Special topics: Environmental Analyses

Course Information

Instructor: Shane Snyder (shane.snyder@ce.gatech.edu)
Course Prefix and Number: CEE 8813 G
Term: Fall 2026

Course Description

This graduate level course will introduce students to the sampling, analyses, and data reporting required for identification and quantification of contaminants in environmental samples. The course will be divided into three sections and include a significant hands-on laboratory component. The first section of the course will focus on environmental sampling and the required quality assurance and quality control measures needed for accurate and precise measurements. The second section focuses on the instrumental detection of chemicals in environmental matrices. The final section of the course will cover bioassays, non-targeted analyses, and genomics for microbial identification. Environmental contaminants have been detected in air, water, soil, and/or biota. Moreover, there are thousands of potential contaminants for which no analytical methodologies have yet been developed. Through this course, students will become familiar with the diversity of analytical (instrumental) tools currently available and will gain knowledge as to the pros and cons of these approaches. The class also will discuss future opportunities, such as the development of on-line sensors and miniaturization of environmental methods. While the emphasis of the course will be on water analysis, the class will also briefly discuss implications for other environmental matrices such as biosolids, sediments, soils, and air. This class will provide fundamental information on key instrument platforms such as gas chromatography, liquid chromatography, mass spectrometric detection, inductively coupled plasma, fluorescence, and others. Effects directed analyses (EDA) will be discussed along with the latest generation of bioassay and genomic tools. Students will work independently and as groups to investigate a key issue related to environmental analysis, write a paper on this topic, and present and defend their findings before the class.

Course Learning Outcomes

1. Understand the principles of environmental analyses.
2. Understand the critical quality assurance and quality control measures.
3. Understand the analytical platforms available for analyses.
4. Develop the skillset to critically review and comment on manuscripts
5. Develop the skillset to write research proposals.

Required Course Materials

No textbooks or materials are required. Additional reading will include peer-reviewed manuscripts and pre-prints from a variety of disciplines. As well as reports and methods from US EPA and other regulatory agencies.

Grading Policy

Attendance and participation, 5% (50 pts).
Quizzes, 10% (100 pts/ 20 pts each).
Homework, 20% (200 pts/ 50 pts each).
Laboratory Report, 15% (150 pts, 50 pts each).
Mid-term Exam, 20% (200 pts).
Final Project, 30% (300 pts/ 200 pts - report, 100 pts - presentation).

Unless otherwise noted, assignments are due at 2pm (before the start of class period) on their due date. A 20% penalty for each day late will be applied for late assignments unless an excuse has been granted by the instructor before the assignment due date.

Grade	Percentage
A	90–100%
B	80–89%
C	70–79%
D	60–69%
F	0–59%

Attendance Policy

See catalog for institute policies for excused absences and make-up work: http://www.catalog.gatech.edu/rules/4/. No student will receive a passing grade for the course if they miss six or more classes without an excused absence.

Academic and Research Honesty/Integrity Statement

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review the Student Code of Conduct and the Academic Honor Code, especially Appendix A: Graduate Addendum to the Academic Honor Code.
Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Allegations of scientific or scholarly misconduct are handled in accordance with the procedures outlined by the Policy for Responding to Allegations of Scientific or Other Scholarly Misconduct.

Core IMPACTS

Not applicable

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services 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

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 articulates 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.