

NEW COURSE PROPOSAL

GRADUATE Level I (Masters & Phd courses) _____ Level II (Phd courses) _____

UNDERGRADUATE X

SCHOOL, DEPARTMENT, COLLEGE: _____ CEE

DATE: 09/16/17

1. Proposed Course Number: CEE 4460 (Verify with Registrar's Office)		2. Hours: LECTURE <u> 3 </u> LAB/RECITATION _____ SEMESTER CREDIT <u> 3 </u> <i>Is this course repeatable for credit? No _____</i>	
3. Descriptive Title: International Disaster Reconnaissance			
4. Recommended Abbreviation for Transcript – (24 characters including spaces): <u> I n t D i s a s t e r R e c o n </u>			
5. Catalog Description – (25 words or less): Reviews consequence of and response to foreign disasters in light of technical, cultural and political factors; disasters include earthquakes, floods, hurricanes/typhoons, and man-made infrastructure failures.			
6. Basis: L/G <u> X </u> P/F _____ Audit _____			
7. Prerequisites: (For graduate level courses, Graduate Standing or Permission of Instructor is assumed) Prerequisites with concurrency: Math 1552 Corequisites:			
8. Has the course been taught as a special topic? Yes If YES, When Summer 2016 Enrollment 5			
9. Is this course equivalent to another course (graduate or undergraduate) taught at Ga. Tech? If yes, list course number(s): N/A			
10. For undergraduate courses, are you requesting that this course satisfy: No Humanities _____ Social Science _____ Ethics _____			
11. Expected Mode of Presentation:		MODE	% of COURSE
• Lecture		Lecture	45
		Discussion	25
		Seminar	
		Demonstration	10
		Other (Specify)	20 (Post-trip data analysis)
• Lab/Recitation		Supervised	
		Unsupervised	
12. Planned Frequency of Offering:		TERM TO BE OFFERED	EXPECTED ENROLLMENT
Annually		Fall	
		Spring 2018	18
		Summer	
13. Probable Instructor(s) – Please mark with an asterisk any non-tenure track individuals. David Frost			
14. Purpose of Course: Relation to other courses, programs and curricula: This course can be taken as part of the Global Engineering Leadership Minor (GELM) or as a stand-alone course for those interested in natural disasters. The course seeks to develop a rich understanding of the engineering and societal consequences of major natural and man-made disasters in foreign countries and the associated studies undertaken to both understand the factors contributing to these consequences as well as efforts aimed at mitigating them for future similar events.			
15. Required		Elective <u> X </u>	
16. Submit a course syllabus		See attached.	
17. Can the class count toward degree requirements at Georgia Tech? Yes			
18. Is this class restricted to Free Elective only? No			

CEE 4460

International Disaster Reconnaissance

Course Objectives:

The course seeks to develop a rich understanding of the engineering and societal consequences of major natural and man-made disasters in foreign countries and the associated studies undertaken to both understand the factors contributing to these consequences as well as efforts aimed at mitigating them for future similar events. Central to the objectives of the course is the development of an appreciation that both the consequences of, and response to, a disaster in a foreign country are likely to be influenced by the construction methods and materials used, the local building codes and their enforcement as well as political and cultural factors. Simply transposing US practices and approaches to a foreign location is likely to be fraught with problems. Each time the course is offered, a relatively recent disaster location somewhere in the world outside the US will be selected as the focus of the course. Candidate disasters will include earthquakes, floods, hurricanes/typhoons, and man-made infrastructure failures. Disaster and location selection will be based on both the quality of the opportunity to learn as well as safety considerations amongst others.

The course will combine lecture modules as well as group study activities during the semester at Georgia Tech with an international travel experience that will include opportunities to visit sites impacted by a disaster as well as visits to relevant research or response facilities that responds to such disasters in the region. For example, if the selected disaster was a major earthquake in China such as the Mw8 event that occurred in Wenchuan on May 12, 2008, the international travel experience might include: (i) visits to sites directly impacted by the event including the Old Beichuan Town which has now been preserved as a full-scale earthquake museum in the condition it was in immediately after the earthquake, the New Beichuan Town which was built at a location approximately 30 km from the Old Beichuan Town following the devastating event and a number of other sites in the region that were severely impacted during the event including bridges, buildings, landslides, quake lakes, and fault rupture zones; and (ii) a tour of one of the world's largest "Shake Tables" facilities in Chengdu where near full size infrastructure models are subjected to seismic motions. Similar international travel experiences would be designed for the selected disaster during each offering of the course. Other candidate countries include Japan and Chile. Each has its own unique set of locations impacted by former events to be visited and learned from.

