Chemistry 380A45
X-ray Diffractometry
Fall Semester 2021 (asynchronous online version)

Lecturer: **Professor G. M. Ferrence**
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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: Mondays & Fridays 11:00 a.m. – 11:50 a.m. https://illinoisstate.zoom.us/j/6962699783

Required Text: Crystallography: A Very Short Introduction by A. M. Glazer, Oxford Publishing, ISBN: 978-0-19-871759-1 (costs about $12).

Optional Texts: 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-page: Reggienet

Catalog Description:

CHE 380A45 X-RAY DIFFRACTOMETRY 3 sem. hrs.
Advanced study in the area of X-ray Crystallography. Prerequisite: CHE 362 or concurrent registration.

Contact Hours:

The asynchronous online version of the course will include weekly assignments and projects that are likely to require time-on-task equivalent to the synchronous version of the course. Many of the assignments are more like a cyber-laboratory with most of the time spent hands-on using specialized computer programs.

Course Overview:

This course (CHE 380A45) constitutes an in depth exploration of methods, 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 application of the techniques of crystallography. 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 in the examinations. Reading and homework assignments will be made on a regular basis. You are responsible for **lecture (module content)**, **laboratory**, **readings**, and **homework** material on course exams.

Learner Objectives:

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

1. How to prepare a scientific manuscript starting with data analysis and culminating with manuscript submission.
2. Common instrumentation for X-ray Crystallography.
3. Theory and methodology of Single Crystal X-ray Crystallography.
4. Hands-on X-ray structure solution and refinement using modern computers.
5. Interpretation of crystallographic data reported in the scientific literature.
6. Critical evaluation of crystallographic data literature.
7. Medium to advanced use of Windows based computers.

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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 crystallographic projects. Some projects 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 Forums and/or Quizzes within the Reggienet 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%

Academic Honesty 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. All work is to be appropriately cited when it is borrowed, directly or indirectly, from another source. Unauthorized and unacknowledged collaboration on any work, the presentation of someone else's work, and plagiarism are all forms of cheating. Fabrication, falsification, and plagiarism are misconduct. Misconduct is cheating. In certain circumstances, I may be required to refer violations to the Office of Student Conduct and Conflict Resolution.

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.

Absence Due to Illness or Bereavement:

If you have to miss class due to an extended illness (3 or more consecutive class days) or a bereavement, the Dean of Students Office can help. It's located in Room 387, Student Services Building.

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University Sanctioned Events including Athletics:

As per University policy, if you are on an athletic team or involved in other university sanctioned events, you need to provide me with information (name, athletic team/event & planned travel dates) by the end of the 2nd week of class.

As per University policy, if you think you will be missing an assignment due to travel, you need to inform **me in person at least one week in advance of the missed assignment to make accommodations**, and your coach needs to email me 48 hours in advance of you leaving town. If the coach does not contact me within that timeframe you will likely receive a zero for that assignment.

Student Access and Accommodation Services:

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 350 Fell Hall, (309) 438-5853, or visit the website at StudentAccess.IllinoisState.edu.

Campus Safety and Security:

Illinois State University is committed to maintaining a safe environment for the University community. Please take a few moments to make sure you are signed up for ISU Emergency Alerts at IllinoisState.edu/EmergencyAlert. Also, note the information posted in each classroom about emergency shelters and evacuation assembly areas (both are indicated on stickers inside every classroom). Additional safety information is available on the Campus Safety and Security website, Security.IllinoisState.edu.

Classroom Behavior:

In the classroom and elsewhere, you are expected to conduct yourself in a manner consistent with Illinois State University's Code of Student Conduct.

Diversity:

ISU remains committed to creating and maintaining a working, learning and living environment that is welcoming, supportive, respectful, inclusive, diverse and free from discrimination and harassment.

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). These services are free and completely confidential. SCS is located at 320 Student Services Building, 309-438-3655.

Student Well-Being:

It's hard to learn if you're hungry or couch surfing. If you are having difficulty affording groceries, accessing sufficient food to eat every day, or securing a safe and stable place to live, help may be available. I urge you to contact the Dean of Students Office to learn more.

CDC Guidelines and ISU COVID requirements:

The CDC provides updated COVID-related guidelines as the science becomes clearer and humans shift their behavior and responses to COVID. ISU monitors and evaluates these guidelines and provides university wide COVID requirements, which may change throughout the semester. You are expected to adhere to these guidelines and requirements. For example, at the beginning of the Fall 2021 semester, all ISU faculty, staff, and students are required to wear masks indoors. However, this guidance may shift. Please be flexible and patient as we continue to collectively care for one another and navigate unknown developments with the virus.

Disclaimer:

The above represents a tentative syllabus and outline and is subject to changes announced in class.