

## Chem 380 – Instrumental Methods of Analysis - Fall 2019

**Lecture** – Nobel Hall 3540, M, T, W, F – 11:30 AM - 12:20 PM

**Laboratory** – Nobel Hall 3512, M - 1:30-5:20 PM

**Instructor** – Dwight R. Stoll, Ph.D.

**Office** – Nobel Hall 3534

**Campus Phone** – Google Voice – 507-933-0699

**Email** – dstoll@gustavus.edu

**Office Hours** – By appointment or by chance – check my Google Calendar in the 'About' tab of my website

**Course website** – <https://dwightstoll.wixsite.com/drstoll>

### Required Materials

1. Textbooks – We will use materials from a variety of sources. You may consider buying one or more of the, but there will be several copies available to share.
2. Bound paper laboratory notebook
3. Approved laboratory eyewear

**Course Goal** – To provide a learning framework within which students can effectively and efficiently develop a level of competence with modern instrumental methods of analysis that will allow direct application of the principles learned in future work, and/or serve as a solid foundation for further study of instrumental techniques and other complex methodologies in graduate or professional school.

### Course Objectives

1. To learn and apply the fundamental concepts common to all instrumental methods of analysis
2. To gain an appreciation for the theoretical basis of a variety of common analytical laboratory instruments, and to become comfortable with their operation through hands-on experience
3. To recognize the significance of instrumental analysis in both public life and in science
4. To explore opportunities as a professional through self-reflection
5. To improve written and oral communication, and interpersonal skills
6. To enjoy learning about chemistry and science

**Grading** – Evaluation of performance in the course will be based upon a variety of activities including problem sets, quizzes, exams, and laboratory activities. The number and point assignment for each of these activities is given below.

Activity	Number of Events	Points Per Event	Total Points
Class Leadership	1	50	50
Online Homework	10	5	50
Offline Homework	4	15	60
Personal narrative exercise	1	100	100
Resiliency plan	1	50	50
Quizzes	4	25	100
Mid-term Exams	2	125	250
Final Exam	1	125	125
Laboratory Writing	2.5	100	250
Laboratory Participation	1	100	100
Laboratory Project Poster	1	100	100
		<b>Course Point Total</b>	<b>1235</b>

Letter grades will be assigned based upon the following scale. ***The instructor reserves the right to lower these cutoffs under special circumstances, however the cutoffs will not be raised under any circumstances.***

<b>% of Points</b>	<b>Letter Grade</b>	<b>% of Points</b>	<b>Letter Grade</b>
92-100	A	75-78	C+
88-92	A-	70-75	C
85-88	B+	67-70	C-
81-85	B	60-67	D
78-81	B-	<60	F

**Communication:** I strongly prefer communication by email over voicemail. When attaching files, please use the following file-naming convention:

2010-XX-YY 'your initials' 'short description'

For example, in submitting work for offline homework #2 I would use the following filename:  
20180903 drs hw\_2.doc

**Course Content** – A large majority of the content that will be covered in lecture can be broken down into seven categories.

1. Introduction to Instrumental Methods, Figures of Merit, and Quantitation
2. Sample Preparation
3. Separations
4. Mass Spectrometry
5. Spectroscopy
6. Electrochemistry
7. Electronics, Signal Processing, and Data Analysis

**Course Calendar** – A calendar of course events and topics will be updated regularly at the course website – <https://dwrightstoll.wixsite.com/drstoll>. Assignments, announcements, and solutions will be available through the website in the form of posts on the front page. You are responsible for checking this site regularly.

### **Laboratory Activities**

**Laboratory Writing:** You will work with your lab group to construct a full journal-style paper describing the work you complete over the course of the semester. The other team members are expected to provide feedback in writing on each piece that is submitted for grading. More details will be provided in due time.

**Laboratory Participation:** Active participation in the laboratory portion of the course is essential to achieving the course objectives. Absences from the laboratory should be made-up according to a schedule agreed upon with the instructor. We will discuss in class a rubric for peer- and self-evaluation of participation in the laboratory activities.

**Laboratory Project Poster:** Each lab group will prepare a poster that captures the entire project for presentation in a campus-wide venue near the end of the semester. More details will be provided in due time.

**Laboratory Safety:** You will be expected to take reasonable measures in the laboratory to ensure the safety of you and your peers. This includes clear labeling of all containers, responsible and organized collection of waste materials, and wearing protective eyewear at all times in the laboratory, even when you may not be working with chemicals *per se*.

## **Details**

**Readings and Preparation** – Recommended reading and preparation material will be suggested *via* the course website.

**Class Leadership** – You are asked to prepare to lead a class discussion during the semester. This will include preparing presentation slides and/or other materials that will help the rest of the class learn the material at hand.

