CHM 3400
Physical Chemistry with Applications to Biology.
Spring 2016

e-learning site: posted in canvas

All communications will be done through the e-learning site, including homework, deadlines, grades and announcements. It is your responsibility to check this site for updates.

Schedule: MWF, Second Period. 8:30 AM→ 9:20 AM

Professor: Dr. Adrian E. Roitberg
Leigh Hall, Room 440
Email : roitberg@ufl.edu
Office Hours: TBA

Graduate Teaching Assistant: Vinicius Cruzerio
Email: vwcruzeiro@ufl.edu
Office Hours: TBA

Graduate Teaching Assistant: Xiang Gao
Email: qasdfgtyuiop@ufl.edu
Office Hours: TBA

Prerequisites: CHM 3120, MAC 2312 and two semesters of college physics.

Textbook:
None required

Textbook Suggested:
Any undergraduate Physical Chemistry Book that includes thermodynamics and kinetics.

Homework:
There will homework assigned nearly every week. Homework is due one week after it is assigned. It has to be turned in before or at the beginning of the lecture class. They will be graded and returned. Solutions will be provided after the deadline. Answers should be turned in on time and should be neat and legible. Computer-typed is preferable. One answer per page is required. Each homework problem has to show the full derivation. Units and numerical results will be checked and graded. No points will be given for a final result without justification. There will be no partial credit for late homeworks. If not turned in before or at the deadline, the grade will be zero.

Exams: There will be two progress exams. Conflicts with these exams dates should be resolved with the instructor no later than 1 week prior to the exam date. There will be no make-up exams. The exam dates will be announced shortly

Grading: The grade will be determined by Homework (40%), 2 progress tests (30% total) and a final exam (20%) and 10% at professor's discretion (attendance, participation). Students can decide not to take the final exam. If they choose not to take it, then the two midterms will count for 50% of the grade. If they do take it, their grades could go up or down, I will not take the better of the grades. This decision can be made as late as the last week of classes. The grades are absolute, there will be no curve grading.

Grading scale:
A > 90
A- 87.5 to 89.99
B+ 82.5 to 87.49
B 77.5 to 82.49
B- 75 to 77.49
C+ 72.5 to 74.49
C 67.5 to 72.49
C- 65 to 67.49
D+ 62.5 to 64.99
D 57.5 to 62.40
D- 55 to 57.49
E <60

Students with Disabilities:
Appropriate accommodations will be provided, according to the policy stated at http://www.chem.ufl.edu/~itl/disabilities.html

Academic Honesty:
Students are expected to obey the University of Florida Honor Code, detailed at http://regulations.ufl.edu/chapter4. Violations, including plagiarism, will be reported to the Office of Students Judicial Affairs.

(Tentative) Course Syllabus
CHM 3400 – Physical Chemistry

Note: Items marked with an asterisk (*) will depend on the time available.

The First Law: Energy Is Conserved.
Energy Conversion and Conservation.
Describing the State of a System.
Phase Changes. Chemical Reactions.

The Second Law: The Entropy of the Universe Increases.
A New State Function, Entropy.
The Second Law of Thermodynamics: Entropy Is Not Conserved.

Chemical Reactions. Third Law of Thermodynamics.
Gibbs Free Energy. Helmholtz Free Energy. Noncovalent Reactions.

Free Energy and Chemical Equilibria.
Chemical Potential (Partial Molar Gibbs Free Energy).
Reactions of Gases: The Ideal Gas Approximation.
Nonideal Systems.*
The Eq. Constant and the Standard Gibbs Free Energies of the Reactants and Products.
Biochemical Applications of Thermodynamics

Kinetics: Rates of Chemical Reactions.
Kinetics. Reaction Mechanisms and Rate Laws. Temperature Dependence.
Transition-State Theory. Electron Transfer Reactions: Marcus Theory.
Ionic Reactions and Salt Effects. Isotopes and Stereochemical Properties.
Very Fast Reactions. Diffusion-Controlled Reactions.
Photochemistry and Photobiology. Photosynthesis.

Enzyme Kinetics. Michaelis-Menten Kinetics. Competition and Inhibition.