The initial lecture modules for the course would focus on topics such as evaluating hazard, reconnaissance techniques, infrastructure assessment, societal impacts and event simulation. The manner in which authorities responded to the event from a rescue/recovery perspective would also be discussed. A large portion of the course will incorporate a problem-based learning approach. Students will become familiar with key considerations in the impacted zone as well as the planning and execution of a field reconnaissance project. The course will culminate in a final report and poster/oral presentation.

In addition to the technical focus of the course, a parallel set of activities will be undertaken to help the students develop an appreciation for the culture of the country they are visiting. This will be accomplished through homework assignments that focus on unique cultural features and

events in the country, prior to the international trip. For example, in the case of China, students will study the history and role of places such as the Great Wall, the Forbidden City, Tiananmen Square, the Dujiangyan Irrigation System, and the Chengdu Panda Sanctuary. During the trip, the students will have the opportunity to visit these unique locations. Developing an appreciation for these cultural elements is key to understanding the country being visited.

Course Requirements:

The class will be limited to a maximum of 18 students (likely, junior and senior students). The goal will be to have about 66 % of the students from CEE with the remaining students from other engineering and non-engineering disciplines in an effort to mimic the interdisciplinary nature of teams that typically respond to natural disasters. Permission will be required from the instructor to register for the course. Students will be required to participate in the international travel experience and must acquire all immunizations necessary for travel to the specified region. Resources through the Mundy Scholarship Fund to offset travel costs will be available to eligible students. Other OIE administered Fellowships are available for non-CEE students.

Lead Instructor:

David Frost (*Office:* Mason 2285)

Email: david.frost@ce.gatech.edu

Phone: 404-894-2280 (o)

Class Schedule:

The class is a 3 credit hour course and will meet two times per week for 1.25 hours each. The course includes a ten-day international travel experience during Spring Break.

Assessment:

Individual Homework Assignments	20%
Group Assignments	20%
Final Report	40%
Group Project Poster	10%
Final Project Oral Presentation	10%

Approach:

The students will be divided into groups of three or four students. Each group will have a combination of CEE and non-CEE students with each initially tasked with defining important consequences of the selected disaster in the specific region of interest. The groups will have initial areas that will be their focus. Each group will have a graduate student mentor that will serve as an advisor and help them remain focused on their specific topic area. For example, if earthquakes are the focus of the particular offering of the course, then individual group topics might include seismic hazard assessment, field earthquake reconnaissance methods, infrastructure performance, societal impacts and event simulation methods and within those topic areas, the group members will determine the key problems that can be studied as part of the field exercise. As an example, for the course offering focusing on a major earthquake in China, the specific tasks might be:

1. Define the problem of interest

2. Develop methodologies to evaluate the extent/consequences of the problem
3. Understand the societal context of the response to the event
4. Conduct preparatory field reconnaissance activities in Atlanta
5. Perform field reconnaissance in China and visit research facilities
6. Analyze data and discuss relevance of event consequences to US
7. Identify lessons learned from event including future mitigation suggestions
8. Prepare final report, poster and deliver presentation

Typical Class Schedule (event generic):

Week 1	Introduction/Context/Group Assignments
Week 2	Overview Lectures (hazard assessment)
Week 3	Overview Lectures (reconnaissance methods)
Week 4	Overview Lectures (expected infrastructure performance)
Week 5	Overview Lectures/Group Discussion (societal impacts)
Week 6	Overview Lectures/Group Discussion (event simulation)
Week 7	Overview Lectures/Group Discussion (field protocols and safety)
Week 8	Lectures (reconnaissance planning and information communication)
Week 9	Field reconnaissance trial activities in Atlanta
Week 10	Final preparation for trip and group planning meetings
Week 11	<i>International travel experience</i>
Week 12	Data analyses and group work
Week 13	Data analyses and presentation
Week 14	Discussion of preliminary results
Week 15	Final data analyses and preparation of final report
Week 16	Final report poster session and group presentation

Course Outcomes:

The expectation is that at a time when we are dealing with an increasing number of global natural hazards and disasters, exposing students to working under these challenging conditions represents an opportunity to develop critical leadership skills within the context of disaster response and recovery. The critical skills that produce exceptional leaders during times of crisis cannot simply be gleaned from reading or observing – they need to be experienced in person. This course is intended to create a “near reality” environment for students to develop such leadership skills. Further, a core emphasis in the course is on communicating technical information during times of crisis. During such events, the availability of well-presented information in a timely manner is critical to both response and recovery activities.

Learning Accommodations:

The Georgia Institute of Technology has policies regarding disability accommodation, which are administered through The Office of Disability Services. See <http://disabilityservices.gatech.edu/>. For students with disabilities, please contact this Office to request classroom accommodations.

Honor Code:

This course will be conducted under the guidelines of the Georgia Tech Academic Honor Code. A copy of the code can be found at <http://www.catalog.gatech.edu/rules/18b.php>