RECEIPT OF COURSE SYLLABUS

Printed Name _________________________________________  Student ID Number _________________________________________

Recitation Section Number ______________________________

By signing this page I acknowledge that I have read and understood the attached syllabus and course calendar for TDEC 120, Fall term 2002. I understand the course schedule and the policy regarding the final exam.

Signature: ______________________________  Date: ______________________________

This receipt must be submitted to your recitation teacher during recitation any time prior to 5:00 PM, October 10, 2002 in order to receive recitation credit for WEEK 1. Lost syllabi may be replaced by visiting the TDEC 120 web site, downloading the syllabus and printing the receipt.
The Drexel Engineering Curriculum
Chemical Foundations of Engineering I
TDEC 120, Fall Term, 2002

Objectives for TDEC 120-121
- to understand the concept of the atomic and molecular nature of matter and of the chemical reactions which transform matter from one substance to another;
- to develop problem-solving skills in the qualitative areas of chemistry such as stoichiometry or mass balance, thermochemistry, properties of gases, chemical equilibria, and the rates of chemical reactions;
- to be introduced to the elementary experimental chemistry;
- to learn the basis of the physical properties and structure of solids, liquids, and gases to understand the factors affecting their chemical reactivity;
- to develop a broad understanding of chemistry so during the course of a career as an engineer you will recognize when chemical effects are important to consider;
- to gain sufficient knowledge of chemistry so that chemical aspects of engineering problems can be conveyed accurately to other technical professionals;

Lecturers:
Section A, Stratton 113, T & Th 11:00-11:50 AM, Dr. Nicholas V. Coppa, Chemistry and Physics Departments, (ncoppa@drexel.edu), Office Location: Stratton 409 [course coordinator]
Section B, Stratton 113, T & Th 1:00-1:50 PM, Dr. C. Rosenthal, Chemistry Department (carey.rosenthal@Drexel.edu), Office: 405 Disque Hall.
Section C, Nesbitt 111, T & Th 2:00-2:50 PM Dr. Karl W. Sohlberg, Chemistry Department (ohlberk@drexel.edu), Office Location: Disque 222

Course Web-site:
http://files.irt.drexel.edu/courseweb/cbfe/tdec120/ You will find here the most current syllabus (supersedes this paper document), announcements about changes in the course, quizzes and exams. Check it regularly.

Required Textbooks and Manuals:
   Please note: Required online web-based learning is bundled with this textbook. Individuals purchasing “used” texts will be required to obtain the web based package from the publisher.
   It is strongly recommended that the student purchase a new text to ensure they obtain the complete package which also includes a study guide.

Required Laboratory Manual:

Required Supplementary Materials
- Each student must purchase an OWL account either as part of their textbook bundle or separately from the bookstore. OWL accounts can not be shared.
- Safety glasses or goggles must be worn in the laboratory (available at the bookstore).
The bookstore sells a laminated chemistry “quick study” guide for about $4. This document contains a periodic table and additional review information. They also sell laminated periodic tables for about $3. Either of these items can be useful while studying and while doing the homework on Owl. NOTE: neither of these items, similar ones, or any other information or fact sheets will be allowed for use during the quizzes or examinations, “tests.” Periodic tables, and other useful information will be provided as part of your test package at the time of the test.

TDEC 120
Page 2 of 4 Revised 9/27/2

Academic Honesty / Cheating: Students are held to the highest expectations and standards regarding honesty in taking exams and quizzes and in the preparation of laboratory reports. Cheating will not be tolerated. All cases of cheating will be reported to the University and the Engineering College. Students caught cheating will have their paper taken away, will receive a failing (F) grade and a record will be added to their student file.

