Chemistry 480A45
Summer Term 2025

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Default communication with students will be made via ISU student ULID e-mail accounts. WARNING: Dr. Ferrence's default spam filter settings block e-mail not ending in ".ilstu.edu".

Office Hours: Zoom by appointment (request appointment by emailing me at gferren@ilstu.edu)

Optional Texts: Crystallography: A Very Short Introduction by A. M. Glazer, Oxford Publishing, ISBN: 978-0-19-871759-1 (costs about $13);
Crystal Engineering: A Textbook by G. Desiraju, J. Vittal, A. Ramanan, World Scientific, ISBN:9-789814-366861; and
X-ray Crystallography, 2nd Ed by William Clegg, Oxford Publishing, ISBN: 978-0-19-870097-5.

Course Web-pages: Canvas

Catalog Description:

CHE 480A45 TOPICS IN CHEMISTRY: X-RAY DIFFRACTOMETRY 3 Credit Hours
Advanced study in the area of X-ray Crystallography. Not for credit if earned credit in CHE 380a45. This course is approved for graduate credit.

Contact Hours:

This course is an 8-week online class starting on June 9th and ending on August 1st, 2025. There are no required face-to-face meetings. The asynchronous online version of the course will include regular (several weekly) assignments and projects that are likely to require time-on-task equivalent to the synchronous version of the course, a standard 3 credit hour 15-week course that meets weekly for three 50 minute periods and has regular homework assignments Many of the assignments are more like a cyber-laboratory with most of the time spent hands-on using specialized computer programs.

Academic Integrity and Professionalism:

Simply put: *Be nice and don't cheat. Seriously!*

You are expected to be honest in all academic work, consistent with the academic integrity policy as outlined in the Code of Student Conduct (https://deanofstudents.illinoisstate.edu/conduct/code/) and any additional syllabus language. All work is to be appropriately cited when it is borrowed, directly or indirectly, from another source. Unauthorized and/or unacknowledged collaboration on any work, or the presentation of someone else's work as your own, is a form of academic dishonesty under the Code of Student Conduct.

Content generated by an Artificial Intelligence third-party service or site (AI-generated content) without proper authorization and attribution is a form of academic dishonesty. If you are unsure about whether something used in your work requires attribution, please reach out to me to discuss it as soon as possible. Allegations of academic dishonesty will be referred to the Student Conduct and Community Responsibilities (https://deanofstudents.illinoisstate.edu/conduct/), a unit of the Dean of Students Office, for possible review under the Student Code of Conduct. Students found responsible for academic dishonesty may also be assigned a grade penalty by the instructor.

Other than communication with the instructor, any communication about an exam in progress, regardless of whether the communication occurs inside or outside of the location of the exam can be considered a breach of integrity and may be considered an act of cheating.

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Course Overview:

This course (CHE 480A45) constitutes an in depth exploration of methods and data interpretation, both practical and theoretical, commonly encountered in structural determination using X-ray crystallography. Topics include: Crystals, X-rays, Symmetry, Data Collection, Structure solution, Refinement, Interpretation, Presentation, Evaluation, Crystallographic Information (particularly in databases), and Crystal Engineering. Topic will generally be developed from a practical basis and culminate in hands on computer based exploration of molecular structure. The methods will be placed in a theoretical perspective; however, the emphasis will be on practical application and data interpretation.

Your attendance/participation is expected in all scheduled assignments/activities (for the asynchronous online class). Material presented is the core of the course, and is the material that will be heavily emphasized on quizzes. Reading and homework assignments will be made on a regular basis, some graded, some not. You are responsible for **Canvas content**, **linked content**, **cyber-laboratory**, **readings**, and **homework** material on course quizzes. Generally, content will be delivered through **Modules** in **Canvas**.

Learner Objectives:

Through successful completion of CHE 380A45, learners have the opportunity to develop and demonstrate knowledge and competencies in the following areas:

1. Basic theory and methodology of Single Crystal X-ray Diffraction, "Crystallography".
2. Crystallographic information with an emphasis on the Cambridge Crystallographic Database (CSD).
3. Hands-on structure interpretation using modern computers, software, and data from the CSD.
4. Critical evaluation of crystallographically derived data with an emphasis on structures in the CSD.
5. Interpretation of crystallographic data reported in the scientific literature.
6. Medium to advanced use of Windows based computers.
7. Development of high school appropriate lesson plans leveraging crystallographic information.

