Advanced Laboratory III
The University of Toledo
College of Natural Sciences and Mathematics
Department of Chemistry and Biochemistry
CHEM 4880, Course Registration Number (42029) and Section 001

Instructor: Dr. Jennifer Gadient
Email: Jennifer.gadient@utoledo.edu
Office Hours: By Appointment
Offered: Fall 2020
Course Website: Blackboard Learn

Class Location: Bowman-Oddy (BO) 2087
Class Day/Time: T, R 8:30 AM – 11:20 AM
Credit Hours: 2
Lab Hours: 6

CATALOG/COURSE DESCRIPTION
Laboratory experiments and techniques relating to subjects developed in CHEM 4300. Six hours of laboratory per week. Approved chemical safety goggles meeting the American National Standard Z87.1-1968 must be worn by every student during every laboratory class meeting.

COURSE OVERVIEW/TEACHING METHODOLOGY
Advanced Laboratory III (CHEM 4880), is a laboratory class that is the final course in the Advanced Laboratory series. This course is a continuation of the previous two laboratory experiences in which students work on laboratory techniques and instrumentation present in modern chemistry laboratories as covered in Instrumental Analysis (CHEM4300) course. They are including but not limited to: gas and liquid chromatography (GC and HPLC), size exclusion chromatography (SEC), mass spectrometry (MS), ultraviolet-visible (UV-VIS) and infra-red (IR) spectroscopy, as well as electrochemical methods.

STUDENT LEARNING OUTCOMES
Upon completion of this course, the student will be able to: adequately prepare for analytical work on instrumentation by researching and writing detailed prelab notes, select and employ adequate sample preparation method for instrumental technique used, separate, identify and quantify components present in samples using standard analytical methods, communicate results of performed experiments and analysis by writing formal reports.

PREREQUISITES AND COREQUISITES
CHEM 3860 with a minimum grade of C- and CHEM 4300 (may be taken concurrently) with a minimum grade of C-

TEXTS AND ANCILLARY MATERIALS
Textbooks listed are not required for this course but could provide additional background information relevant to the labs. Required materials will be provided on blackboard.


Standard laboratory notebook, duplicate page style
Colored markers, pencils or pens for labeling printed instrument graphic overlays

Approved safety lab goggles

TECHNOLOGY REQUIREMENTS
Access to utoledo.edu Blackboard CHEM4880 course site for course information, instructor provided materials and current grades
Access to word processing software (i.e Word), spreadsheet and graphing software (i.e Excel)
Access to the internet for independent research of topics, methods, instruments, etc.
Data storage device for exporting instrument data for later analysis

ACADEMIC POLICIES
All students at the University of Toledo are expected to read, understand, and follow the academic policies that govern their attendance at the University. These policies include, but are not limited to, academic dishonesty, academic forgiveness, adding and dropping a course, grades and grading, and the missed class policy. Student should use the following URL to read a comprehensive list of academic policies that pertain to students in this class and throughout her/his academic journey: http://www.utoledo.edu/policies/academic/undergraduate/ Because of specific nature of lab class and its scheduling, generally there is no make-up work for excused missed class but student will be allowed to participate in the remaining portion of the lab (the techniques are important). Excused absences have 24 hours to contact the instructor or Chemistry Department Main Office by email or phone. Required Documentation must be provided within seven (7) days of the missed class.
http://www.utoledo.edu/policies/academic/undergraduate/pdfs/3364-71-14%20Missed%20class%20policy.pdf

University regulations on academic honesty will be strictly enforced throughout this course
http://www.utoledo.edu/policies/academic/undergraduate/pdfs/3364-71-04%20%20Academic%20dishonesty.pdf

Violation of these policies can result in a grade of F for the subject laboratory report or even for the entire course. Please note that academic dishonesty in this course includes (but is not limited to) plagiarism of another’s work (website, text, pictures, any part of a peer’s lab report, etc), falsification and fabrication of data, etc. It is the responsibility of the students to ensure that they are familiar with the university regulations at the websites provided.

