

Spring 2022



THE UNIVERSITY OF TEXAS AT TYLER

# CHEM 5351 Molecular Spectroscopy

## Course Information

### Course Description

This course covers the theory and applications of modern spectroscopic methods including basic concepts of infrared, Raman, visible, ultraviolet, NMR, ESR, Mössbauer and mass spectrometry.

### Learning Objectives:

By the end of the course the students should be able to:

- Understand and explain the principles and basic concepts associated with infrared, Raman, visible, ultraviolet NMR, ESR, Mössbauer and mass spectrometry.
- Explain the connection between quantum mechanics and spectroscopy.
- Select the appropriate type of spectroscopic study to address the problem of interest.
- Analyze and interpret results of molecular spectroscopic measurements.

### Meeting Times: Mondays 6:00-8:50 pm RBN 3035

This class will meet Monday evenings from 6:00-8:50 pm from January 10<sup>th</sup>, 2022 to April 25<sup>th</sup>, 2022 except for University holidays. We will NOT have class on January 17<sup>th</sup> or March 7<sup>th</sup>. We are scheduled to meet in RBN 3035. We may occasionally have class in other areas; these locations will be announced as they develop.

### Course Pre-requisites:

CHEM 3354 or equivalent or instructor permission

## Instructor Information

**Instructor:** Dr. Rachel Mason

**Email:** rmason@uttyler.edu

**Phone:** 903/565-5641

**Office:** RBS 3002

### Office Hours

MW: 11:00 am –12:00 pm

T: 3:30-4:30 am

Ω: 4:00-5:00 pm

Additional times available by appointment or by drop-in.

## Course Materials

The textbook for the course is Molecular Spectroscopy by Jeanne L. McHale (Prentice Hall, ISBN:0-13-229063-4).

We will use some additional resources which will be posted to the course Canvas page.

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### Administrative Dates

**January 24<sup>th</sup>** – Census date, last day to file for grade replacement or make a schedule change.

**March 1<sup>st</sup>** – Last day to file for Spring 2022 graduation

**March 7<sup>th</sup>-12<sup>th</sup>** – Spring Break

**March 28<sup>th</sup>** – Last day to withdraw from courses with a W.

**March 28<sup>th</sup>** – Last day to schedule thesis defense for Spring 2022 Graduation

**April 11<sup>th</sup>** – Last day to submit thesis for Spring 2022 Graduation

**May 7<sup>th</sup>** – Commencement

## Grading Policies

### Grade Components:

The grade the course will be composed of 1 mid-term exam, 1 final exams, several homework assignments, in-class activities, and an independent paper and in-class presentation. Each component will contribute to the total grade as described in the accompanying chart. Course grade will be assigned as >90% = A, >80% = B, >70% = C, >60% = D, <60% = F.

Assignment	Points
Exams (2)	400
Homework	200
In-Class Activities	200
Paper	100
Presentation	200
Total	1000

### Homework:

Both problems sets and short data analysis reports will be assigned throughout the term. Students are free to discuss the problems sets and ask for help, but submitted work represent the individual's efforts rather than be a team contribution unless otherwise directed. Be sure to reference any materials or sources used for completing assignments.

### Exams:

The course has two exams. Specific chapters covered on the exams will be announced a minimum of 1 week prior to the exam. While the final exam is not cumulative *per se* the course material does build on that previously covered. Students are expected to work independently on exams.

### Paper & Presentation:

A 10 page (double spaced, with figures) paper will be assigned during the term. This paper will cover a type of spectroscopic method not covered in the lecture. The details of the paper will be assigned during class. A 20 minute presentation will accompany the paper during the last week of the term.

### Make-Up & Late Work:

The expectation is that graduate students will manage their time appropriately and not need such accommodations. However, many graduate students have family and employer demands which may not be negotiable. Please let me know as soon as a conflict arises so we many determine the best resolution.

### Grading Mistakes:

While grades will be posted on Canvas, the official gradebook is my excel file. I strive to be consistent and correct in grading, but mistakes do happen. If you have a question or complaint about the way something has been graded please contact me as soon as possible to discuss it. Grades will be considered final 1 week after posting/assignment return.

## Academic Integrity

The value of any academic degree depends upon the integrity of the work done in earning the degree. Academic misconduct includes, but is not limited to cheating, plagiarism, collusion and/or falsification of records (including data collection). Students are expected to assume full responsibility for the content and integrity of all academic work submitted as homework, projects and examinations. University policy obliges instructors to report cases of academic misconduct to the Dean of Students; it also obligates students to report observed instances of academic dishonesty to the instructor. As graduate students, I expect an extremely high level of responsibility and academic honesty.

Students are strongly encouraged to form cooperative learning groups in order to help each other learn, to encourage each other,, to discuss problem sets and to share knowledge. However, students are expected to do their own learning.

During examinations, an honor code will apply such that students are to work alone and neither give nor accept help to/from others (unless otherwise specified in writing). Students are expected to help enforce the code.

