

NANO 704 – Spring 2021
Crystallography & Structure of Nanomaterials
Course Description

- Overview:** This graduate course covers crystallographic characteristics and structural properties of nanomaterials. Emphasis is placed on the nomenclature for conveying crystallographic elements of symmetry. Direct methods of solution and diffraction signatures of crystal structures will also be addressed.
- Credit Hours:** 3 (lecture)
- Classrooms:** Lecture: N/A
- Time:** MWF 9:00 AM-9:50 AM
- Instructor:** S. P. Ahrenkiel
Office: By appointment
Phone: 605-394-5238
Zoom PMI: 6053945238
Internet: e-mail: Phil.Ahrenkiel@sdsmt.edu
URL: <http://ahrenkiel.sdsmt.edu/Fall2021/NANO704>
- Text:** Fundamentals of Crystallography, 3rd Edition
C. Giacovazzo et al., Oxford University Press (2011) ISBN-10: 00199573662
- Optional:** D. E. Sands, Introduction to Crystallography, Dover, New York (1993) ISBN 0-486-67893-3
- Equipment:** Note-taking supplies. A compass is recommended. **A straightedge (ruler) *must* be used for hand-drawn diagrams.**
- Exams:** There will be one midterm exam covering specified lecture material.
- Final:** The final exam will include specified lecture material from throughout the semester.
- Quizzes:** There will be quizzes, both announced and unannounced. Attendance or prior arrangement is required for credit or omission.
- Homework:** Homework problems will be assigned with specified due dates. Late submissions may be assessed a score reduction. Original work and legibility are required.
- Attendance:** Attendance is essential and may be recorded. Work may be deferred only upon prior arrangement.
- Grading:** Assignments will have the following weight toward the final grade:
Homework: 40%; Midterm Exam: 25%; Final Exam: 30%
Quizzes, Attendance & Participation: 5%

Policies:

- All submitted work must be original. Exams and in-class assignments are strictly independent.
- Cooperation on homework assignments is permissible, but each submission must be unique.
- Brief duplication from third-party sources is acceptable *only* if the source is explicitly identified.
- Direct quotations must be indicated with quotation marks, offset margins, and/or altered font.
- Please discuss with me before submitting any work electronically. Electronically submitted assignments will be accepted *only* in .pdf format, with permission from the instructor. Student name or ID must be included in the file name and *also* within the document.

Special Needs: Students with special needs or requiring special accommodations should contact the instructor and/or the campus director of counseling and ADA services (605-394-6988) at the earliest opportunity.

Course Schedule: The following proposed course schedule is subject to change.

WEEK	DATE	LECTURE/READING
1	M-1/11	<i>1. Transformations and Symmetry</i>
	W-1/13	
	F-1/15	
2	W-1/20	
	F-1/22	
3	M-1/25	<i>2. Point Groups</i>
	W-1/27	
	F-1/29	
4	M-2/1	
	W-2/3	
	F-2/5	
5	M-2/8	<i>3. Space Groups</i>
	W-2/10	
	F-2/12	
6	W-2/13	
	F-2/15	
7	M-2/22	
	W-2/24	
	F-2/26	
8	M-3/1	<i>4. X Ray Diffraction</i>
	W-3/3	
	F-3/5	
9	M-3/15	
	W-3/17	
	F-3/19	
10	M-3/22	<i>5. Direct Methods</i>
	W-3/24	
	F-3/26	
11	M-3/29	
	W-3/31	
12	M-4/5	<i>6. Patterson</i>
	W-4/7	
	F-4/9	
13	M-4/12	
	W-4/14	
	F-4/16	
14	M-4/19	<i>7. Electron Diffraction</i>
	W-4/21	
	W-4/23	
15	M-4/26	Final Review
	W-4/28	
	F-4/30	