tr>
<td>10</td>
<td><strong>EXAM I</strong></td>
<td>Lectures 1-8</td>
<td>Chapter 6, 7.1</td>
</tr>
<tr>
<td>11</td>
<td>Principles of Heat Flow</td>
<td>8.1</td>
<td>1, 4</td>
</tr>
<tr>
<td>12</td>
<td>Measurement of Heat Flow, Calorimetry</td>
<td>8.2</td>
<td>6, 7, 11</td>
</tr>
<tr>
<td>13</td>
<td>Enthalpy, Thermochemical Equations</td>
<td>8.3, 8.4</td>
<td>18</td>
</tr>
<tr>
<td>14</td>
<td>Thermochemical Equations</td>
<td>8.4</td>
<td>27</td>
</tr>
<tr>
<td>15</td>
<td>Enthalpies of Formation</td>
<td>8.5</td>
<td>33, 36, 45</td>
</tr>
<tr>
<td>16</td>
<td>The First Law of Thermodynamics</td>
<td>8.7</td>
<td>49, 50</td>
</tr>
<tr>
<td>17</td>
<td>The First Law of Thermodynamics</td>
<td>8.7</td>
<td>summary problem</td>
</tr>
<tr>
<td>18</td>
<td>Liquid-Vapor Equilibrium</td>
<td>9.1</td>
<td>4, 8, 10</td>
</tr>
<tr>
<td>19</td>
<td><strong>EXAM II</strong></td>
<td>Lectures 9, 11-17</td>
<td>Chapters 7, 8</td>
</tr>
<tr>
<td>20</td>
<td>Phase Diagrams</td>
<td>9.2</td>
<td>17, 18</td>
</tr>
<tr>
<td>21</td>
<td>Molecular Substances, Intermolecular Forces</td>
<td>9.3</td>
<td>28, 34</td>
</tr>
<tr>
<td>22</td>
<td>Network Covalent, Ionic &amp; Metallic Solids</td>
<td>9.4</td>
<td>35, 43, summary problem</td>
</tr>
<tr>
<td>23</td>
<td>Concentration Units</td>
<td>10.1</td>
<td>1, 4, 11, 13, 16</td>
</tr>
<tr>
<td>24</td>
<td><strong>EXAM III</strong></td>
<td>Lectures 18, 20-22</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>25</td>
<td>Principles of Solubility</td>
<td>10.2</td>
<td>19, 22</td>
</tr>
<tr>
<td>26</td>
<td>Colligative Properties of Nonelectrolytes</td>
<td>10.3</td>
<td>27a, 29</td>
</tr>
<tr>
<td>27</td>
<td>Molar Masses from Colligative Properties</td>
<td>10.3</td>
<td>40; 35a, 37, 39, 49</td>
</tr>
<tr>
<td>28</td>
<td>Colligative Properties of Electrolytes</td>
<td>10.4</td>
<td>summary problem</td>
</tr>
<tr>
<td>Final</td>
<td><strong>EXAM IV</strong></td>
<td>Lectures 23-28, all</td>
<td>Chapter 10, Cumulative</td>
</tr>
</tbody>
</table>
**Che 102 Laboratory Schedule**

<table>
<thead>
<tr>
<th>SESSION</th>
<th>LABORATORY SESSION</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, Syllabus, Safety Rules, Emergency Notification Data, Grading, Math Intro</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Recitation Session in Lab</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Significant Figures &amp; Scientific Notation/ Accuracy of Common Measuring Devices</td>
<td>Handouts &amp; Appendices IV, V</td>
</tr>
<tr>
<td>5</td>
<td><strong>Review for Lecture Exam I</strong></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>The Densities of Liquids and Solids**</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Resolution of Matter into Pure Substances, I. Paper Chromatography**</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Resolution of Matter into Pure Substances, II. Fractional Crystallization**</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td><strong>Review for Lecture Exam II</strong></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Analysis of Al-Zn Alloy**</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Determination of a Chemical Formula**</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td><strong>Review for Lecture Exam III</strong></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Identification of a Compound Using Mass Relationships**</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Heats Effects and Calorimetry**</td>
<td></td>
</tr>
<tr>
<td><strong>FINAL</strong></td>
<td><strong>COMPREHENSIVE LAB EXAMINATION</strong>*</td>
<td></td>
</tr>
</tbody>
</table>

***The Comprehensive Lab Examination will be held on Departmental Exam Day. The date and time is determined by the Registrar's Office.

“ASA” in the above table refers to Advance Study Assignment. The ASA for each exercise may be found on the page indicated in ( ) and must be completed prior to the scheduled lab. You must be prepared to hand in Advanced Study Assignments (ASA's) at the beginning of the laboratory session. Located at the end of each laboratory exercise in your lab manual, they are designed to assist you in understanding the theoretical principles and mathematical calculations required before you come to the laboratory so that you can work efficiently and-- more importantly-- safely. Failure to submit a completed ASA when requested will result in a severe performance factor penalty. In order to receive full credit on an ASA, you must show all work, including, when applicable, formulas, unit conversions required to use the formulas, significant digits, etc. Do not omit documenting any steps.

**General Chemistry lab technicians (responsible for all lab chemicals, supplies and equipment) -- office 4517N, phone 212-237-8959:**

Mondays: TBD (8:00 am – 11:00 am) and TBD (11:00 am – 5:00 pm). Wednesdays: TBD (7:30 am – 11:00 am) and TBD (11:00 am – 5:00 pm).

**Lab Manual:** (The lab manual must be brought to each lab session.)


**Other required material (must be brought to each laboratory session):**

--- Splash-resistant safety goggles or safety glasses meeting the ANSI Z87.1-1989 standard. All students must wear safety glasses or goggles in lab. Students requiring corrective lenses must wear safety glasses or goggles over the corrective lenses. (Two sizes of safety glasses and large goggles are available at the book store. Ask specifically for Che 103 safety glasses at the help desk.
--- Chemical-resistant gloves.
--- A non-programmable scientific calculator that can be removed from its case (available at most electronic stores).

**A SIGNED COPY OF THE SAFETY RULES MUST BE TAPED TO THE INSIDE COVER OF YOUR LAB MANUAL**