

The George Washington University  
School of Engineering and Applied Science  
Department of Engineering Management and Systems Engineering  
Certificate in Greenhouse Gas Management

*This syllabus is a demonstration syllabus only. The final syllabus will be distributed on the first day of class.*

COURSE TITLE & NUMBER: **Greenhouse Gas Mitigation**  
EMSE 6292

COURSE DESCRIPTION: Conducting mitigation analyses, identifying, and analyzing projects to reduce greenhouse gas emissions with a focus on energy efficiency and renewable energy. Monitoring and reporting emission reductions using accepted methodologies. Use of carbon markets as a tool for cost-effective mitigation.

COURSE GOAL: Students will use appropriate resources to identify and select mitigation projects, develop and present the business case for the project, monitor and assess reductions in emissions, and trade those reductions in emission markets.

COURSE INSTRUCTOR: Dr. Mark Trexler

COURSE LEARNING OBJECTIVES:

1. Use a GHG inventory and standard industry resources to identify mitigation opportunities from energy efficiency and renewable energy in a business setting.
2. Select mitigation projects appropriate for a given setting.
3. Evaluate the business case for mitigation projects including payback and return on investment.
4. Develop and implement monitoring to assess the impacts of projects.
5. Trade project-based emission reductions in a carbon market.

COURSE PROCESSES: Lectures, active discussions (in-class and on-line), small group, multi-media, and projects are employed to provide students with the opportunity to learn through different approaches and mechanisms. Grading methods will conform to typical university grading policy.

COURSE PREREQUISITES: Masters level status or consent of instructor.  
EMSE 6290 and EMSE 6291 or concurrent registration.

ASSUMED PRIOR KNOWLEDGE, SKILLS, AND ABILITIES: Knowledge of physics, chemistry, earth science, mathematics, and at least one social science, at college level. Ability to use word processing, spreadsheets, web and library search tools, and presentation tools. Skill at writing and expression in English at college level. Familiarity with, and consistent adherence to, the GWU Code of Student Conduct (<http://studentconduct.gwu.edu/code-student-conduct>).

COURSE RESOURCES: WRI/WBCSD GHG Protocol, 2005, **The GHG Protocol for Project Accounting**, Washington, DC, 144p, ISBN 1-56973-598-0

**ASSESSMENT OF COURSE OUTCOMES:** You will have at least one, and usually several, opportunities to develop and demonstrate expertise in each of the learning outcomes listed above. This information will be posted on the course BlackBoard web site. Assignments may relate to more than one learning outcome.

**GRADING EVALUATION METHODS:** Grades will be recorded in BlackBoard and available to you real-time. Final course grades will be based on the following items and letter grades will be assigned as follows: A ( $\geq 90\%$ ), B (80-89%), C (70-79%), D (60-69%), F ( $< 60\%$ ).

<b>COURSE</b>	Individual Project (20%)
<b>ASSIGNMENTS:</b>	Team Project (20%)
	Problem Sets (20%)
	Comprehensive Exam (20%)
	On-Line Discussion (20%)

## Greenhouse Gas Mitigation Tentative Course Schedule

Session	Topics and Assignments
1	What are GHG reduction projects? What key concepts must project level accounting address? How are projects used in a business setting to achieve mitigation goals?
2	What are GHG Project Standards and Protocols? How do they relate to GHG reduction projects? What are the existing contexts where GHG Projects are useful tools?
3	How do I find mitigation opportunities? What are the facility-wide data needs required for project selection and approval? What are the challenges and keys to success?
4	What features define a GHG reduction project? How do project boundaries help ensure a viable project? What happens if leakage occurs?
5	What is a project baseline? How do I create a project baseline? What if the project baseline changes?
6	How do I quantify reductions in emissions from a project? How do I determine the financial case for mitigation projects? What if regulations and policies change?
7	What technologies help reduce my business's energy intensity? How do I apply the International Performance Measurement and Verification Protocol? How do I monetize reductions and who owns them?
8	What technologies help reduce my business's carbon intensity? How do I evaluate the success of such projects? What if the rules change and undercut my project? <b>Individual projects due at beginning of class.</b>
9	<b>Presentation of individual projects. Assignment of term project.</b> Who needs to monitor the project during its lifetime? How do I convey the results of the project to bosses, regulators, and investors? What if the project runs into problems?
10	How do I demonstrate success throughout the life of my GHG reduction project? How do I document this success? How do others verify my results?
11	Can I make money from my carbon reductions? What is a carbon market? What forms do these markets take?
12	What are the basic principles used within carbon markets? What is an offset? How can I tell what an offset is worth right now?
13	How well do the existing carbon markets work? What new markets are developing? Can markets be linked?
14	Next Steps – trends, gaps, and innovations in GHG Mitigation Project team presentations Course Collaborative Review and Evaluations
15	<b>Comprehensive Exam</b>

