CEE4320 Hazardous Substance Remediation

Credits: 3-0-3

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Instructor Information

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General Course Information

Description

Welcome to CEE 4305 which will prepare you for Environmental Health & Safety (EH&S) management, with knowledge of chemical risks, environmental regulatory programs, and OSHA/DOT requirements. Methods of incorporating pollution prevention and sustainability initiatives into EHS activities will also be addressed. This course will provide critical information for anyone planning a career as an EHS manager or anyone planning to work in the environmental field for a consulting firm, industry (including plant and corporate level), regulatory agency, and/or local/state/federal government.

Course Learning Outcomes

At completion of this course, students will:

- Understand the role of the EHS manager
- Be able to identify chemical risks using Safety Data Sheets
- Be knowledgeable of key provisions of major environmental programs, including:
    - Spill Prevention, Control, and Countermeasure Plans (SPCC)
    - Stormwater Pollution Prevention Plans (SWPPP)
    - Multi-Sector General Permit (MSGP) and Municipal Separate Storm Sewer System (MS4) stormwater permits
    - Technically Based Local Limit Development (TBLL) input
    - Categorical and Local Limit Wastewater Permit Applications (40 CFR)
    - Slug Control Plans
    - Air Permits
    - RCRA Hazardous Waste requirements for Generators
    - Pollution Prevention (P2) and example State-Specific Reporting (e.g., Annual Progress Reports - APRs)

    - Emergency Planning & Community Right-to-Know-Act (EPCRA) Tier2 Reports
    - Toxics Release Inventory (TRI) Reports
    - Integrated Contingency Plans (ICP)
- Understand safety, shipping, and emergency spill response, including:
    - OSHA Voluntary Protection Program (VPP)
    - OSHA considerations in the factory environment
    - DOT shipping and labeling requirements
    - Emergency spill response
- Be knowledgeable of historical and current initiatives for:
    - pollution prevention
    - sustainability.

Where applicable, the course will include calculations related to these programs. All requirements necessary for calculations will be addressed in class, so that engineering students as well as students in other majors can learn the material.

Required Course Materials

Material will be assigned from on-line regulatory materials that one would use and refer to as a practicing engineer and are thus free. No coursebook is required.

Course materials including powerpoint slides and web links will be posted to canvas. However, as the slides will present main bullet points, students are encouraged to attend class for more detailed information.

Grading Policy:

Assignments

- 8% - Class Attendance, Participation, Preparation, Contribution
- 14% - 7 homework assignments (2% each)
- 4% - Project 1 – SPCC Submittal (Group)
- 4% - Project 2 – Tier 2 Excel Assignment (Individual)
- 4% - Project 3 – Case Study (Individual) - 2% powerpoint, 2% presentation
- 22% - Test 1 – covering classes 1-8
- 22% - Test 2 – covering classes 9-18
- 22% - Test 3 (Final, non-cumulative) – covering classes 19-29

Grading Scale

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

- A 90-100%
- B 80-89%
- C 70-79%

- D 60-69%
- F 0-59%

Description of Graded Components

Presence and active input during class time activities and discussions will be considered in evaluating the participation grade. A sign-in sheet will be placed on a desk near the classroom entrance.

Test #1 will cover material from classes 1-8, test #2 will cover classes 9-18, and test #3 (which is the final) will cover classes 19-29. The final will not be cumulative (except as to information such as conversions or similar general information). I will typically include either a bonus problem or allow "student select one problem to omit" on exams, but this may not occur on all exams. One single-sided, personally handwritten, 8.5x11 study sheet is allowed per exam; a printout of personally-written ipad notes is acceptable.

Homework will be assigned to cover specific topics. All homework (7 assignments) will be assigned in a manner to provide at least 7 calendar days between assignment and due date.

Three additional homework submittals (approximately one per month) will be assigned, including one SPCC group project, one tier 2 homework assignment, and one case study:

- The SPCC group project will be assigned to teams of 2 to 3 students (class-size dependent) and consist of submitting the main tables required for an SPCC plan, including identifying oil containers and sizing containment.
- The Tier2 homework assignment will be used to learn some higher functions within Excel (such as use of pivot tables), that you will find useful in your careers. All skills needed will be covered in class. You will apply the information by pivoting data for a Tier2 report (pivot containers, identify Tier reportables).
- The case study project is an individual assignment where students will be randomly assigned (out of a hat) one of the topics addressed during this course. You may trade your topic with another student, as long as both of you agree. Each student is responsible for conducting a literature review to identify a case study on that topic, involving a lesson learned, regulatory interpretation, or similar deeper knowledge. Required presentation lengths will be determined after class enrollment is finalized, to ensure the entire class can present during the allocated time (expect approximate 5 to 6-minute presentation and 2-minute Q&A). The grade will be based on the slides and presentation. The intention is for students to gain experience in researching how regulations end up impacted by events and interpretations, to provide deeper knowledge, and to practice presentation skills.

Course Policies

Attendance and/or Participation

Students are expected to attend class and participation is part of the grade. However, if you are sick, please contact me so that alternative arrangements can be made as to your access to the course materials from that day.

Academic Integrity

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 Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism 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.

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.

Pre- &/or Co-Requisites

Pre-Req: Math and chemistry, including CHEM 1310 or CHEM 1211K are required.
Standing: Junior or Senior status (graduate students may also enroll).

Do not worry! I review the fundamentals needed for success in this class during lectures. If you need additional review, I am very willing to help any student outside of class as well.

Extra Credit Opportunities

Bonus: +1 for arranging/attending a 15-minute 1:1 office visit during semester.

Collaboration, Group Work, and Use of Generative AI

Homework shall be completed individually, unless the specific assignment is discussed in class as something that may be prepared with peers.

The group project will be graded on a group basis. However, students will be asked to provide a summary regarding the ways in which each member contributed, and grades may be adjusted accordingly based on individual contribution.

The use of spell checker, thesaurus, Grammarly, and similar programs is allowed. However, the use of AI such as ChatGPT to complete your homework and/or projects is not. For clarity: programs that correct your original content are allowed, but programs that generate new content independent of what you wrote are prohibited. For the project, you may use AI to identify a path of investigation, but you are responsible for finding and selecting appropriate case studies and reading the originals to prepare you presentation. As AI is constantly changing, the instructor reserves the right to change the approach to AI during the course of the semester; any changes in what is acceptable will be discussed with the class prior to any affected assignments.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Each assignment will include a due date/time when posted. Any assignment handed in late will be docked 5% (1 day), 10% (2 days), and 10% more each additional day (day = 24 hours from original due date/time), including weekends. If a submittal is multiple days late, the student risks a 0 on the assignment, as no credit will be given for submittals received after submittals from other students have been graded and uploaded.

No make-up exams will be given unless the absence is institute approved. If you are sick or have an approved institute activity, please let me know and accommodations will be made. During the course of the semester, if students feel a scheduled due date should be shifted, please raise for class discussion.

Inclement Weather and Digital Learning Days

On-line zoom classes may be utilized in the event that on-campus attendance is interrupted.

Student Use of Mobile Devices in the Classroom

Mobile devices shall be turned off during class, unless being used for notetaking, in which case no other apps are to be open.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Graduate Student Academic and Professional Success Resources:

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- *Professional Development such as the programming from the Career Center and other professional development resources and events"*

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu).