Syllabus

CHEM 313 - 01

PHYSICAL CHEMISTRY I

Fall 2011

1 LOCATOR INFORMATION

Lecture schedule: MWF 12:00 - 12:50 PM, LS 304W

Lecturer: Dr. Jairo Castillo-Chará

Office: LS 321

Telephone: (910) 672-2062

Office Hours: MT 2:00-4:00 PM, WF 10:00-12:00 AM and by appointment

e-mail: jcastill@uncfsu.edu

Website: http://faculty.uncfsu.edu/jcastill/

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Rules and regulations governing the use of FSU email may be found at http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf
2 COURSE DESCRIPTION

This is the first of two-semester sequence course to present the fundamentals of physical chemistry from the macroscopic point of view. Without losing rigorousness, the essential ideas of physical chemistry will be introduced hopefully in a way that would be interesting, comprehensible and enjoyable to students with a background of one year of college calculus and physics. The lectures in this class will cover thermodynamics, kinetics and chemical change.

2.1 Motivation

The main objective of physical chemistry is the understanding of structure, properties and transformations of matter, from macroscopic behavior to mechanisms that operate at molecular level. Physical chemists collect, select and analyze experimental data from all areas of chemistry and use this information to construct models capable of predicting new phenomena. Physical chemistry permeates much of the modern science and constitutes a driving force promoting scientific advances in a wide range of fields. Based on concepts from chemistry, physics and mathematics, physical chemistry contributes to many areas of science as diverse as medicine, molecular biology, molecular engineering, chemical engineering, materials and earth sciences.

2.2 Course Prerequisites:

This course assumes that the students have taken college calculus (MATH 241-2), physics (PHYS 121) and chemistry (CHEM 210). An introduction course in differential equations will be useful, however provisions will be made during the course to satisfy this requirement.

3 DISABLED STUDENT SERVICES:

In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); 910-672-1203.
4 TEXTBOOK


5 STUDENT LEARNING OUTCOMES:

After completion of the first course in physical chemistry, students are expected:
1. To become familiar with the applications of thermodynamics in different areas of chemistry.
2. To be able to solve physical chemistry problems based on critical analysis of the available data and by the appropriated use of concepts and mathematical tools.
3. To relate the principles, methods, theories and models of physical chemistry to other areas of chemistry and other areas of science such as biology, physics, earth sciences, and engineering.
4. To increase their familiarity with the use of tables of thermodynamic data to calculate thermodynamic functions and to sharpen their graphing interpretation skills.
5. To be familiar with spreadsheet softwares to analyze, solve and visualize problems in physical chemistry and related areas.
6. To be prepared to take advanced, senior-level and graduate courses in chemistry, biochemistry and physics.

6 COURSE REQUIREMENTS AND EVALUATION CRITERIA

7 Homework Policy

1. Homework will be given during Friday class once every week and should be turned in on the following Friday before the start of the class.
2. Homework problems should be neatly written in order to make clear that the instructor understands your solutions(not credit will be given for confusing, unreadable work)
3. Each time that you submit the homework make sure that you write your name, date and problem set number or chapter number.
4. Homework turned in late will be graded at a rate of 10 % per day late (you will lost 10 points
5. Questions about homework or questions related to grading will be discussed during office hours. If you cannot see the instructor at the office hours cited above, you can email or call to make an appointment that suit your schedule.

### 7.1 Grading

This course will be graded on a maximum of 100 points distributed as follows:

<table>
<thead>
<tr>
<th>Section</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three hour Exams</td>
<td>45 Points</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25 Points</td>
</tr>
<tr>
<td>Homework</td>
<td>30 Points</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 Points</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentile Points</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>92 - 100%</td>
<td>A</td>
</tr>
<tr>
<td>83 - 91%</td>
<td>B</td>
</tr>
<tr>
<td>73 - 82%</td>
<td>C</td>
</tr>
<tr>
<td>64 - 72%</td>
<td>D</td>
</tr>
<tr>
<td>63 or less %</td>
<td>F</td>
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</tbody>
</table>

Your course grade will be determined using the total number of points that you have accumulated during the semester.

### 7.2 Make up Examination Policy:

There will be no make-up examinations except in the case of serious illness or accident (properly documented), family emergency, or participation in University official activities (class field trips, etc.). For the latter case, make up-examination arrangements must be made in advance.

### 7.3 REVISION OF GRADES - STUDENTS RESPONSIBILITIES

Absences from class will be handled following strictly the University policy. Absences of more than 10% of the total contact hours the course meets during the semester, which is approximately seven
(7) total hours of unexcused absences will fall in the category of 'EXCESSIVE ABSENCES-EA'. As indicated in the new guidelines, 'WN' grade has been eliminated and it is the STUDENT'S RESPONSIBILITY TO WITHDRAW HIMSELF OR HERSELF FROM THE CLASS. Please, check the 'Revision of Grades-Student Responsibilities' at: www.uncfsu.edu/fsuretension/policiesprocedures.htm. A copy of the Revision of Grades-Student Responsibilities has been provided in the last page of this document.

- **X GRADE (NO SHOW):** will be assigned to any student on the roster that did not attend during the first week of classes or, in online classes, did not interact with class website during the first week of classes. Since X grade is not a final grade, it can removed if the student begins attending class.
- **EA GRADE (EXCESSIVE ABSENCES):** will be assigned to students whose absences exceed 10% of class contact hours. After the grade has been assigned the student will be warranted in order for them to take the corrective action.

**NEW FINAL GRADE:**
- **FN (FAILURE DUE TO NON-ATTENDANCE):** Final grade for students who are on class roster, but never attend the class. An FN grades is equivalent to an F grade in the calculation of the GPA.