COURSE EXPECTATIONS
Laboratory Safety: Everyone working in the laboratory is responsible for laboratory safety. General safety lab rules will be reviewed at the beginning of semester and students will always have the access to file on safety rules available at course site at BlackBoard. If student has a concern or question, s/he should always ask the instructor.

Anyone who endangers the safety of themselves or others in the laboratory will only be given one warning. A second warning will result in the removal of the student from the laboratory and a grade of zero for the laboratory experiment.

Each student must wear approved safety goggles at all times in the laboratory. Only one warning will be given; each additional warning will result in a five point deduction from the laboratory grade. No shorts, sandals or open toed shoes will be allowed. These rules are for student protection and no exceptions will be permitted.
Communication: Out of class communication will be by email so students are prompted to check their rockets email daily. The instructor is checking her email several times a day and will normally respond to emails within 24 to 48 hours. Students are encouraged to email the instructor regarding their work and studies in the course. In case of any emergency students should call General Chemistry office at 419.530.2698. Students are required to access course site at Blackboard regularly to download required supplied files with various lab materials and instructions (mostly needed for lab preparation). Instructor will be updating and posting new grades weekly and it is student’s responsibility to check them regularly and promptly report any discrepancies or errors to instructor.

Lab work: Students are encouraged to be at lab and ready with prelab materials on time. Everybody should be in the lab at the start time of class, properly dressed and equipped for safe work, with their prelab notes ready, being late will result in loss of valuable lab time.

Students will usually work in pairs with each individual recording results and observations independently. Students are to attend lab and perform their experiments at their scheduled class times only and are not to try to gain access to the lab at different times at any circumstances. Teaching assistants have no authority to approve, attend and supervise undergraduate students in lab outside class time student is registered for. Use of personal electronic devices during class (cell phones, computers, etc) is reserved for class related materials and contents only, and only in areas of the lab free of chemicals and lab equipment.

Every student is required to sign in log book of every instrument s/he used and save all recorded/generated files in individual student folders on instrument’s computer. Failing to do so results on 5-point deduction for experiment grade per occurrence. Lab time should be efficiently used as additional time will not be given except in extenuating circumstances.

Laboratory Notebooks: Each student is required to keep and maintain a well-organized laboratory notebook. Duplicate sheet style notebooks are required: copy of lab notebook pages is submitted for grading with every lab report and is worth 50% of the experiment grade. Upon satisfactory completion of an experiment, recording of the collected data (including saving it as instrument specific files on the instrument computer, as well as exporting files for student later use in lab report writing) and clean-up of work spaces, the instructor will initial first page of lab in notebook and mark the date it is due with the full lab report.

Laboratory Assignments: Each student is required to turn in their own laboratory notebook pages, pre-lab and completed lab report. These materials will be submitted through blackboard unless prior approval for other methods is given by the instructor. A full rubric on expectations and how each assignment will be available on Blackboard.

OVERVIEW OF COURSE GRADE ASSIGNMENT

Students will always have access to current grade in the course at Blackboard. The grade is calculated as described below, based on all reports done to that moment.

Midterm Grading
Midterm grades are assigned the 8th week of class and are used to assist students with determining their academic standing. Attendance is also recorded during the 8th week to meet state and federal laws regarding financial aid disbursement. Please note, if you are not attending class it could affect your financial aid (scholarships, grants, loans or Federal Work Study). If you decide to discontinue any course you must formally withdraw from the course using the myUT portal.
Final Grading
Students who do not attend class or stop attending at some point throughout the semester will be given a final grade of “F” which will affect student’s overall grade point average. To formally withdraw from this or any other course student needs to contact the Registrar’s Office.

The grade for the course will be determined from percent average of all labs over grading period.

Every lab is worth 100 points: 50 pts for Lab Notebook/Pre-Lab and 50 pts for Lab Report.

