CHEM 4699 Syllabus

Undergraduate Research, variable number of credit hours by student

Fall 2026

Instructor Information

Instructor: Christoph J. Fahrni

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General Course Information

Description

Undergraduate research in bioinorganic chemistry with faculty guidance.

Course Learning Outcomes

- Communication
  - Uses and understands professional and discipline-specific language
  - Expresses ideas orally in an organized, clear, and concise manner
  - Writes clearly and concisely using correct grammar, spelling, syntax, and sentence structure
  - Demonstrates an ability to interpret, evaluate, and create visual representations of ideas

- Creativity
  - Shows ability to approach problems from different perspectives
  - Uses information in ways that demonstrate intellectual resourcefulness
  - Effectively connects multiple ideas/approaches

- Autonomy
  - Demonstrates an ability to work independently and identify when guidance is needed
  - Accepts constructive criticism and uses feedback effectively
  - Uses time well to ensure work gets accomplished

- Ability to Deal with Obstacles
  - Is not discouraged by setbacks or unforeseen events and perseveres when challenges are encountered

- Shows flexibility and a willingness to take risks and try again
- Troubleshoots problems and searches for ways to do things more effectively

- Intellectual Development
  - Recognizes that problems are often more complicated than they first appear
  - Approaches problems with an understanding that there can be more than one right explanation or even none at all
  - Displays insights into the limits of their knowledge and an appreciation for what isn't known

- Critical Thinking and Problem Solving
  - Uses a reflective and iterative approach to problem solving
  - Looks for the root causes of problems and develops or recognizes the most appropriate corrective actions
  - Recognizes flaws, assumptions, and missing elements in arguments

- Practice & Process of Inquiry
  - Demonstrates ability to formulate questions and hypotheses within the discipline
  - Demonstrates ability to properly identify and/or generate reliable data
  - Shows understanding of how knowledge is generated, validated, and communicated within the discipline

- Nature of Disciplinary Knowledge
  - Shows understanding of the criteria for determining what is valued as a contribution in the discipline
  - Shows awareness of important contributions in the discipline and who was responsible for those contributions
  - Reads and applies information obtained from professional journals and other sources

- Project Knowledge and Skills
  - Displays knowledge of key facts and concepts
  - Displays a grasp of relevant methods and is clear about how these methods apply to the research project
  - Demonstrates an appropriate mastery of skills needed to conduct the project

- Ethical Conduct
  - Shows understanding of the importance of principles of Responsible Conduct of Research (RCR)

Required Course Materials

There are no required materials for this course.

Grading Policy:

The final grade will be assigned as a letter grade according to the following scale:

A 90.0 – 100%
B 80.0 – 89.9%
C 70.0 – 79.9%
D 60.0 – 69.9%
F Less than 60.0%

The grade will be assigned based on the assessment of laboratory participation and engagement in the research along with your demonstration of the course learning outcomes, at a level appropriate for your research experience, during your project activities (80%), the project final report (10%), and the project presentation slide deck (10%).

Assignments:

- Towards the end of the project the student will prepare a presentation suitable for a research group meeting.
- In addition, the student will complete a final project report by the end of the course semester.

Description of Graded Components

Each student will prepare a final project report consisting of the project background/motivation, methods, results, a discussion of the results in the context of current knowledge, and conclusions. The report should include relevant references to the scientific literature.

Each student will prepare a slide deck, suitable for presentation at a research group meeting (10 to 15 minute presentation) which summarizes the project background, motivation, methods, results, and conclusions.

Course Policies

Attendance and/or Participation

Undergraduate research students will participate in research activities on a weekly basis commensurate with registered credit hours and as discussed with faculty research mentors.

Academic Integrity

Students are expected to maintain the highest standards of academic integrity. All work submitted must be original and properly cited. Plagiarism, cheating, or any form of academic dishonesty will result in immediate consequences as outlined in the university's academic honor code: https://policylibrary.gatech.edu/student-life/academic-honor-code

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Campus Resources for Students

The Undergraduate Research Opportunities Program (UROP) provides resources and support for undergraduate research students and their mentors. Visit https://undergradresearch.gatech.edu/ or contact UROP at urop@gatech.edu for more information.