Required Learner Tasks/Assignments:

1. **Homework**

   Learners will be expected to complete regular homework that is not graded but quite valid material that may be needed for successful completion of assessments such as projects and graded tasks.

2. **Projects/Graded Homework/Online Quizzes**

   Learners will be expected to complete regular course projects, discussion posts and quizzes. Some will be ungraded online exercises and/or tasks. Others may be graded assignments and the graded portion will generally be administered using requests to post to Discussions and/or Quizzes within Modules in the Canvas platform. Graded assignments will comprise 80% of the total grade. Graded assignments will generally be required to be submitted electronically to the instructor via the specified means no later than 6:00 p.m. on the due date to potentially receive full credit, and they will be graded more upon quality of attempt than correctness. Specific details regarding submission requirements will be provide with the assignments.

3. **CSDS Tutorial / Lesson Plan**

   Each learner will be expected to prepare a teaching module and lesson plan which rely on high school learners using of the Cambridge Crystallographic Data Centre's "WebCSD". Specific criteria will be provided with the formal assignment. The tutorial is valued at 20% of the total grade.

4. **Grading Scale**

   A = 90% – 100%; B = 80% – 89%; C = 70% – 79%; D = 60% – 69%; F = 0% – 59%

Deadlines and Late Work:

Deadlines (due dates and times) for work including, homework, assignments, and projects are to be considered fixed (hard). Generally late work will not be accepted by the instructor. Assume late work will not be accepted by the instructor, thus earning a grade of zero. The instructor reserves the right to apply exceptions on a case by case basis. Generally to receive consideration for an exception, the learner needs to make arrangements with the instructor well in advance of the deadline. Those last five sentences are my default statements about late work for all of the courses I teach. If you do have specific issues, please contact me. Particularly in this course, specifically CHE480A45 for the MCE program, I am much more flexible than the statements signal. Giving me advanced notice tends to garner increased flexibility.

Calculating your real-time grade at any point during the semester:

Course grades are assigned at the end of the semester based upon the number of points a learned has accumulated over the course of the semester. Specific point thresholds for each letter grade are provided in the previous section. Real-time grade calculation is like a percent yield calculation. Sum the points you have earned then divide by the maxim score to that point then multiply by 100%. Grade cutoffs are approximately 90.00% for an A; 80.00% for a B; 70.00% for a C; and 60.00% to pass with a D.

Cell Phones:

Not applicable to this asynchronous online course.

ISU Common Language Syllabus Statements: (some bits are less applicable to online asynchronous)

Student Accommodation Statement:

Any student needing to arrange a reasonable accommodation for a documented disability and/or medical/mental health condition should contact *Student Access and Accommodation Services* at 308 Fell Hall, Office Phone (309) 438-5853, Video Phone (309) 319-7682 or visit the website at StudentAccess.IllinoisState.edu. Once you have the paperwork from SAAS, you need to: 1) schedule and have a face-to-face meeting with the instructor to discuss the accommodation; 2) provide an e-mail to the instructor explaining the requested accommodation in the body of the email and attach (not link) a copy of the paperwork from SAAS; 3) provide the instructor with a physical copy of the paperwork from SAAS. Once these three tasks are complete, the instructor will shepherd the request through the Department of Chemistry's approval process, then inform the student of the outcome. The student must not assume an accommodation is granted unless informed by the instructor of the Departmental outcome in the affirmative.

Attendance:

You are responsible for attending class and completing all academic work. You should familiarize yourself with University policy to understand which absences are excused under university policy and which are not (https://deanofstudents.illinoisstate.edu/contact/absence/). You are responsible for making arrangements with me to complete missed coursework after an excused absence. Follow the instructions in this syllabus about any additional absences I excuse for this class. If you need advice on how to manage an extended absence or want notification of your absence sent to your instructors, contact the Dean of Students Office (https://deanofstudents.illinoisstate.edu/).