Table 1. Grading policy

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage of Overall Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10</td>
<td>Completed online (see below)</td>
</tr>
<tr>
<td>Quizzes &amp; Recitation</td>
<td>25</td>
<td>Three 50 minute quizzes will be given in on Fridays starting at 8:30 AM on dates indicated on the course schedule. A recitation grade will be determined based on recitation participation. You may opt to replace your lowest quiz score with your recitation grade. The receipt for this syllabus will be counted as credit for recitation for WEEK 1.</td>
</tr>
<tr>
<td>Cumulative</td>
<td>20</td>
<td>You must score at least 50% on the final in order to pass the course.</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Cumulative</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Lectures: Lectures will be given on topics as indicated by the course schedule. Lecturers may call upon students to provide feedback from time to time, but attendance is not mandatory. There are several Review / catch-up days scheduled prior to each quiz or exam. A review will be provided if the lecturer feels sufficient attention has been given to the subject matter otherwise this day may be used to discuss new material. Not all required material will be covered in lecture. The course schedule is provided as a guide and will be revised if dictated by prevailing circumstances (e.g. weather, pedagogical purposes ...)

Examinations: There are midterm and final examinations. The date is provided on the schedule which is attached. The exam locations and start time will be announced in class and posted on the course web site. NO MAKE UP WILL BE GIVEN FOR THESE EXAMS. After the commencement of the exam, no student will be allowed to leave the examination room with out handing in their exam. Once a student leaves the examination room they will not be allowed to reenter it for any reason. Students arriving late to the exam, after any other student has left, will not be permitted to take the exam. The exams will consist of multiple-choice questions. Credit is given for correct answers and points will be deducted for incorrect answers as indicated on the exam packet. All students are responsible for bringing to the exam their own operational writing instruments and calculators - no sharing will be allowed. Ancillary habiliments such as periodic tables, constant values, etc. will be provided. No other materials will be allowed.

Special note regarding the FINAL EXAM. The final exam will cover the entire term. A student who does not score at least 50% of the points on the final exam will not pass the course regardless of their prior performance in the course.

Quizzes: Three, fifty (50) minute quizzes will be given as indicated on the course schedule. Dates, times and locations will of these quizzes be posted on the course website. NO MAKE UP QUIZZES WILL BE GIVEN. After the commencement of the quiz, no student will be allowed to leave the testing room with out handing in their quiz. Once a student leaves the testing room they will not be allowed to reenter it for any reason. Students arriving late to the
Virtually all industry is dependent upon chemical products or locomotion, thinking, sensation, reproduction, communication, etc. Everything is governed by the principles of chemistry for energy, electronics, chemical kinetics, environmental engineering, and many others. Chemistry provides the archetypes for the subject matter. A brief tutorial will be provided based on questions asked by students. If no tutorial is requested, students will be divided into groups and given a problem to solve. An elected member of the group will present the solved problem on the board. Group members from other groups will analyze the problem and offer concurrence or correction. The recitation grade will be based on the students’ or groups’ performance and participation not merely attendance. Clearly it is impossible to obtain a recitation grade if absent. Your recitation grade can be substituted for your lowest grade scored on a quiz.

Recitation Classes: There is a 50 minute recitation every week, designed to give you experience in explaining and working problems. Recitation instructors are prepared to answer any question in this chemistry course, but priority will be given to those on the current subject matter. Problems from the end of each chapter are (new ones will be posted weekly on the schedule at the web site) posted on the course schedule under “recitation.” These questions are archetypes for the subject matter. A brief tutorial will be provided based on questions asked by students. If no tutorial is requested, students will be divided into groups and given a problem to solve. An elected member of the group will present the solved problem on the board. Group members from other groups will analyze the problem and offer concurrence or correction. The recitation grade will be based on the students’ or groups’ performance and participation not merely attendance. Clearly it is impossible to obtain a recitation grade if absent. Your recitation grade can be substituted for your lowest grade scored on a quiz.

Laboratories: The purpose of the laboratory is to augment the course material. Subject matter not covered in the lecture part of the course will be covered in the lab. The major objective of the lab part of the course is for you to obtain training in the chemical laboratory and the experimental technique and the record and reporting of experimental results. You will have a chemistry lab every other week beginning in week 2 for even-numbered lab sections or week 3 for odd-numbered lab sections (please refer to the table below). All laboratory instruction is given in Disque 12-313. You are required to complete a pre-laboratory quiz prior to each experiment. This quiz is to be done as a homework assignment and handed in at the beginning of the lab period. You will not be permitted to start the experiment until the pre-lab quiz has been handed in. The Pre-Lab Quiz will account for 20% of the grade given for your lab report. The data sheet from the labs must be signed by your instructor prior to leaving the lab. The data sheets may be photocopied and shared (with your lab partner only). Every student is required to hand in an individual lab report. See page 2 of the Lab Manual for more details.

