Chemistry 4930/5390
Fall 2024

Lecture: TTh 8:00 a.m. – 9:20 p.m. CHEM 352 and CHEM 271.
Attendance is required.

Instructor: Dr. Teresa D. Golden

Office hours: 8:00 - 9:00 a.m. MW, CHEM 279, 565-2888, tgolden@unt.edu

Reading: *X-ray Diffraction Procedures for Polycrystalline and Amorphous Materials,* H.P. Klug and L.E. Alexander, Wiley, 1974, ISBN 0-471-49369-4

Elements of X-ray Diffraction, B.D. Cullity and S.R. Stock, Prentice Hall, 3rd edition, 2001, ISBN 0-201-61091-4

X-ray Diffraction, C. Suryanarayana and M. Norton, 1998, ISBN 0-306-45744-X

Introduction to X-ray Powder Diffractometry, R. Jenkins and R. Synder, John Wiley & Sons, 1996, 0-471-51339-3

The reading assignments are on hold at the Willis library under the instructor and course name.

Exams: There will be several exams, homework assignments, a research project and a final exam. Dates for each exam will be announced in class.
The final will be Tuesday, December 10th, 8:00 a.m. - 10:00 a.m.

Project: The research project can include the student's graduate research related to x-ray analysis or an assigned topic. Abstract for research topic is due September 26th. Outline due October 24th. Research Paper due December 3rd, 2024.

Grading: A – 90% B – 80% C – 70% D – 60% F < 60%

Additional Information:

(a) No Makeups or Late Assignments accepted.

(b) *The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first contact the Office of Disability Access (ODA) to verify their eligibility. Note that students must register for every semester and must meet with each faculty member prior to*

implementation in each class. For additional information see the Office of Disability Access website at https://studentaffairs.unt.edu/office-disability-access/index.html.

(c) *Students are expected to attend classes regularly and to abide by the attendance policy established for this class.*

Lecture Topics: CHEM 253

I. Production and Properties of X-rays
II. Basic Crystallography
III. Diffraction Theory
IV. Instrumentation for X-ray Diffraction
V. Crystallographic Databases
VI. Qualitative Analysis
VII. Quantitative Analysis

Practicum Topics: CHEM 253/271

I. Safety and Sample Prep
II. Basic Instrument Operation
III. Intro to Software, ICDD JCPDS
IV. Crystal Structure Determination - Cubic
V. Crystal Structure Determination - Hexagonal
VI. Determination of Precise Lattice Parameters
VII. Determination of Crystallite Size and Strain
VIII. Phase Diagram Determination
IX. Quantitative Analysis
X. Advanced Software, jPowd, Rietveld