Chemistry 534 – Chemical Statistical Mechanics (3 cr., Fall 2015)

Tues/Thurs. (12-1:15)   **Todd 202**

Instructor: Prof. Kirk Peterson   Fulmer 104B (335-7867)

Office Hours: By appointment

Email: kipeters@wsu.edu

Class web page: http://tyr0.chem.wsu.edu/~kipeters/Chem534/

Recommended Texts:

> Statistical Mechanics, by Donald A. McQuarrie (Univ. Press)
>
> Statistical Mechanics, by Norman Davidson (Dover)
>
> Introduction to Modern Statistical Mechanics, by David Chandler (Oxford)
>
> Statistical Mechanics: A Concise Introduction for Chemists, by Benjamin Widom, Cambridge University Press, 2002.

Point Distribution:

Hour Exams (2 x 250 pts)	500
Final Exam (cumulative)	300
Homework (9 total)	200
TOTAL	1000

Grading:

> **850 –1000 A**
> **801 – 849 B+/A-**
> **650 – 800 B**
> **600 – 649 C+/B-**
> **< 600 C**

Topics to be covered

Ensembles, Probabilities, Probability distributions, Boltzmann distribution, partition functions, intro to stat thermo

Ideal gases: Boltzmann statistics, molecular partition functions

Diatomic and polyatomic partition functions

Chemical Equilibria

Ideal solids and blackbody radiation (harmonic crystals, Rayleigh-Jeans, Debye theory)

Classical statistical mechanics (phase space averages, equipartition theorem), the grand canonical partition function

Non-ideal gases (virial expansion, intermolecular potentials)

Liquids (molecular dynamics, Monte Carlo)

Quantum ideal gases (Bose-Einstein and Fermi-Dirac statistics)

Learning Outcomes

Student Learning Outcomes At the end of this course, students should be able to:	Course Topics/Dates The following topic(s)/dates(s) will address this outcome:	Evaluation of Outcome: This outcome will be evaluated primarily by:
Define basic terms and concepts in statistical mechanics	Throughout course	Homework and Exams
Apply statistical mechanical methods to standard problems in statistical thermodynamics	Weeks 1–8	Homework and Exams
Develop a foundation in statistical mechanics that can be applied to practical problems involving more complex liquids and solids	Weeks 9-15	Homework and Exams

University boilerplate

Academic Integrity:

I encourage you to work with classmates on assignments. However, each student must turn in original work. No copying will be accepted (including from textbooks or homework assignments from earlier semesters). Students who violate WSU's Standards of Conduct for Students will receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions.

Reasonable Accommodation Statement:

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist on your home campus:

Pullman or WSU Online: 509-335-3417
http://accesscenter.wsu.edu, Access.Center@wsu.edu
Spokane: http://spokane.wsu.edu/students/current/studentaffairs/disability/
Tri-Cities: http://www.tricity.wsu.edu/disability/

Vancouver: 360-546-9138 http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services

Safety and Emergency Notification:

Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (http://safetyplan.wsu.edu/) and visit the Office of Emergency Management web site (http://oem.wsu.edu/) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community.