CEE 3052 - Introduction to Structural Engineering for GELM

Instructor

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Teaching Assistants

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Course Description

This course, designed exclusively for study abroad, introduces key concepts in structural engineering: the science, art and skill of designing various types of structures such that their behavior is as intended in a safe manner throughout their lifetime. Through case studies of structures and failures, demonstrations and lectures, students will understand how structures of all types (i.e., buildings, bridges, domes, dams, etc.) take and transfer loads. Students will also compute the effects of the loads on the structural members and determine the material and size of these members such that they are safe.

Course Objectives

During this course, students will learn by actively participating in lectures and demonstrations, by solving individual homework assignments, and by applying concepts to real-world structures. After students completes the course, they will be able to:

- Determine the behavior of structural systems as defined by gravity, lateral, dynamic and other loads
- Represent three-dimensional structural systems as two-dimensional analysis models
- Compute the demand loads on members
- Design basic structural members made of commonly used materials
- Explain the force transfer mechanisms of the structure

Prerequisites

This course is intended for all levels of undergraduate students who have taken COE 3001 Deformable Bodies, or equivalent.

Course Conduct

The Georgia Tech Honor Code is the standard of conduct for this course. The Honor Code is available at http://www.honor.gatech.edu/.

Access and Accommodations

At Georgia Tech we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome

to let me know so that we can discuss options. You are also encouraged to contact the Office of Disability Services (https://disabilityservices.gatech.edu) and the Office of International Education (https://oie.gatech.edu) to determine if accommodations are available in the international setting.

Website & Communication

All course content including lectures, homework assignments, and grades will be published on Canvas (https://canvas.gatech.edu). Communication in London and updates regarding field trips will be communicated via Slack. Students are required to have access to data on their mobile device at all times in London.

Homework Problem Sets

Assignment of problem sets related to the lecture material will be assigned as homework. Please be concise and neat in submitting solutions. All students must turn in their own assignment. Discussion of the homework problems with other class members is allowed; however, homework will be checked for excessive similarities and, if discovered, all parties will be given a zero for the assignment. Late homework will receive a 25% markdown per day late. No credit will be given once solutions are posted on Canvas.

Participation

This course includes extensive lecture periods and field trips. Participation is based on the following criteria: arriving to class/field trip location on time; paying attention during lectures; attentive watching and listening on field trips; respectful listening when the instructor or your peers are speaking; your ability to be fully engaged in your learning without texting, checking your phone or email, or participating in other digital distractions; your ability to stay awake, etc. If you are unable to meet the above criteria, the instructor will take away participation points throughout the semester. Keep in mind you start the semester with ALL your points, so don't lose them! If you are distracting others by your lack of participation or you do not attend a mandatory event, you will be notified by the instructor via email or in a short face-to-face conference before or after class.

Real-World Structural Analysis Assignments

The field trips in London will be complemented by six structural analysis assignments. These assignments will utilize the information from instructor's lectures, your detailed observations, and at-home critical thinking. It is recommended to take pictures of the site and record your observations.

Final Exam

A three-hour final exam will be given during a lecture period at the end of the course. The exam is closed notes, but a calculator is allowed. Cheating off of another student's exam is unethical and unacceptable. Cheating is a direct violation of the GT Academic Honor Code, and will be dealt with accordingly per Georgia Tech policy. Examples of cheating include,

but are not limited to, bringing unauthorized material to exam, collaborating or sharing notes, talking during exam and using cellphones. Prior to the exam, all personal belongings will be placed in the front of the classroom. Please do not bring anything into the exam room which you are not comfortable leaving at the front.

Leadership Component

This course is an approved elective in the Global Engineering Leadership Minor. As such, it incorporates a leadership development component. The leadership development component is integrated into the course instruction and deliverables. In this course, students will be instructed in engineering communication with a focus on graphical communication. Students will be instructed on the standard practices and standards of excellence of data display and given opportunities to demonstrate competence in this area as they complete their homework and analysis assignments.

Textbook

There is no official textbook for the course. Course notes, homework solutions and additional course material will be available on Canvas.

Grading

The grade will be determined from the following grading scheme:

- Problem Sets (30%)
- Real World Structural Analysis Assignments (35%)
  - London Eye
  - St. Paul's Cathedral
  - Forth Bridges
  - Chelsea, Millennium, and Vauxhall Bridges
  - Eiffel Tower
  - Notre Dame Cathedral
- Final Exam (30%)
- Participation (5%)

Tentative Schedule

Date	Topic	Assigned	Due
M 5/7	Course Introduction Types of Structures & Structural Elements Loads Connections Tributary Area	HW#1	
T 5/8	Load Paths Internal Forces Engineering Communications 1	HW#2	
W 5/9	Material Properties Stresses and Strains Axially Loaded Members		HW#1
Th 5/10	Trusses Bending and Flexural Stresses Engineering Communications 2	HW#3	
F 5/11	Shear and Shear Stresses Deflected Shapes		HW#2
M 5/14	Influence Lines - Trusses Influence Lines - Beams	HW#4	HW#3
T 5/15	Cables Arches Domes		
W 5/16	Bridges Introduction		
Th 5/17	Structural Analysis Software		
M 5/21	Cable-stayed Bridges *Field Activity - London Eye*	 London Eye Analysis	HW#4
W 5/23	Suspension Bridges *Field Activity - St. Paul's Cathedral*	 St. Paul's Analysis	
Th 5/24	*Field Activity - Forth Bridges*	Forth Bridge Analysis	London Eye Analysis
M 5/28	Structural Dynamics *Field Activity - Bridge Tour*	 London Bridge Analysis	St. Paul's Analysis
T 5/29	Earthquake Engineering		Forth Bridge Analysis
W 5/30	Construction		
Th 5/24	*Field Activity - Notre Dame* *Field Activity - Eiffel Tower*	Notre Dame Analysis Eiffel Tower Analysis	London Bridge Analysis
M 6/4	Structural Office Visit: ARUP		
T 6/7	Course Summary		Notre Dame Analysis Eiffel Tower Analysis
W 6/8	Final Exam		