Molecular Spectroscopy

CHM 676 (CRN 20984), Fall 2019

2:30 PM - 3:20 PM **Mon/Wed/Fri** **WALC 3132** **3 Credits**

Website: http://mreppert.github.io/education/chm676

Instructor Contact:
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Course Description: This course offers an overview of fundamental theory and applications in optical and infrared spectroscopy. Topics addressed will include: electrodynamics, response theory, linear and nonlinear experimental methods (including two-dimensional spectroscopy), density matrix dynamics, harmonic and excitonic molecular models, dephasing and decoherence.

Expected learning outcomes include:

- An *intuitive* understanding of the physical principles behind molecular spectroscopy
- A basic familiarity with both classical and modern experimental spectroscopic techniques, and
- The computational skills needed to process experimental spectroscopic data and to build and test simple physical models.

Textbooks: No textbooks are required for this course. Lectures will be based on course notes provided on the class web page. As a reference, however, some students may find Becker's textbook useful:

> Richard Becker, *Electromagnetic Fields and Interactions, vols. 1-2.* Available from Dover Books on Physics.

Exercises and Grading: Grades will be based on a course average for performance on:

- Exercises/homework (50%)
- A mid-term exam (25%)
- A final project (25%)
- Extra credit exercises (additional 10%) will be offered alongside regular exercises.

Exercises will typically be assigned at or before Friday lecture and will be due the following Friday. All exercises should be submitted *by e-mail* to reppertm@purdue.edu with the subject line "CHM676 Exercise Submission." Late assignments will be assigned a 1% penalty for every *hour* past the deadline. For example, an exercise due at midnight and submitted at 1 AM will be penalized 1%; an exercise submitted 24 hours late will be penalized 24%. No credit will be assigned for exercises turned in more than 100 hours (roughly four days) late. Grading may be delayed for late assignments.

Letter grades will follow the generic rubric:

- **A**: $\geq 90\%$ course average.
- **B**: $\geq 80\%$ course average.
- **C**: $\geq 70\%$ course average.
- **D**: $\geq 50\%$ course average.
- **F**: $< 50\%$ course average.

Attendance: All students are expected to regularly attend lectures. However, compliance with this policy is the responsibility of the individual student: no regular attendance records will be taken.

Academic Integrity:

Specific expectations for this course: Students are expected and encouraged to work together on exercises. However, the work submitted by each student is expected to be their own. Electronic submissions (e.g., computer code) are expected to have been manually written by each student individually. Copy-and-pasting work from other students constitutes a violation of the honor code. No collaboration, or communication with other students is allowed during the mid-term exam.

University Policy: "Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern."

Consequences: Incidents of academic misconduct in this course will be addressed by the course instructor and referred to the Office of Student Rights and Responsibilities (OSRR) for review at the university level. Any violation of course policies as it relates to academic integrity will result minimally in a failing or zero grade for that particular assignment, and at the instructor's discretion may result in a failing grade for the course. In addition, all incidents of academic misconduct will be forwarded to OSRR, where university penalties, including removal from the university, may be considered.

Honor Pledge: "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – we are Purdue."

Nondiscrimination Statement: Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Purdue's nondiscrimination policy can be found at `http://www.purdue.edu/purdue/ea_eou_statement.html`.

Students with disabilities: Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you

are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Mental Health Statement:

- If you find yourself beginning to feel some stress, anxiety, and/or feeling slightly overwhelmed, try WellTrack, https://purdue.welltrack.com. Sign in and find information and tools at your fingertips, available to you at any time.
- If you need support and information about options and resources, please see the Office of the Dean of Students, http://www.purdue.edu/odos, for drop-in hours (M-F, 8 am-5 pm).
- If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and `http://www.purdue.edu/caps/` during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.