The UT Tyler Honor Code states: *Honor and integrity will not allow me to lie, cheat, or steal, nor to accept that actions of those who do.*



## Tentative Topic Schedule

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Date	Topic
January 10	Syllabus & Quantum Review
January 17	Martin Luther King Jr Holiday—No Class
January 24	Light & It Interaction with Matter
January 31	Molecular Symmetry
February 7	Atomic Spectroscopy
February 14	Atomic Spectroscopy
February 21	Mid Term Exam
February 28	Rotational Spectroscopy

Date	Topic
March 7	Spring Break—No Class
March 16	Vibrational Spectroscopy
March 23	Vibrational Spectroscopy
March 30	Raman Spectroscopy
April 6	Electronic Transitions
April 13	Electronic Transitions
April 20	Presentations
April 27	Final Exam

### A Note on the Schedule:

The above schedule is **tentative**. It is my best guess and best intention. However changes may be necessary due to pacing and interest concerns. I reserve the right to alter the schedule and/or topics at my discretion throughout the course of the term. Any changes will be announced in class and posted the course's Canvas page.

## Departmental Cell Phone Policy

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Departmental policy states that cell phones, smart watches, and any similar electronic devices must be turned off and put in designated area during exams. If these are observed out in a visually accessible place during an exam (*i.e.* between legs, on the floor, etc.), it will be assumed that they are being used to cheat; your exam will taken away, you will receive a zero score (0 points) for the exam, and you will be referred to the Office of Judicial Affairs.

## Classroom Courtesy

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Even though this is not a large class small disruptions add up quickly so please keep chatter to a minimum. The course has ample opportunity for discussion and students are encouraged to actively participate at those times. I expect students to behave with respect and courtesy to both the instructor and fellow students. This includes:

- Choosing an outside seat if you arrive late or need to leave early.
- **Deactivating/silencing all cell phones, and other devices during class.**
- **Not texting or calling during class.** Please leave class if you absolutely must make a call.
- Refraining from derogatory remarks and profanity in class.
- Using electronic devices responsibly.
- Not talking during class presentations or over top of another person during discussions. If you have questions, please ask them of me directly rather whispering to your neighbor.



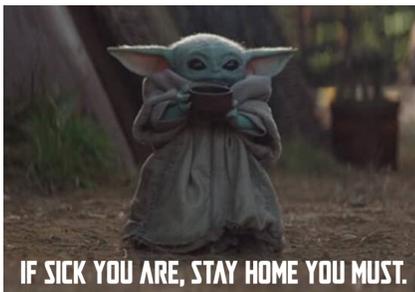
# COVID Concerns

## Face Coverings

Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its [Honor Code \(Links to an external site.\)](#) and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.



## Isolating & Quarantining Students:



Students who have tested positive, are showing symptoms of COVID-19 infection should isolate at home following University guidelines. Students who have been exposed to COVID-19 should follow University policies about quarantining (<https://www.uttyler.edu/coronavirus/>). Isolating and quarantining students should participate via Zoom as fully as possible given their individual health situation. Students are encouraged to keep the instructor apprised of their health situation and needs so that appropriate accommodation can be made.

## In-Case of non-COVID Illness

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, respiratory congestion, digestive issues (e.g. nausea, diarrhea), or a higher than normal temperature should stay at home and are encouraged to use the [UT Tyler COVID-19 Information and Procedures](#) website to review protocols, check symptoms, and report possible exposure. Students experiences other symptoms of communicable diseases should also stay home. Even if it isn't COVID, please don't bring your disease to the rest of us—we don't want the flu or strep or the plague either. In this case not sharing is caring! Just let me know as soon as is practical that you need to miss and we will make accommodations as needed.

**WARNING**  
some things are not worth sharing

## Additional Accommodation

Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email [saroffice@uttyler.edu](mailto:saroffice@uttyler.edu).

# Course Format

## Format:

This course will be taught face-to-face (as much as possible). My hope to is conduct the course in a face-to-face mode as much as is safely possible. Students who are not comfortable with face-to-face learning in the current environment should communicate concerns to me as soon as possible. Obviously this continues to be a developing situation and with shifting comfort levels and policies so communication is vital. We will follow UT Tyler guidelines as they are announced.



## Use of Zoom:

Zoom will be used to conduct remote classes as needed. Students should only use this option if they have discussed with the instructor prior to missing class. Zoom sessions are not available as a regular substitute for class attendance.

## Recorded Sessions:

Class sessions will be recorded by the instructor for use by students enrolled in this course. They are reserved **ONLY** for the use of students enrolled in this course and are for educational purposes only. Course recordings should not be shared outside of the course without express written permission of the instructor. Recordings which contain information subject to the FERPA guidelines shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant parties. As a general rule class recordings will not be posted. However, they will be available for students missing class for a University approved event or illness.



# University Policies

## Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

## Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

## UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit [www.uttyler.edu/tobacco-free](http://www.uttyler.edu/tobacco-free).



## Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

## State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.



## Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

## Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

## Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

## Social Security and FERPA Statement

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

## Emergency Exits and Evacuation

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

