

Chemistry of Solid Materials, CHM 4930

Syllabus Spring Semester 2025

Daniel R. Talham

CLB 412

Office Hours: Monday 2-4 pm, and by appointment.

Topics: Approximately 2/3 of the course will be dedicated to background and fundamentals of solid state chemistry, with the final 1/3 reserved for current or advanced topics.

- Fundamentals
 - Classification and Structures of Solids
 - Electronic Structure of Solids
 - Semiconductors, Metals and Superconductors
 - Optical Properties of Solids
 - Magnetism and Magnetic Materials
 - Porous Solids, Intercalation, Ion Storage and Transport
 - Characterization Methods
- Current Topics and Case Studies
 - To be decided. Some Possibilities:
 - Hybrid Perovskite Semiconductors and Emitters
 - 2D Materials
 - Battery Solid Electrolytes and Electrode Materials
 - Ferroelectrics and Multiferroics
 - Surfaces

Objective: At the conclusion of the course students should have an understanding of the fundamentals that underlie most contemporary solid-state and materials chemistry, including: solid-state structure types; electronic structure of semiconductors, metals, and superconductors; magnetism and magnetic materials; optical properties; surface effects and properties; solid-state nanochemistry; and modern characterization methods.

Grading: Grades will be based on homework and in-term assignments (15%), and exams to be given in-class on Friday Feb. 7 (25 %), Wed. March 12 (25%), and third exam to be given during the last week of class, April 21 and/or 24 (35%).

Homework: Homework will be assigned approximately every two weeks and will be graded as pass/fail. Doing homework with a partner or in groups is encouraged. On the due date, students will take turns working problems and leading the discussion.

Accompanying Reading:

“Solid State Materials Chemistry” Woodward, Karen, Evans and Vogt. Chapters of this book will be used as an introduction to several topics. Reading will also be assigned throughout the course from several sources including books, review articles and primary literature articles.

The following are included as part of the UF Policy on Course Syllabi. Please contact the instructor if there are any questions.

Attendance: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Academic Honesty: UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.” On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel.

Accommodations for students with disabilities: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

UF grading policies for assigning grade points:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

UF Course Evaluation Process: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluer.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit (<https://umatter.ufl.edu/>) to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website (<https://counseling.ufl.edu/>) or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website (<https://shcc.ufl.edu/>) .