**Online Homework** – You are asked to work collaboratively to develop answers and solutions to questions posed online. We will discuss ground rules and credit for this work in class.

**Offline Homework** – Some homework will be assigned with the expectation that it is submitted individually. Details of each problem set will be announced on the course website. You are encouraged to work with peers in completing these assignments, however each student must submit his/her own work for the graded items. Problem sets are due at the beginning of class on days negotiated during the semester. Grading of the problem sets will be accomplished according to the following scheme:

- Wrong answer, but a genuine attempt to solve the problem – 1/3 credit
- Wrong answer, but at least half of the logic is correct – 1/2 credit
- Correct answer – Full credit

**Late Work** – The number of points awarded for a particular problem set will decrease by 50 % for every day that lapses between the due date and the date that the work is turned in; problem sets are due at the beginning of lecture.

**Personal narrative** - Effectiveness in achieving life goals is enhanced through self-awareness. We will explore the notions of learning to be astonished, a personal narrative, and personal resilience in order to attend to aspects of your internal landscape, along with external aspects of being a scientist, as part of your last year in the Chemistry major.

**Resiliency plan** - You will spend some time learning about and assessing self-care, discussing resiliency with practicing professionals (via video conference), and developing a personal resiliency plan.

**Quizzes** – The four quizzes throughout the semester will be completed in class and will be 15 to 20 minutes in length. These quizzes will primarily be used as a diagnostic tool to assess your understanding of the material as we progress toward each exam. The quizzes will be closed book and closed note, and will be taken under the guidelines of the Honor Code.

**Mid-Term and Final Exams** – The two mid-term exams and the final exam will be given in class and will be 50 minutes in length. Each of these exams should be considered comprehensive. The exams will be closed book and closed note unless otherwise indicated, and will be taken under the guidelines of the Honor Code.

***All exams are considered comprehensive***

**Missed Exams/Quizzes** – Examinations and quizzes **will not be made up if missed**, unless due to circumstances beyond your control. If you will miss an exam due to circumstances beyond your control, you must contact me no later than one hour **prior to** the exam. You can call my office, home or e-mail me. If neither of these work, please contact the Department office at x7320 or as a last resort, the Dean of Students office.

**Check Your Email** - Email is an official means for communication at Gustavus Adolphus College. I expect that you will check your Gustavus email at least once per day.

### ***Understand When You May Drop This Course***

It is your responsibility to understand when you need to consider dropping/withdrawing from a course. Refer to the Gustavus Academic Catalog for dates and deadlines for registration.

### **Incomplete Policy**

A grade of incomplete may be awarded at the discretion of the instructor, if requested by the student, under the following conditions: 1) the last day to withdraw has passed, 2) and unforeseen circumstances beyond the student's control (usually restricted to illness or family emergency) preclude completion of the remaining work for the course by the semester deadline. Note that poor planning or having a lot of work to complete at the end of the term are not, in fairness to other students, considered circumstances beyond a student's control. This additional time to complete coursework may not extend beyond the final day of the following semester, and earlier limits may be set at the discretion of the instructor.

The grade "I" for a particular student, along with an expiration date, is reported at the end of the term to the Office of the Registrar on a special form, which is signed by both the instructor and the department chair. A temporary grade will also be submitted, in the computation of which the instructor has considered work not completed as a zero or an F. If before the end of the expiration date, the instructor reports a final grade to the Registrar, that grade will be recorded and the grade point average will be computed accordingly. When the expiration date has passed without a grade being reported, the temporary grade will replace the "I" and become a permanent part of the transcript record.

### ***Requesting Accommodations***

Gustavus Adolphus College is committed to ensuring the full participation of all students in its programs. If you have a documented disability, or you think you may have a disability of any nature (e.g., mental health, attentional, learning, chronic health, sensory, or physical) and, as a result, need reasonable academic accommodation to participate in class, take tests or benefit from the College's services, then you should speak with Accessibility Resources staff for a confidential discussion of your needs and appropriate plans. Course requirements cannot be waived, but reasonable accommodations may be provided based on disability documentation and course outcomes. Accommodations cannot be made retroactively; therefore, to maximize your academic success at Gustavus, please contact Accessibility Resources as early as possible. Accessibility Resources (<https://gustavus.edu/care/accessibility/>) is located in the Center for Academic Resources and Enhancement. Accessibility Resources Coordinator, Kelly Karstad, ([kkarstad@gustavus.edu](mailto:kkarstad@gustavus.edu) or x7138), can provide further information.

