Dalhousie University is located in Mi’kma’ki, the ancestral and unceded territory of the Mi’kmaq. We are all Treaty people.

Instructor(s): Josef W. Zwanziger, jzwanzig@dal.ca Office hours by appointment.

Lectures: Tuesday/Thursday 10:05-11:25, LSC C214

Course delivery: In person

Course Description
The fundamentals and postulates of quantum mechanics are developed from first principles, with applications to illustrative model systems, vibrations, rotations, atoms, and molecules.

Course Prerequisites
MATH 2001.03 and MATH 2030.03, and CHEM 2304.03, (grade of C- or better) and PHYC 1190.03/1290.03 or 1300.06

Learning Objectives
Conversant with the standard models used in quantum chemistry:

• Hydrogenic atom
• Harmonic Oscillator
• Rigid rotor

Understanding of spin and symmetrization

Relation of quantum mechanics to chemical bonding

Beginning of many-particle effects (Hartree-Fock theory)

Course Materials
- Quantum Chemistry and Molecular Interactions, Andrew Cooksy (Pearson, 2014).
- Much of this course will be served through the CHEM 3301 page at Brightspace.
Course Assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weight (% of final grade)</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>20%</td>
<td>9/14, 9/21, 9/28, 10/5, 10/19, 10/26, 11/2, 11/16, 11/23, 11/30</td>
</tr>
<tr>
<td>Tests</td>
<td>40% (20%, 20%)</td>
<td>10/7, 11/18</td>
</tr>
<tr>
<td>Final exam</td>
<td>40%</td>
<td>TBA</td>
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Other course requirements
A mark of 50/100 or better on the final is required to pass the course.

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Numerical Range</th>
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<tbody>
<tr>
<td>A+</td>
<td>(90-100)</td>
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<tr>
<td>B+</td>
<td>(77-79)</td>
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<tr>
<td>C+</td>
<td>(65-69)</td>
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<tr>
<td>D</td>
<td>(50-54)</td>
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<tr>
<td>A</td>
<td>(85-89)</td>
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<td>F</td>
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<tr>
<td>B-</td>
<td>(70-72)</td>
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<tr>
<td>C-</td>
<td>(55-59)</td>
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</tbody>
</table>

Course Policies on Missed or Late Academic Requirements
Assignments are due in class on the noted day. Late assignments will not be accepted. If a test or the final is missed due to illness, file a Student Declaration of Absence form immediately and inform Dr. Zwanziger, so that make-up possibilities can be discussed.

Course Policies related to Academic Integrity
Assignments may be done with discussion between students, but turn in your own work. Tests and the final exam are in class and done individually.

Course Content
As per textbook: Chapters 1-9, 12, 13.
University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity
At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility
The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct
Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.


Diversity and Inclusion – Culture of Respect
Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: http://www.dal.ca/cultureofrespect.html

Recognition of Mi'kmaq Territory
Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for
guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)
https://www.dal.ca/academics/important_dates.html

University Grading Practices
https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html
Faculty of Science Course Syllabus (Section C)
Fall/Winter 2021-22
CHEM 3301
Quantum Mechanics and Chemical Bonding
Fall 2021

Student Resources and Support

Advising

General Advising: https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: https://www.dal.ca/faculty/science/current-students/academic-advising.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: https://libraries.dal.ca/

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: https://libraries.dal.ca/services/copyright-office.html

Fair Dealing Guidelines: https://libraries.dal.ca/services/copyright-office/fair-dealing.html

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: https://dsu.ca/dsas


Safety

Biosafety: https://www.dal.ca/dept/safety/programs-services/biosafety.html

Chemical Safety: https://www.dal.ca/dept/safety/programs-services/chemical-safety.html
Radiation Safety: https://www.dal.ca/dept/safety/programs-services/radiation-safety.html

Scent-Free Program: https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html