The final advanced instrument project will be worth 200 points: 75 pts for Lab Notebook and 125 pts for Lab Report

Typical Grading Scale

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>&gt;93%</td>
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<tr>
<td>A-</td>
<td>&gt;88%</td>
</tr>
<tr>
<td>B+</td>
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<tr>
<td>C-</td>
<td>&gt;56%</td>
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<tr>
<td>D</td>
<td>&gt;50%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 49%</td>
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UNIVERSITY POLICIES
Policy Statement on Non-Discrimination on the Basis of Disability (ADA) The University is an equal opportunity educational institution. Please read The University’s Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance. Your safety and well-being as a University of Toledo student is important to the faculty, staff, and administration; as such please take a minute to review the following university policies that apply to you as a student of the University:

- [https://www.utoledo.edu/title-ix/policies.html](https://www.utoledo.edu/title-ix/policies.html)
- The University of Toledo's Title IX (Sexual Misconduct) Policy - 3364-50-01
- Nondiscrimination 3364-50-02
- Nondiscrimination on the basis of disability - Americans with Disability Act compliance 3354-50-03
- Consensual romantic and/or sexual relationships - Policy 3364-25-65
- Student Code of Conduct 3364-30-04

Please use this URL to view a more comprehensive list of student policies: [https://www.utoledo.edu/policies/audience.html/#students](https://www.utoledo.edu/policies/audience.html/#students)
Policy Statement on Non-Discrimination on the Basis of Disability (ADA) The University is an equal opportunity educational institution. Please read The University’s Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance. Students can find this policy along with other university policies listed by audience on the University Policy webpage.

Academic Accommodations The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an accommodations memo from Student Disability Services, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course. For students who have not established affiliation with Student Disability Services and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the Student Disability Services Office (http://www.utoledo.edu/offices/student-disability-services/) by phone: 419.530.4981 or email at StudentDisability@utoledo.edu.

ACADEMIC AND SUPPORT SERVICES
Please follow this link to view a comprehensive list of Student Academic and Support Services (http://www.utoledo.edu/studentaffairs/departments.html) available to you as a student. The university provides a variety of academic and support services on campus to help you succeed and reach your fullest potential. Whether you need to ask a question, get help with an assignment, seek advice from a counselor, find a job or join a club, UToledo is there for you! Just use the following URLs to find the academic support or service you need:
Tutoring: http://www.utoledo.edu/success/lec/
Library: http://www.utoledo.edu/library/
Success Coaching: https://www.utoledo.edu/successcoach/
Student Affairs: http://www.utoledo.edu/studentaffairs/
Career Services: http://www.utoledo.edu/success/career/

SAFETY AND HEALTH SERVICES FOR UT STUDENTS
Please use the following link to view a comprehensive list Campus Health and Safety Services available to you as a student.

INCLUSIVE CLASSROOM STATEMENT
In this class, we will work together to develop a learning community that is inclusive and respectful. Our diversity may be reflected by differences in race, culture, age, religion, sexual orientation, gender identity/expression, socioeconomic background, and a myriad of other social identities and life experiences. We will encourage and appreciate expressions of different ideas, opinions, and beliefs so that conversations and interactions that could potentially be divisive turn, instead, into opportunities for intellectual and personal development.

SPECIAL COURSE EXPECTATIONS DURING COVID-19 PANDEMIC
This is an unprecedented time for our Rockets community at the University of Toledo. In times of challenge, such as this, we come together to support each other and help keep the more vulnerable members of our community safe during the COVID-19 pandemic. If we all do our part, we will help to minimize the spread of infection and maintain engaging face to face class environments this fall. That is why we are asking all faculty, staff and students to adhere to the special course expectations described below. Please review the policies described below.

Course Attendance In order to ensure that we self-quarantine if symptomatic, students, faculty and staff must perform a daily health assessment, based on based on CDC guidelines, before coming to campus each day, which includes taking your temperature. Students who are symptomatic/sick should not come to class and should contact the Main Campus Health Center at 419-530-3451. The University of Toledo has a missed class policy. It is important that you understand the attendance requirements for this course. Please engage with me if you have any questions.
about these requirements. Absences due to COVID-19 quarantine or isolation requirements are considered excused absences. You should notify me if you are in quarantine or isolation and these absences may not require written notice.