## ***Multilingual Student Support***

Some Gusties may have grown up speaking a language (or languages) other than English at home. If so, we refer to you as “multilingual.” Your multilingual background is an incredible resource for you, and for our campus, but it can come with some challenges. You can find support through the Center for International and Cultural Education’s (<https://gustavus.edu/cice/>) Multilingual and Intercultural Program Coordinator (MIPC), Carly Overfelt ([overfelt@gustavus.edu](mailto:overfelt@gustavus.edu)). Carly can meet individually for tutoring in writing, consulting about specific assignments, and helping students connect with the College’s support systems. If you want help with a specific task (for example, reading word problems on an exam quickly enough or revising grammar in essays), let your professor and Carly know as soon as possible. In addition, the Writing Center (<https://gustavus.edu/writingcenter/>) offers tutoring from peers (some of whom are themselves multilingual) who can help you do your best writing.

## ***Mental Wellbeing***

The Gustavus community is committed to and cares about all students. Strained relationships, increased anxiety, alcohol or drug problems, feeling down, difficulty concentrating, and/or lack of motivation may affect a student’s academic performance or reduce a student’s ability to participate in daily activities. If you or someone you know expresses such mental health concerns or experiences a stressful event that can create barriers to learning, Gustavus services are available to assist you. You can learn more about the broad range of confidential health services available on campus at <https://gustavus.edu/counseling/> and <https://gustavus.edu/deanofstudents/services/>.

## ***Research Assistance***

Students can always get help with research at the library. Reference librarians will help find information on a topic, develop search strategies for papers and projects, search library catalogs and databases, and provide assistance at every step. Drop-ins and appointments are both welcome. Visit [https://gustavus.edu/library/reference\\_question.php](https://gustavus.edu/library/reference_question.php) for hours, location, and more information.

## ***Gustavus Adolphus College Honor Code***

The faculty of Gustavus Adolphus College expects all students to adhere to the highest standards of academic honesty and to refrain from any action that impinges upon academic freedom of other members of the college community. In all academic exercises, examinations, presentations, speeches, papers, and reports, students shall submit their own work. Footnotes or some other acceptable form of citation must accompany any use of another’s words or ideas. Students are especially cautioned that quoting or paraphrasing from electronic sources without proper citation is as serious a violation as copying from a book or other printed source.

In the case of cheating or plagiarism, the instructor will inform the student and the Office of the Provost of the nature of the offense, the penalty within the course, and the recommendation of the instructor as to whether further disciplinary action is warranted. Another instance of academic dishonesty will result in review of the student’s record by the probation committee and may result in the student being placed on academic probation. If a pattern of academic dishonesty continues, the student may be permanently dismissed from the College.

A student may not submit work that is substantially the same in two courses without first gaining permission of both instructors if the courses are taken concurrently, or permission of the current instructor if the work had been submitted in a previous semester.

The faculty regards the damaging of library materials and failing to sign out or to return them properly, and the misuse of computer files and programs, as equally serious violations of the ethical standards of courtesy, fairness, and honesty that bind together a community of scholars.

Individuals who use the College’s computer facilities assume the responsibility of seeing that these resources are

used in an appropriate manner. Misuse of computer hardware, software, data, and output is a violation of College policy and regulations and may also be a violation of law if data of other computer users are disturbed or the privacy of individuals is violated.

In order to maintain classrooms as places for the respectful exchange of ideas, and to preserve the integrity of a community of scholars, audio or video recording and dissemination of course-related content require the express permission of the individual faculty member who will also respond to infractions as necessary. Recording as a disability accommodation (without dissemination) is coordinated by the Center for Academic Resources and Enhancement.

Finally, students who serve the College in positions of responsibility in which they deal with test materials, letters of recommendation, and other matters that must be held in confidence are expected to maintain confidentiality and to adhere to the same high standards of personal integrity.

### ***Title IX: Sexual Misconduct Prevention and Resources***

Gustavus Adolphus College recognizes the dignity of all individuals and promotes respect for all people. As such, we are committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, intimate partner violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available; you can learn more online at <https://gustavus.edu/titleix/>.

Please know that if you choose to confide in me, I am mandated by the College to report to the Title IX Coordinator, because Gustavus and I want to be sure you are connected with all the support the College can offer. Although it is encouraged, you are not required to respond to outreach from the College if you do not want to. You may speak to someone confidentially by contacting the Sexual Assault Response Team (SART/CADA), Chaplains, Counseling Center, or Health Service staff; conversations with these individuals can be kept strictly confidential. SART/CADA can be reached 24 hours a day at 507-933-6868. You can also make a report yourself, including an anonymous report, through the form at <https://gustavus.edu/titleix/>.

*The information listed on the course web site, in the syllabus, and in associated documents is subject to change at the discretion of the instructor.*