CEM 383 US18
Introduction to Physical Chemistry I, Fall Semester 2018

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Course Description

CEM 383 is the first semester of the course in physical chemistry for B.A.-degree Chemistry majors and for non-Chemistry majors; the CEM 483/484 sequence is intended for B.S.-degree Chemistry majors and Chemical Engineering majors.

The focus is on thermodynamics and chemical kinetics, but there will be an additional introduction to some aspects of statistical thermodynamics in order to provide aspects of a microscopic point of view, especially for temperature and heat capacity. Examples from biochemistry and biophysics will be emphasized.

Course Outline

1. Thermodynamics: Systems and State Functions
2. First Law of Thermodynamics: Energy and Thermochemistry
3. Second Law of Thermodynamics: Entropy and Spontaneity
4. Gibbs Free Energy, Chemical Potential, and Activities
5. Chemical Equilibrium
6. Reaction Kinetics
7. Reaction Rates and Activation Energies
8. Statistical Thermodynamics and Temperature

Schedule

Discussion Sections: start 10 September 2018;

Labor Day: Monday, 3 September 2018; University holiday, no lecture.

Quizzes: usually on Wednesdays

Problem Sets: due at the beginning of lectures on Fridays

Midterm Examinations: Mondays, 8 October and 12 November 2018

Final Examination: Friday, 14 December 2018, 7:45 am

Texts and Course Materials

Gordon G. Hammes and Sharon Hammes-Schiffer, *Physical Chemistry for the Biological Sciences*, Wiley, 2015.

http://onlinelibrary.wiley.com.proxy1.cl.msu.edu/book/10.1002/9781118859148

Donald W. Rogers, *Concise Physical Chemistry*, Wiley, 2010.

http://onlinelibrary.wiley.com.proxy1.cl.msu.edu/book/10.1002/9780470906347

These texts are available free-of-charge from the MSU Library's on-line resources using MSU NetID authentication.

The lecture notes, problem sets and solutions, and other materials will be available in the Desire2Learn (D2L) system (https://d2l.msu.edu). Assistance with Desire2Learn is available 24/7 through MSU Distance Learning Services (a.k.a. the Help Desk) locally at (517) 432-6200 or long distance at (844) 678-6200.

N.B.: The course materials provided by the instructor are intended to be used only for this course; the instructor and MSU retain copyright to all materials.

Course Grade

Midterms and Final Exam: 20 points each × 3 = 60 points

Quizzes: 20 points

Problem Sets: 20 points

Course Total: 100 points

The following absolute scale will be used to assign the course grade: 4.0 for >90 points; 3.5 for >83 points; 3.0 for >75 points; 2.5 for >68 points; 2.0 for >60 points; 1.5 for >50 points; 1.0 for >40 points; and 0.0 for <40 points.

Rules

No make-ups will be provided for missed quizzes, but the lowest three quiz scores will be dropped from the grade calculation. Scheduling conflicts must be discussed with the instructor in advance of the midterms so that options can be discussed. At the instructor's discretion, a missed midterm with an approved and documented excuse will be credited using the final exam score on a pro-rated percentage basis.

Quizzes and exams are conducted as closed-book, closed-notes exercises unless specified otherwise by the instructor. Academic misconduct will be treated by the instructor as specified in *MSU Policies, Regulations, and Ordinances* … at the Office of the MSU Ombudsman: https://www.msu.edu/unit/ombud/academic-integrity/. The student has the right to contest any judgment or penalty grade assigned by the instructor in an academic grievance hearing; see item 6 at the above link.

Academic Honesty and Integrity

In this course, the problem sets are intended to be worked out by a student without direct aid from others. Copying of this work from another student's paper or another source is not permitted, and if detected by one of the TAs or by the instructor, the student will receive a grade of 0 for that assignment. Verbal discussion (but not by email or text message, etc.) of how to work problems with other students in the class or in a study group is encouraged; but each student is responsible for individually performing and writing up all of the calculations, derivations, written discussion, etc., that is turned in for a grade.

Accessibility

Michigan State University is committed to providing equal opportunity for participation in all programs, services, and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities by phone at 517-884-RCPD or through the web at https://www.rcpd.msu.edu/. Once your eligibility for an accommodation has been determined, you will be issued a verified individual services accommodation (VISA) form. Please present this form to the instructor at the start of the semester and/or at least a week prior to the accommodation date (test, final exam, homework, etc.). Requests received after this date will be honored whenever possible.