**Face Coverings** To help keep each other safe, everyone must wear face coverings while on campus, except while eating, alone in an enclosed space, or outdoors practicing social distancing. Students will not be permitted in class without a face covering. If you have a medical reason that prevents you from wearing a face covering due to a health condition deemed high-risk for COVID-19 by the Centers for Disease Control and Prevention (CDC), you should submit a request for accommodation through the Student Disability Services Office (SDS) by completing this online application. You will need to provide documentation that verifies your health condition or disability and supports the need for accommodations. If you are already affiliated with SDS and would like to request additional accommodations due to the impact of COVID-19, please contact their accessibility specialist to discuss your specific needs.

**Social Distancing** As further efforts to keep everyone safe, students should practice social distancing inside and outside the classroom, including when you enter and exit. Please maintain at least 6 feet of distance between yourself and others, follow posted signage, and pay attention to the seating arrangements in the classroom. It’s important that you do not remove stickers or tape from seats and/or tables, as they are there to provide guidance on the appropriate classroom capacity based on recommended social distancing between individuals. Please be conscious of your personal space and respectful of the space of others in the class.

**Desks and Work Spaces** An important part of keeping our classroom spaces safe involves keeping them sanitized. We ask all students to sanitize their desks and/or work space before class begins, with the sanitizing spray and paper towels provided in the classroom. Special Note Although we have developed a gold standard plan for keeping each other safe during COVID-19, it’s important to note that, based on the unpredictability of the virus, things can change at any time. So please be patient and understanding as we move through the semester. If at any point you have any concerns about class, completing course work/assignments, and/or health concerns related to COVID, please let me know.

**Special Note** Although we have developed a gold standard plan for keeping each other safe during COVID-19, it’s important to note that, based on the unpredictability of the virus, things can change at any time. So please be patient and understanding as we move through the semester. If at any point you have any concerns about class, completing course work/assignments, and/or health concerns related to COVID, please let me know.

Please also know that we recognize the COVID-19 situation has placed additional burdens on many of our students. If, at any point in the semester, you experience difficulties meeting your basic needs, managing your different responsibilities, or maintaining your physical or mental health, we have a variety of resources that can help. Please review and utilize our Student Success resources and let me know if you have any questions.
COURSE SCHEDULE (tentative, subject to change)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATES</th>
<th>Group 1 Lab</th>
<th>Group 2 Lab</th>
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<tbody>
<tr>
<td>1</td>
<td>8/18, 8/20</td>
<td>ABS</td>
<td>IR</td>
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<tr>
<td>2</td>
<td>8/25, 8/27</td>
<td>BL</td>
<td>ABS</td>
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<tr>
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<tr>
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<td>GC</td>
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<td>9/15, 9/17</td>
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<tr>
<td>6</td>
<td>9/22, 9/24</td>
<td>GC/MS</td>
<td>LC</td>
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<td>PH</td>
<td>EC</td>
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<tr>
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<td>PH</td>
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<tr>
<td>9</td>
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<td>11</td>
<td>10/27, 10/29</td>
<td>MALDI</td>
<td>MALDI</td>
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<tr>
<td>12</td>
<td>11/3, 11/5</td>
<td>Advanced Instrumentation Project</td>
<td>Advanced Instrumentation Project</td>
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<td>11/10, 11/12</td>
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<td>11/17, 11/19</td>
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<tr>
<td>15</td>
<td>11/24</td>
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Laboratory Experiment Abbreviations (Readings from: H- Harris, S-Skoog)

BL – Beer’s Law (handout, S, H, Sawyer modified exp. 6-1)

ABS – UV–VIS spectroscopy (Sawyer exp. 6–4, S, H)

IR – Infrared Spectroscopy (handout, Sawyer, S, H)

LC – HPLC (Sawyer exp. 13–1, handouts, S, H)

GC – Gas Chromatography (Sawyer exp. 12–3, handout, S, H)

MS – Mass Spectrometry (handouts, S, H)

EC – Electrochemistry (Sawyer exp. 4–1, S, H)

PH – Potentiometric Methods (Sawyer exp. 2–1)

SEC – Size Exclusion Chromatography (Sawyer exp. 14–1, H, S)

MALDI – Matrix Assisted Laser Desorption Ionization (handout)