### Table 2. Laboratory Schedule

<table>
<thead>
<tr>
<th></th>
<th>Lab 1</th>
<th>Lab 2</th>
<th>Lab 3</th>
<th>Lab 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>Exp. #3, Stoichiometry and Limiting Reagents</td>
<td>Exp. #2, A survey of Chemical Reactions</td>
<td>Exp. #4, Spectroscopy</td>
<td>Exp. #9, Kinetics of Alcohol Oxidation</td>
</tr>
<tr>
<td><strong>Even Lab Sect.</strong></td>
<td>Week of September 30</td>
<td>Week of October 14</td>
<td>Week of October 28</td>
<td>Week of November 11</td>
</tr>
<tr>
<td><strong>Odd Lab Sect.</strong></td>
<td>Week of October 7</td>
<td>Week of October 21</td>
<td>Week of November 4</td>
<td>Week of November 18</td>
</tr>
</tbody>
</table>

**Note:** October 14 is Columbus Day observance. Laboratory Sections 062 and 078 will have their lab on Monday October 21 at their regularly scheduled time but in Room 12-309 instead of 12-302.

Laboratories (continued): If you miss a lab, try to make-up the lab in one of the other sections. If that is not possible, a makeup day will be scheduled during the last week of classes.

Safety in the lab: Everyone is required to wear safety glasses or goggles while in the lab. Prescription glasses must be covered with safety goggles unless written documentation is provided to the instructor that indicates that their lenses meet or exceed ANSI Z87.1-1989 standard and are equipped with side shields. All students must sign a form stating that you understand and will abide by this policy prior to being allowed to work in the lab. It is recommended that a pair of safety glasses are purchased from the Drexel Bookstore prior to coming to the lab.

**GENERAL INFORMATION**

**Why Should a Student of Engineering Master Chemistry?**

Chemistry is the science of matter, its composition, structure, properties, and transformations. It provides the engineer with an atomic- or molecular-level understanding of matter. As engineers, you will design, produce, or maintain objects or systems that utilize, transform or manipulate matter. Knowledge of chemistry enables the engineer to understand the behavior of these systems at a deeper, often critical, level. Chemistry provides the basics for more advanced courses in thermodynamics, materials, electronics, chemical kinetics, environmental engineering, and many others.

Chemistry is central to all life processes. Every living thing is governed by the principles of chemistry for energy, locomotion, thinking, sensation, reproduction, communication, etc. Virtually all industry is dependent upon chemical products or chemical processes. For example, the technology of new electronic and electro-optic materials relies on basic advancements in solid-state chemistry. In the area of new materials and manufacturing, products such as bulk chemicals, polymers, fuels and lubricants, plastics components for automobiles, ceramics for engines, new coatings, food packaging, and architectural structural and decorative materials, road surfaces, housing materials all involve chemical technologies. It is impossible to say if these particular technologies will be the critical ones thirty years from now, when you will still be very active in your careers. Nevertheless, engineering will still involve the design and manufacture of systems made of matter, and the structure, properties, and transformations of that matter will determine whether the system will work. Thus, chemistry is basic to whatever technology evolves, and to whatever engineering career you may choose to pursue.

The chemical industry is an important component of the US economy. It employs over a million workers, one of every 18 in manufacturing. The chemical industry spends more money on research and development than any other industry, spending about $20 billion annually. The chemical industry is one of the few segments of the American economy that has maintained a healthy balance-of-trade surplus during recent years. Several of Drexel’s most active co-op employers are chemical and pharmaceutical firms. This is because 25% of the chemical and pharmaceutical industry in this country lies within 200 miles of Philadelphia, the region from which most of you come. You should have a good grounding in the subject that underlies this industry. You may not end up working for a chemical or pharmaceutical company, but knowledge in chemistry will allow you to identify and communicate important issues of a chemical nature to the experts who can affect a solution for you.

