

# CHEM 3600: Advanced Physical Chemistry

**Credit Hours 3.0**

**Meeting Time:** TR 8:30-9:45 a.m.

**Classroom:** Perkins Bldg. Room 107

**Instructor:** James Zahardis, PhD

**Email:** James.Zahardis@uvm.edu

**Office:** Innovation E329

**Office Hours:** TWR 12:00-2:00 p.m.

**Textbook (recommended):** Physical Chemistry A Molecular Approach by Donald A. McQuarrie and John D. Simons, University Science Books

**ISBN-13:** 978-0935702996

## Co- and Pre-requisites

Co-requisite: MATH 2248 (Calculus III) or CHEM 3602 (Physical Chemistry Preparation)

Pre-requisite: CHEM 3600 (Introduction to Physical Chemistry)

## Course Description

This course will develop a comprehensive the link between quantum mechanics and thermodynamics, taking the approach of applying statistical mechanics to link these two regimes.

## Course Modality

This is an in-person course. The lectures will not be recorded. If you miss class due to an excused absence, please contact me so we can discuss mitigation strategies.

## Grading

The following grading scheme is *approximate* and may be modified by the instructor during the semester:

50% Homework (problem sets)

40% Exams: 2 Midterms

10%: Presentation

## Grading Criteria/Policies

**Grade components:** I will grade exams and homework assignments based on your application of principles and methods of physical chemistry to solving problems, so showing all work is essential. Specific restrictions on assignments or exams will be provided at the time this material is distributed. There will also be a graded component based on a presentation that can be done in front of the class or in my office. These presentations will be summarized in brief 2-to-3-page written documents. The focus of these talks will be on discussing areas of physical chemistry that go beyond what we discussed in class. More details will be provided in an upcoming document.

**Late policy:** Graded assignments that are turned in late are subject to a loss of points, which will be detailed when the assignment is distributed.

**Grading scheme:** I will apply the standard grading scale but reserve the right to rescale the grades at the end of the course.

## Assessments (Graded Work)

This course will include exams and graded homework assignments. During lecture I will recommend problems from the textbook, which I will not grade but may help you master the skills needed for the graded assignments. The exams will have both conceptual questions and problems that require applying mathematical methods to solve. For in-class exams, I will provide a formula sheet (similar to the end of chapter listing of equations in the text) as well as tables of constants and other needed information. The more complex mathematical formulas will be provided, but the student is required to have basic familiar with algebra, trigonometry and introductory calculus. Exams will require use of a calculator that can perform calculations involving logarithmic, exponential and trigonometric functions. For in-class exams, phone and internet use during exams is not allowed. Exams will be taken in blue or black nonerasable ink.

Homework assignments that are to be graded will typically be given at the end of every chapter. These assignments are open book and you can use data (such as

integral tables) found on the internet, but not the use of AI such as ChatGPT. However, the homework assignments are only to be completed by the student: use of tutors or other individuals to provide answers, including for a fee, is against class policy. All work should be shown and completed in blue or black nonerasable ink.

## **Attendance Policy and Classroom Environment Expectations**

### **General Attendance, Participation Policies, and Expectations**

Attendance and participation in this course are expected and necessary for developing a good understanding of the material. In this class, we will work together to develop a learning community that is inclusive and respectful. As a learning community we will seek to encourage and appreciate expressions of different ideas, opinions, and beliefs in the spirit of Our Common Ground. Meaningful and constructive dialogue is encouraged in this class. This requires mutual respect, willingness to listen, and open-mindedness to opposing points of view. Respect for individual differences and alternative viewpoints will be maintained at all times in this class. Conduct that substantially or repeatedly disrupts the ability of faculty and instructors to teach and the ability of students to engage may result in my asking a student to temporarily leave the classroom. See Undergraduate Catalogue - Classroom Code of Conduct (p. 443-444).

### **Excused Absence Policies**

If you intend on missing class to observe a religious holiday or to participate in inter-collegiate athletics, please submit the dates of your absence to me in writing by the end of the second week of classes. If you miss due to medical reason or because of an emergency, please inform me as soon as possible. In all the above cases, we will work together to develop a plan to make up work that you missed.

### **Course Evaluation**

There will be an evaluation of the course at the end of the semester, which is anonymous and confidential. I appreciate all feedback and will use it to improve the course.

## **Intellectual Property Statement**

Students are prohibited from publicly sharing or selling academic materials that they did not author. Violations will be handled under UVM's Intellectual Property policy and Code of Academic Integrity.

## **Other Resources**

### **Diversity, Equity, and Inclusion Resources**

The Division of Diversity, Equity, and Inclusion believes excellence should be inclusive of the entire University of Vermont (UVM) community and is steadfastly committed to this belief. Every day, our Division strives to make our work accessible, affirming, and action-oriented to help ensure excellence is inclusive of everyone.