You are responsible for attending class and completing all academic work. You are also responsible for communicating any absences. If you have missed class or know that you will miss a future class, fill out this form (https://forms.office.com/r/UzaPZd2XWh).

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Absence for Bereavement, Active Military Duty, Serious Communicable Disease:

If you need to miss class due to the loss of a family member (https://policy.illinoisstate.edu/students/2-1-27/), active military duty, or required quarantine/isolation for a serious communicable disease (https://policy.illinoisstate.edu/students/2-1-30/), contact the Dean of Students Office to request that a formal excused absence notice be sent to your instructors. The Dean of Students Office (https://deanofstudents.illinoisstate.edu/) can send a courtesy notice to your instructors about other absences, but many other absences (including routine illness for which isolation/quarantine are not indicated) are governed by the absence policy for this course and are not excused under university policy.

You are responsible for attending class and completing all academic work. You are also responsible for communicating any absences. If you have missed class or know that you will miss a future class, fill out this form (https://forms.office.com/r/UzaPZd2XWh).

Title IX Assistance:

Illinois State University's Title IX Coordinator is available to assist students with coordinating specific actions, including reasonable modifications, to ensure equal access due to pregnancy or related conditions. This applies to pregnancy, childbirth, termination of pregnancy (either naturally or through medical means), lactation, and conditions related to or recovery from pregnancy, childbirth, termination, and lactation. The Title IX Coordinator can be reached in the Office of Equal Opportunity and Access at (309) 438-3383, EqualOpportunity@IllinoisState.edu, or by mail at Campus Box 1280, Normal, IL 61790-1280.

Artificial Intelligence:

Generative AI use is not permitted in this class, unless specified otherwise by the instructor.

In this course, unless specified otherwise by Dr. Ferrence, the use of generative AI tools such as ChatGPT or Adobe Firefly is not permitted to support the completion of any assigned work. This includes, but is not limited to, using generative AI tools to ideate, pre-plan, edit, translate, or otherwise create original material you claim to be solely your creation. Use of a generative AI tool to complete assigned work in whole or in part may be referred under the Code of Student Conduct academic dishonesty provisions for further action by the Dean of Students Office.

Campus Safety and Security:

Illinois State University is committed to maintaining a safe environment for the University community. ISU asks students to ensure they have downloaded the SafeRedbirds app (https://saferedbirds.illinoisstate.edu/), the official safety application for Illinois State University. Students should also consult information posted in each classroom about emergency shelters and evacuation assembly areas (both are indicated on stickers inside every classroom).

Constructive Conversations:

Scholarly discourse or exchanges in an instructional setting may include diverse perspectives, and difficult situations sometimes arise in conversations between people with differing opinions. We may choose to turn contentious moments into valuable learning experiences for all and will work to agree on the following ground rules for constructive conversations:

- Constructive conversations should relate to course goals and objectives.
- Ensure everyone has an opportunity to speak and be heard.
- Listen actively without interrupting. Seek to understand before responding.
- Focus on ideas and arguments rather than attacking individuals.
- Respect and maintain privacy regarding personal disclosures made during discussions.
- Be open to considering different viewpoints and willing to consider new information.

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Classroom Behavior:

In the classroom and other learning environments, you are expected to conduct yourself in a manner consistent with Illinois State University's Code of Student Conduct (https://deanofstudents.illinoisstate.edu/conduct/code/) and you should familiarize yourself with the University Classroom Disruption Policy 4.1.17 (https://policy.illinoisstate.edu/academic/4-1-17/).

Disruptive student conduct is behavior in a classroom or other learning environment (including in person and virtual learning environment in both on and off campus locations) that disrupts the educational process. Examples of disruptive behavior include, but are not limited to, the following:

- threatening, intimidating, or other inappropriate behavior toward the instructor or classmates
- persisting in disruptive personal conversations with other class members
- unreasonable interference with class discussion or activities
- repeated interruptions by electronic devices
- refusing to follow the direction of the instructor or other university official
- leaving and entering class frequently without notifying the instructor of illness or other extenuating circumstances

Students who demonstrate disruptive class behavior may be removed from the classroom for the remainder of that class session and/or may be referred to the Dean of Student Office in accordance with the Student Code of Conduct Policy 4-1-17.