TDEC 120 Page 3 of 4 Revised 9/27/2
Concern about the environment is affecting both our economy and the decisions that informed citizens make. All environmental problems and many civil engineering problems are strongly dependent on the understanding of the behavior of the chemical component which comprise the system. Wise decisions depend on the consideration of basic chemical facts.

Engineers design objects and systems, and the process of design is central to all branches of engineering. Design strategies extend down to the molecular level. All of the easy stuff has been done and the problems that await most future engineers (you) working at the frontier involve understanding and deriving enhanced performance from the materials they use.

Aside from these arguments of relevance to the US economy and to the environment, there is another important reason why chemistry is an essential component of any engineering curriculum. Chemistry, along with the other natural sciences, provides a perspective for the educated individual and serves as a basis for incorporating knowledge of our world and of man. Technical literacy includes college-level proficiency in the natural sciences including chemistry. Perhaps the most valuable aspect of education in the sciences is learning to view scientific data objectively and to apply this objectivity of evaluation and thinking in all aspects of life. This is the premise behind the curricula of all US universities that educate engineers, and Drexel’s Engineering Curriculum is no exception.

Most students entering Drexel have taken one year of chemistry, perhaps in the tenth grade, and may have forgotten much of what they studied. (In other countries, chemistry is taught for four years in grades 9-12, and students are more likely to remember what they once learned.) Thus, a college-level course in chemistry is appropriate for all freshman engineering students.

How Will You Learn Chemistry in This Course?

It has been our experience in the past that to do well in this course, you must study at least two hours for every hour you spend in class (three hours is recommended). That means studying chemistry eight to twelve hours per week. Focus on successfully completing the homework assignments, but don’t ignore the problems at the end of the chapter. The assignments provided should prepare the “average” student to get the average grade. Higher grades require more practice. The more you practice chemistry, for example by solving problems, the more quickly you will be able to get through the easy problems on a quiz or exam. One common difference between the “A” student and the average student is the “A” student gets through the easier problems quickly, and has more time to spend on the challenging problems.

Do not hesitate to speak with your recitation instructor or your lecturer when you are having difficulty with any of the concepts or problems covered in the course. Be aware this course begins where your high school course left off. Your professors and teaching assistants will assume you are proficient in chemistry at the high school level. If you are not, talk to your instructors so that you can be quickly guided onto a successful track.

My (N. Coppa) formula for efficient learning and long-term retention of the facts taught in this course and for a high grade is to:

1. **Read the text** at a cursory level *prior to coming to lecture*. Do not get bogged down on concepts you do not understand; rather, make note of them and pay particular attention to them while attending lecture. You will not know what to focus on in lecture unless you identify your weaknesses prior to the lecture.

2. **Solve the problems** on OWL and at the end of the current chapter. After the lecture and before recitation do the homework and solve the suggested problems. When you get stuck, go to the text and focus your attention on the concepts relevant to the problem. **Work between the problem and the text**. Do not work between the problem and the answer. Working between the problems and the answers is foolish and develops a false sense of security. The text will lead you to understanding. Once you “get it” you will know your answer is correct. The more problems you do (correctly) the faster you will become and the more likely it is that you will have seen the problems appearing on the tests.

3. **Get your recitation instructor to answer unresolved problems**. Your instructor has solved hundreds if not thousands of problems -- learn the tricks from them. Keep in mind that your instructor cannot teach you anything you do not want to learn, but if you want to learn, you will learn everything your instructor teaches. You need to try the problems and identify your problems before approaching your instructor otherwise you are wasting your (and your instructor’s) time.

4. **Keep up. Do not get behind**. If you do, spend the following weekend getting back on track. This semester you will be given tests closely following lectures on the subject. You must be prepared to start solving problems immediately following those lectures in order to be prepared for the tests.