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 Management Assurance and Information Systems Design** EMSE 6293
COURSE DESCRIPTION:	Design of information systems for management of greenhouse gas emissions. Assurance of greenhouse gas emissions assertions.
COURSE GOAL:	Students will design, evaluate, set up, test, and operate greenhouse gas (GHG) information management systems (IMS), and GHG assurance processes that are appropriate for specific applications in a business setting, and conform to applicable standards.
COURSE INSTRUCTOR:	Dr. Tod Delaney
COURSE LEARNING OBJECTIVES:	1. Compare and contrast different GHG IMSs. 2. Design, evaluate, and set up a GHG IMS. 3. Operate, assess, and maintain a GHG IMS. 4. Compare and contrast different GHG assurance processes. 5. Design, evaluate, and set up a GHG assurance plan and assurance processes. 6. Apply and assess assurance procedures to GHG assertions.
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, EMSE 6291, EMSE 6292 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:	The Climate Registry, 2014, **General Verification Protocol for the Voluntary Reporting Program**, V2.1, June 2014, 118p.

Climate Action Reserve, 2010, **Verification Program Manual**, Los Angeles, CA, 20 December 2010, 58p, www.climateactionreserve.org

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 (≥90%), B (80-89%), C (70-79%), D (60-69%), F (<60%).

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

Information Systems and Assurance for Greenhouse Gas Management
Tentative Course Schedule

Session	Topics and Assignments
1	What is the course about and how does it fit into the certificate and your professional responsibilities? What are the key concepts about an Information Management System (IMS) I need to know to manage information about greenhouse gases? What are the major information management tools available to support GHG inventories?
2	How do I plan and define the scope of my GHG IMS (Requirements Phase)? What special IT concerns and methods are appropriate for the GHG user community? What should I consider when evaluating tradeoffs (including costs and benefits) in GHG reporting requirements?
3	How do I build and document consensus with my requirements decisions? How does a successful functional design model inform an implementation model of a GHG IMS? What are some major pitfalls and problems in creating such models?
4	How do I confirm that my implementation model will satisfy my requirements? How can I use tools or customize existing components or systems to simplify development of my GHG IMS? **Assignment of term paper.**
5	What supporting materials and steps help ensure the business will use the IMS correctly and effectively? How can I evaluate the usefulness of these materials for those who will use them? What steps can I take to ensure the quality of the IMS and its implementation?
6	What is a risk-based test of my IMS and GHG assertions? What are the key concepts and various approaches to assurance of GHG assertions? What are the lessons learned from GHG assertions done by others?
7	What are the major standards and methods of verification? How and why do verification standards differ? Who is a GHG verifier?
8	**Individual paper/projects due at beginning of class #8.** What do I need to do to become a GHG verifier? What obligations does a GHG verifier assume? **Assignment of team projects.**
9	**Presentation of individual papers.** How do I prepare to verify a GHG assertion?
10	What documentation must be available for the verification process? How do I ensure proper oversight of the verification process? How does an enterprise certify its *chain of custody*?
11	What variance or materiality issues will I encounter? How do I verify/validate baselines? How do I verify emission changes?
12	How do I sample to assess GHG assertions? How can I assess the uncertainty in reported GHG emissions? Why should I consider the variation in reported values over time?
13	What steps do I follow to prepare and submit my verification report? What happens if an organization disputes my findings? What records of verification must I maintain?
14	Project team presentations. Course Collaborative Review and Evaluations
15	**Comprehensive Exam**

Administrative Information and Academic Integrity

UNIVERSITY RESOURCES AND POLICIES

Class Policies:
- o Attendance is expected at every class session. Students should notify the instructor in advance if attendance is not possible on a particular date.
- o 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.
- o 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 <u>and</u> 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:
  - o Primary Location: front steps of GSA building E St entrance (next to Elliott School on White House side, middle of block),
  - o 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/