Equity, Diversity, Access, and Belonging:

ISU is committed to creating and maintaining a learning environment that is welcoming, supportive, respectful, inclusive, diverse, and free from discrimination and harassment. University classrooms are perhaps the most diverse learning environment in which you have ever been. We will most often be speaking across differences—sex, gender, sexuality, race, nation, economic class, religion, age, ability, political views, and more. This diversity will be an asset to our discussions and other learning experiences in this course. I encourage you to consider the experiences of your classmates to be equally valuable as your own. For resources on reporting concerns, please contact the Dean on Duty (https://deanofstudents.illinoisstate.edu/contact/#dean-on-duty).

Land Acknowledgement:

Illinois State University was built on the land of multiple native nations. These lands were the traditional birthright of Indigenous people who were forcibly removed and have faced centuries of struggle for survival and identity in the wake of dispossession and displacement. We would like to acknowledge that our campus sits on the lands that were once home to the Illini, Peoria and the Myaamia, and later due to colonial encroachment and displacement to the Fox, Potawatomi, Sauk, Shawnee, Winnebago, Ioway, Mascouten, Piankashaw, Wea, and Kickapoo Nations. We also express honor to those Indigenous people who we may have excluded in this acknowledgement due to erasure and historical inaccuracy.

Mental Health:

Life at college can get complicated. If you're feeling stressed, overwhelmed, lost, anxious, depressed or are struggling with personal issues, do not hesitate to call or visit Student Counseling Services (SCS) at 320 Student Services Building, (309) 438-3655). SCS services are free and confidential.

If you are worried about a friend, you can call SCS and ask to speak to a counselor for ideas on how to help. The Kognito simulation (https://counseling.illinoisstate.edu/outreach/kognito/), available through SCS's webpage, can also help you learn how to assist your friend in connecting to services.

Student Technology Support:

All students are encouraged to take the Introduction to Technology Quickstart Orientation, found here: IllinoisState.edu/Quickstart (https://launch.comevo.com/ilstu/1634/-/pub/Intake).

Technology support is available at help.illinoisstate.edu/technology/, including hundreds of help articles on everything involving ISU technology, online chat, and phone support at (309) 438-HELP (4357). Walk-up support and computer repair & purchases are available from TechZone located on the first floor of the Bone Student Center as well as TechZone.IllinoisState.edu.

Two software packages are available at no additional charge: Microsoft 365 (Word, Excel, PowerPoint, etc.) https://help.illinoisstate.edu/technology/support-topics/communication-and-collaboration-tools/microsoft-365 and Adobe Creative Cloud (https://help.illinoisstate.edu/technology/support-topics/campus-applications-and-websites/adobe-creative-cloud/downloading-adobe-creative-cloud-applications). Students can install these programs on their personal computers.

Students who do not have access to the technology they need to be successful in their coursework should contact the Technology Support Center at help.illinoisstate.edu/technology/ or (309) 438-HELP (4357) to discuss options.

Student Basic Needs:

Student Navigator Program

The Student Navigator program is a student-led, peer-to-peer initiative in the Dean of Students Office designed to assist students facing economic hardships and basic needs crises. Referrals are available to resources for food, textbooks, housing, finances, health, and more.

For more information, please visit the following link:
https://deanofstudents.illinoisstate.edu/services/student-navigator/ .

Religious Accommodations:

The University provides reasonable accommodations for students' sincerely held religious beliefs or practices except where such an accommodation would fundamentally alter the curriculum or academic program. Students seeking religious accommodations should submit a completed request for accommodation form (available on the SAAS website, (https://studentaccess.illinoisstate.edu/students/accommodations/religious/)) to Student Access and Accommodation Services. 10 days' notice prior to the proposed start date for the requested accommodation is requested.

Disclaimer:

Homework & assignments and any changes to this syllabus will be announced in Canvas; it is the responsibility of the student to check Canvas announcements regularly and be aware of any announcements posted in Canvas.