# Administrative Information and Academic Integrity

## UNIVERSITY RESOURCES AND POLICIES

### Class Policies:

- Attendance is expected at every class session. Students should notify the instructor in advance if attendance is not possible on a particular date.
- Blackboard will be used to post all class materials, resources, homework, required and optional readings, detailed guidelines for the paper and the team presentations, the comprehensive final briefing, and grades. BlackBoard is mandatory for group assignments.
- Discuss arrangements for late submission of materials with the instructor in advance. Late work is subject to daily grade reductions except in special circumstances of demonstrated emergencies.

**Academic Integrity:** Each student is required to observe the University's code for academic integrity as presented at <http://www.gwu.edu/~ntegrity/code.html>.

**University Support Services:** Information regarding disability support services and counseling services can be found at <http://gwired.gwu.edu/dss/> and <http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices> respectively.

## EMERGENCY INFORMATION:

### What to do if the instructor does not arrive:

If the Instructor does not arrive for the class at the designated starting time and has not notified the class of a late starting time or the cancellation of the class, the students should wait in the classroom for at least 30 minutes before departing. One member of the class should be selected to notify the EMSE Department of the Instructor's absence by calling the EMSE Department at 202-994-7541 on the next business day.

### What to do in the case of an emergency:

- All students should familiarize themselves with the emergency evacuation routes from the course classroom. Pay particular attention to understanding how to leave if all power is out and there is no light.
- In the event of an emergency evacuation of the class building, the students are to assemble at:
  - Primary Location: front steps of GSA building E St entrance (next to Elliott School on White House side, middle of block),
  - Secondary Location: playground in Rawlins Park in front of Elliott School across E St.

and not depart until the Instructor has accounted for all of the students.

### General emergency preparedness information:

- GW Campus Advisories. Students should check the GW Campus Advisories Web Site at: <http://www.campusadvisories.gwu.edu/index.cfm> for current information related to campus conditions, closures, safety information and any other information concerning events that may disrupt normal operations.
- GW Alert. All students, faculty and staff registered in the GW banner system GW will receive emergency alerts, notifications and updates sent directly to their GW email address. If individuals elect to receive these alerts on a mobile device they may log on to GWeb Information Web Site at <https://banweb.gwu.edu> and update their contact information to include mobile devices.

### ***Academic integrity:***

Academic integrity is central to the learning and teaching process. Students are expected to conduct themselves in a manner that will contribute to the maintenance of academic integrity by making all reasonable efforts to prevent the occurrence of academic dishonesty. Academic dishonesty includes, but is not limited to, obtaining or giving aid on an examination, having unauthorized prior knowledge of an examination, doing work for another student, and plagiarism of all types.

The number one problem that students run into with regards to academic integrity is plagiarism. It is not okay to copy, use, or otherwise exploit other people's ideas, words, or creations without giving them credit in the proper form. Sometimes this means you must use quotation marks, while other times a simple source citation will do the trick. Changing a few words in a paraphrase is not enough to turn source material into "your own words" – in fact, that's a really bad idea to even try. Changing the phrasing order of sentences is not okay and using the thesaurus to find ways to change "happy" to "glad" is also a very bad idea.

It is expected that students know how to correctly quote and cite material, and also how to write well. This is a doctoral level course and students will be held to the high standards associated with this level of education. For those students who need assistance, the GWU Writing Center is available. See <http://www.gwu.edu/~gwriter/>.

**There is no such thing as "boilerplate" or "standard language" in academia.** Students are expected to write their reports themselves, using their own language and their own formulation. If it is necessary to use material from other sources, it is expected (and mandatory) that the standards of academic style and integrity will be followed. This includes glossaries and appendices. For additional information see The George Washington University Code of Academic Integrity <http://www.gwu.edu/~ntegrity/>