

CHM 6626: Applications of Physical Methods in Inorganic Chemistry (23Fall)

Time: MWF 3:00 PM – 3:50 PM (Period 8)

Classroom: FLI 0109

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Office hours: Wednesday after class, and by appointment

Course Description and Objectives

CHM6626, a three-credit course, covers common physical methods employed in inorganic chemistry research. The course discusses basic theory, instrumentation, data analysis, and applications of a spectrum of physical methods to various inorganic materials. After finishing the course, students are expected to understand physical methods applied in literature as well as design characterization methods and analyze data for their own research. Students will also practice reading, presentation, and writing skills which are crucial for success in graduate school. About 30 lectures will be given on the following topics (1-4 will be covered in depth while 5-8 can be changed).

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| (1) Electronic absorption spectroscopy | (5) Photoelectron spectroscopy |
| (2) Vibration and rotation spectroscopy | (6) Raman spectroscopy |
| (3) Nuclear magnetic resonance spectroscopy | (7) X-ray diffraction |
| (4) Electron paramagnetic resonance spectroscopy | (8) Mass spectroscopy/TGA |

Reference Books (The textbooks are not required but recommended)

“Physical Methods in Inorganic Chemistry” by Russell S. Drago

“Structural Methods in Inorganic Chemistry” by Ebsworth, Ranki, and Cradock

“Symmetry and Spectroscopy” by Daniel Harris

“Atkin’s Physical Chemistry” by Peter Atkins and Julio De Paula

“Inorganic Chemistry” by Gary L. Miessler, Paul J. Fischer, and Donald A. Tarr

Grades

30% Attendance/Participation/Assignments

40% Two Exams (Earlier October and Mid November)

15% Oral Presentation (Start from late November)

15% Final Written Report (Due 12/11/23 Monday at 5 pm)

About Oral Presentation: In the last several classes, each student will give a 20 min oral presentation based on the literature survey. The presentation topics can be one of the following, (1) material-focused, that is the employment of different methods to characterize one type of inorganic materials; (2) problem-focused, which is the application of one method to solve different kinds of inorganic problems; and (3) new method, which is not covered in the course, but the student thinks it is interesting and useful.

About Final Report: The topic of the final report is the same as the oral presentation. The final report should review and summarize more than 5 literature about the selected topic. The final report should be prepared in the style of an article written in the *Journal of the American Chemical Society*. The report should be properly referenced and organized. The following separate sections are required in the report: Abstract, Introduction, Summarize of Results and Discussions, Conclusions, and References. Students are encouraged to use the ACS style guide for preparing the final report.

Useful links

UF Attendance Policies: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies>

Disability Resource Center: <https://disability.ufl.edu/get-started>

UF Grading Policies: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies>

Evaluation and Feedback: <https://gatorevals.aa.ufl.edu/students/>