

BSCI-7146-001

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BSCI 7146-001: Structural Systems of Building - Fall 2014

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Overview

The purpose of this course is to gain a conceptual understanding of the behavior of structural systems using significant works of engineering and architecture, as well as the temporary structural systems used to build them. Through lectures, readings, observation, and conceptual analysis we will explore the various forces (physical, social, and cultural) that shape significant structures. In addition, we will research some of the catastrophic failures that have occurred involving significant structures, and the role construction might have played in causing or preventing these failures. Finally, we will seek to find the influence that construction systems and processes have had in shaping great works of of the built environment.

Required Text (Video)

Understanding The World's Greatest Structures: Science and Innovation from Antiquity to Modernity, Professor Stephen Ressler, PhD. This is a DVD lecture series, which is part of The Great Courses by The Teaching Company, 2011. Video DVD series will be checked out to each student at the start of classes.

Learning Outcomes

- Ability to identify major structural systems that support a variety of buildings, towers, bridges, and enclosures.
- Ability to identify primary sources of loading on structures and trace the path of resulting internal forces through the components of the structural system.
- Ability to build simple physical and/or digital graphic models that assist in understanding and communicating structural behavior of a variety of structural systems.
- Ability to identify construction innovations and resources that made significant structural works possible.
- Ability to identify the principal causes of significant historical structural failures.
- Ability to identify the construction contributions to the causes and prevention of structural failures.
- Ability to communicate in written, verbal , and visual forms, the behavior of structural systems.
- Ability to research a significant structural system and communicate the historical, cultural, and technical forces that helped shape it.
- Ability to research and discover construction contributions that contribute to structural innovation.

Course Procedure

To start the semester, class will meet live in Gorrie Center for 4 hours per day for four days. Classes will consist of the following activities;

- Guest Lectures (from course DVD)
- Supplementary presentations by instructor
- Q&A discussion
- Videos

Online Course Component

Following our initial four meetings on campus, we will meet remotely via Web-Ex weekly on Wednesday 6:00-7:00 pm (CDT). Class will consist of review and discussion of key points of assignments, and coverage by instructor of supplementary materials.

Reading/Viewing

- Assigned viewing from course DVD - 1-2 Lectures per week.
- Optional readings: See bibliography on course website
- Online Videos

Assignments

Weekly assignments on the viewing materials will be posted on this CANVAS course website. Solutions should be attached in response to the assignments on the date they are due. Assignments will be graded online by instructor ASAP.

- Research - INTERNET/Library/other
- Videos
- Modeling – physical, computer
- Presentations

Research Reports

1. Research and report on a significant structural failure. Importantly, student should look for construction involvement that may have contributed to, delayed, or prevented the failure.
2. Research and report on a significant structure or structural system. Emphasis should be placed on construction innovation and construction resources that helped to make the structure or system possible.

More detail on the report requirements is provided on Pages link.

Participation

What you learn from the course will be proportional to what you invest, i.e. your preparation, attitude, and engagement. You are expected to attend all lectures and submit all assignment solutions on time. Please notify your instructor via CANVAS email if you have any issue that prevent you from attending a class session or submitting your assignment solution on time.

Communication

The official form of communication in this course will be through the course CANVAS website. Check the website, calendar and announcements frequently for schedule changes. Assignments and tests will be administered on the CANVAS course website.

Course Components and Grading

- Homework Assignments - 20%
- Structural Systems Test T1 – 20%
- Structural Systems Test T2 - 20%
- Structures Failure Report R1 - 20%
- Significant Structure Report R2 - 20%

Date	Day	Details	
Tue, Aug 12	Tue	Introductions: Understanding Structures (https://auburn.instructure.com/calendar?event_id=764851&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d) DVD-L1 (https://auburn.instructure.com/courses/878125/assignments/2981059)	12am due by 11:30am
Wed, Aug 13	Wed	Forces in Balance (https://auburn.instructure.com/calendar?event_id=764860&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d) DVD-L2 (https://auburn.instructure.com/courses/878125/assignments/2981058)	12am due by 11:30am
Thu, Aug 14	Thu	Stress & Strength (https://auburn.instructure.com/calendar?event_id=764859&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Fri, Aug 15	Fri	Properties of Materials (https://auburn.instructure.com/calendar?event_id=764858&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d) Video: The Inca (https://auburn.instructure.com/calendar?event_id=764845&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am 12am
Wed, Aug 20	Wed	Beams & Bending (https://auburn.instructure.com/calendar?event_id=764861&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d) Columns & Buckling (https://auburn.instructure.com/calendar?event_id=764855&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am 12am
Wed, Aug 27	Wed	Cables & Arches (https://auburn.instructure.com/calendar?event_id=764841&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d) Trusses (https://auburn.instructure.com/calendar?event_id=764857&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am 12am
Wed, Sep 3	Wed	Structural Systems (https://auburn.instructure.com/calendar?event_id=764856&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Sep 10	Wed	Arches & Vaults (https://auburn.instructure.com/calendar?event_id=764872&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d) Egypt & Greece (https://auburn.instructure.com/calendar?event_id=764871&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am 12am
Wed, Sep 17	Wed	Domes (https://auburn.instructure.com/calendar?event_id=764853&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am

Date	Day	Details	
		Gothic Cathedrals (https://auburn.instructure.com/calendar?event_id=764869&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
		Review (https://auburn.instructure.com/calendar?event_id=764852&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Sep 24	Wed	Test 1 (https://auburn.instructure.com/calendar?event_id=764850&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Oct 1	Wed	Iron & Science (https://auburn.instructure.com/calendar?event_id=764870&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Oct 8	Wed	Suspension Bridges (https://auburn.instructure.com/calendar?event_id=764868&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Oct 15	Wed	Cantilever Bridges (https://auburn.instructure.com/calendar?event_id=764867&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
		Failures (https://auburn.instructure.com/calendar?event_id=764839&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Oct 22	Wed	Iron & Steel Framed Buildings (https://auburn.instructure.com/calendar?event_id=764866&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
		Skyscrapers (https://auburn.instructure.com/calendar?event_id=764865&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Oct 29	Wed	R1 (https://auburn.instructure.com/courses/878125/assignments/3037836)	due by 6pm
Wed, Nov 5	Wed	Modern Concrete (https://auburn.instructure.com/calendar?event_id=764864&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
		Thin Shells (https://auburn.instructure.com/calendar?event_id=764846&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Nov 12	Wed	Iron & Steel Roof Systems (https://auburn.instructure.com/calendar?event_id=764863&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
		Tension Structures (https://auburn.instructure.com/calendar?event_id=764862&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Wed, Nov 19	Wed	Strategies for Understanding (https://auburn.instructure.com/calendar?event_id=764854&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
		Course Review (https://auburn.instructure.com/calendar?event_id=764840&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	1am to 1:51pm
Wed, Nov 26	Wed	No Class - Happy Thanksgiving! (https://auburn.instructure.com/calendar?event_id=772762&include_contexts=course_878125#7b2273686f77223a2267726f75705f636f757273655f383738313235227d)	12am
Tue, Dec 2	Tue	R2 (https://auburn.instructure.com/courses/878125/assignments/3037838)	due by 11:59pm
	Other	Roll Call Attendance (https://auburn.instructure.com/courses/878125/assignments/2981061)	