### 7.4 Academic Integrity Statement

One of the fundamental pillars of the university is the academic and personal integrity of all its members. You must be truthful and honest at all times and must be aware of what kind of situations and activities constitute ethical violations. In this class the following activities or situations will be considered violations of the ethical code and will be punished accordingly: cheating on exams, plagiarism (misrepresentation of materials obtained from the internet or from other sources), lying, helping someone else to cheat, reuse of assignments, unauthorized collaboration, alteration of graded assignments, forgery, falsification and unfair competition. Please, report any violation to the instructor. Unauthorized cheating is not limited only to those enumerated above, for a more complete list you are advised to consult the Fayetteville State University Student Handbook.

Any form of cheating is considered as an academic dishonesty. **Cheating in this class will be punished with an F for the exam or for any other assignment where the cheating is discovered.**

The use of programmable calculators is strictly forbidden during exams and quizzes, try to bring a simple no programmable calculator if you need one during the exam. Avoid the use of cell phones during the exam and class time, this affects the concentration and distract your peers.
7.5 Student Behavioral Expectations

1. Students are expected to arrive to class on time, remain in class until dismissed by the instructor, and refrain from preparing to leave class until it is dismissed.
2. Students should avoid passing notes or carrying on private conversations while class is being conducted.
3. Students should avoid the use profanity in the classroom.
4. Any form of cheating is considered an academic dishonesty or misconduct and will be punished. For information about disciplinary measures and university policies for academic misconduct, read the Fayetteville State University Student Handbook.
5. Students should avoid the use of cell phones during exams and class time, this affects the concentration and distract your peers.

7.6 Consequences For Failing to Meet Behavioral Expectations

With first time violation of one of the rules above, he or she will be warn privately by the instructor after or before next class. Second time violations will be punished by deducting as many as twenty points from the student’s next exam grade. With third time violations, the student will be reported to the Dean of Students for disciplinary action according to the FSU Code of Student Conduct.[8]

8 ACADEMIC SUPPORT RESOURCES

The instructor will try to make available any additional material that will be required for the proper instruction of students, through blackboard (http://blackboard.uncfsu.edu/), the instructor website (http://faculty.uncfsu.edu/jcastill/).
Other off campus resources are available at: NIST Chemistry WebBook, NIST Standard Reference Database Number 69: http://webbook.nist.gov/chemistry/
Topics in Thermodynamics: http://www.le.ac.uk/chemistry/thermodynamics/
## 9 COURSE OUTLINE

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>CHAP.</th>
<th>ASSIGNED PROBLEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Properties of Gases 1</td>
<td>1</td>
<td>EX:1.2b,1.4b, 1.5b,1.6b,1.8b,1.10b, 11.6b,1.21b,NP:1.2</td>
</tr>
<tr>
<td>The First Law</td>
<td>2</td>
<td>EX:2.1b,2.3b,2.6b,2.8b,2.18b,2.20b,2.22b, 2.33b,NP:2.1,2.8,2.20,2.24</td>
</tr>
<tr>
<td>The Second Law</td>
<td>3</td>
<td>DQ:3.2,3.8,EX:3.1b,3.8b,3.9b,3.10b, 3.14b,3.15b,NP:3.14,TP:3.20</td>
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<tr>
<td><em><strong>EXAM I</strong></em>*</td>
<td></td>
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<tr>
<td>Physical Transformations of Pure Substances 4</td>
<td>4</td>
<td>DQ:4.4,4.6,EX:4.1b,4.3b,4.8b,4.9b, NP:4.4,4.8,4.10,4.14</td>
</tr>
<tr>
<td>Simple Mixtures</td>
<td>5</td>
<td>EX:5.2b,5.6b,5.9b,5.14b,5.15b,5.20b, NP:5.2,5.6,5.16,5.23</td>
</tr>
<tr>
<td>Phase Diagrams</td>
<td>6</td>
<td>DQ:6.2,6.6,EX:6.5b,6.7b,6.9b,6.12b, 6.17b,NP:6.6,TP:6.16,6.20</td>
</tr>
<tr>
<td><em><strong>EXAM II</strong></em>*</td>
<td></td>
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<tr>
<td>Chemical Equilibrium 7</td>
<td>7</td>
<td>DQ:7.2,7.6,EX:7.1b,7.9b,7.10b,7.13b, 7.14b,7.15b,NP:7.12,7.20</td>
</tr>
<tr>
<td>Rates of Chemical Reactions 22</td>
<td>22</td>
<td>DQ:22.4,22.6,22.8,EX:22.1b,22.6b,22.14b, NP:22.2,22.4,22.12,22.16</td>
</tr>
<tr>
<td><em><strong>EXAM III</strong></em>*</td>
<td></td>
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<tr>
<td>Kinetics of Complex Reactions 23</td>
<td>23</td>
<td>DQ:23.2,23.4,EX:23.1b,23.4b,23.5b, 23.6b,23.7b,NP:23.2,ABE:23.22,23.24</td>
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<tr>
<td>****Final Exam Dec. 7th ****</td>
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The textbook problems assigned above are identified by the key words below:

**DQ:** discussions questions

**EX:** exercises

**NP:** numerical problems

**TP:** theoretical problems

**ABE:** applications to biochemistry and environmental science

## 10 TEACHING STRATEGIES

For this course, the basic concepts will be discussed and illustrated with examples and demonstrations whenever possible. Lectures will be delivered using standard blackboard and power point presentations. I strongly encourage students to read the checklist of key ideas at the end of each chapter in the textbook each time that a new chapter will be starting. Students are also encourage to take notes, to ask questions and to participate in class discussions.
11 BIBLIOGRAPHY