<https://www.uvm.edu/diversity>

### **UVM Prism Center**

The Prism Center serves the diverse queer and trans communities at the University of Vermont. We support and empower lesbian, gay, bisexual, transgender and queer students, as well as students whose identities fall in between or expand beyond those categories, and work to create a campus community where people of all sexual and gender identities can thrive.

<https://www.uvm.edu/prism>

### **Mosaic Center for Students of Color**

The Mosaic Center for Students of Color (MCSC) Vision is to create a diverse and rich community of empowered, engaged, and enthusiastic students of color at UVM.

<https://www.uvm.edu/mcsc>

### **Interfaith Center**

No matter how you make meaning of your life, you are welcome at the Interfaith Center for reflection, spiritual practice, education, and community building.

<https://www.uvm.edu/interfaithcenter>

### **Women & Gender Equity Center**

The UVM Women & Gender Equity Center cultivates joyful community while advancing gender equity across identities. We envision a brave, diverse, and equitable learning environment for all members of the UVM community. We strive to provide programming and events that connect our community through the exploration of the intersections of their gender and other identities.

<https://www.uvm.edu/wagecenter>

## **Important University Policies**

## **Academic Integrity**

Offenses against the Code of Academic Integrity are deemed serious and insult the integrity of the entire academic community. Any suspected violations of the code are taken very seriously and will be forwarded to the Center for Student Ethics and Standards for further investigation. Violations of the Code of Academic Integrity—including any inappropriate collaboration, collusion, cheating, corroboration, plagiarism, or any other related offense—will be fully investigated according to the rules set by the UVM Academic Integrity Office and may be punishable with a score of zero for the assignment in question. Details can be found at <http://www.uvm.edu/policies/student/acadintegrity.pdf>.

## **Grade Appeals**

If you would like to contest a grade, please follow the procedures outlined in this policy: <https://www.uvm.edu/policies/student/gradeappeals.pdf>

## **Code of Student Conduct**

<http://www.uvm.edu/policies/student/studentcode.pdf>

## **FERPA Rights Disclosure**

The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974.

<http://catalogue.uvm.edu/undergraduate/academicinfo/ferparightsdisclosure/>

## **Promoting Health and Safety**

The University of Vermont's number one priority is to support a healthy and safe community:

**Center for Health and Wellbeing:** <https://www.uvm.edu/health>

**Counseling & Psychiatry Services (CAPS):** Please call 802-656-3340 for assistance.

**C.A.R.E.** If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at <https://www.uvm.edu/studentaffairs>

**General statement regarding potential changes during the semester:**

<http://catalogue.uvm.edu/>

The University of Vermont reserves the right to make changes in the course offerings, mode of delivery, degree requirements, charges, regulations, and procedures contained herein as educational, financial, and health, safety, and welfare considerations require, or as necessary to be compliant with governmental, accreditation, or public health directives.

**Intellectual Property Statement/Prohibition on Sharing Academic Materials**

Students are prohibited from publicly sharing or selling academic materials that they did not author (for example: class syllabus, outlines or class presentations authored by the professor, practice questions, text from the textbook or other copyrighted class materials, etc.); and students are prohibited from sharing assessments (for example homework or a take-home examination). Violations will be handled under UVM's Intellectual Property policy and Code of Academic Integrity.

**Student Learning Accommodations**

In keeping with University policy, any student with a documented disability interested in utilizing ADA accommodations should contact Student Accessibility Services (SAS), the office of Disability Services on campus for students. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly recommended to discuss with their faculty the accommodations they plan to use in each course. Faculty who receives Letters of Accommodation with Disability Related Flexible accommodations will need to fill out the Disability Related Flexibility Agreement. Any questions from faculty or students on the agreement should be directed to the SAS specialist who is indicated on the letter.

**Contact SAS:**

A170 Living/Learning Center;

802-656-7753

[access@uvm.edu](mailto:access@uvm.edu)

[www.uvm.edu/access](http://www.uvm.edu/access)

## **Important UVM Policies**

### **Academic Integrity:**

The Academic Integrity policy addresses plagiarism, fabrication, collusion, and cheating.

### **Code of Student Conduct**

UVM's Code of Student Conduct outlines conduct expectations as well as students' rights and responsibilities.

### **Final Exam Policy**

The University final exam policy outlines expectations during final exams and explains timing and process of examination period.

### **Grade Appeals**

If you would like to contest a grade, please follow the procedures outlined in this policy.

### **Grading**

This link offers information on grading and GPA calculation.

### **Religious Holidays**

Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time. The complete policy is here.