Description
Why do buildings and bridges look the way they do today? Students will be provided the tools to answer this question for themselves through a study of the history of the design of buildings and bridges throughout the world from both engineering and architectural/aesthetic perspectives. Only simple mathematics is required (no calculus). Students will participate in individual and group critique of structures from engineering, architectural, and social points of view.

Prerequisites
None

Instructor
Prof. Ben Schafer, schafer@jhu.edu, http://engineering.jhu.edu/civil/faculty/benjamin-schafer/
Office: Latrobe 208, 410-516-6265
Office hours: Tuesdays 4:15–5:00 pm, Thursdays 4:15–5:00 pm, and by appointment, email Shamija Jackson at sjacks86@jhu.edu for appointment.

Teaching Assistant
Jean Batista Abreu, jbatist1@jhu.edu
Office: Latrobe 17
Office hours: TBD [in location]

Meetings
Tuesday and Thursday, 3:00 – 4:15pm, Shaffer 3

Textbook

Online Resources
Course materials are provided at www.ce.jhu.edu/perspectives
Blackboard provides online grading only

Course Objectives
By the end of this course, students will be able to:

1. Identify from an image a structure's designer, location, basic form, and structural materials
2. Explain how form (beam, arch, cable, truss, etc.) relates to developed forces in a structure
3. Explain qualitatively how applied loads are transferred by a structural system to the ground
(4) Explain the social, symbolic, and scientific significance of landmark structures: Eiffel Tower, George Washington Bridge, Hancock Tower, and Salginatobel bridge at least
(5) Perform simple calculations to determine the forces in main structural members
(6) Research the qualifications of a structure as a work of structural art, and provide a clear critique in written, graphical, and oral forms

Course Topics

- The Washington Monument and the Eiffel Tower
- The Eiffel Tower and the St. Louis Gateway Arch
- Telford, Brunel and British Metal Forms
- Eads, Eiffel and the Forth Bridge
- John Roebling and the Brooklyn Bridge
- History and aesthetics in suspension bridges
- Covered Bridges and Structural Art
- Structural Analysis Tools and Modeling Structures
- Root and Chicago Origins of Skyscrapers
- New York and the Skyscraper
- Khan and the Chicago Skyscraper
- Robert Maillart and the origins of Reinforced Concrete
- Freyssinet, Finsterwalder and the Origins of Prestressed Concrete
- Field Study of the San Martin Bridge as Structural Art
- Cable-Stayed Bridges
- Examination on visual identification of famous structures
- Roof Vaults and National Styles
- The Swiss Tradition of Bridge Design
- New Forms, Bridges: Maillart & Menn, Buildings: Maillart & Isler
- Baltimore and Structural Art
- Examination of the narrative of Structural Art
- Arch. and Eng.: Schlaich, Calatrava, Gehry, and Virlogeux
- Green Buildings from Fathy to Yeang
- High, wide and far, structural engineering today
- Presentation and Final Project – Mastering your own critique

Course Expectations & Grading
The course requires weekly reading, active participation in class discussion, and weekly homeworks (approximately half the time in small groups). Homeworks are approximately ½ narrative and ½ quantitative. The course includes two mid-terms: one including identifications and multiple choice questions the second consisting of an in-class essay. In addition small groups complete a final project (in lieu of a final exam) consisting of a brief in-class presentation and a final paper. Grading is distributed as 1/3 homework, 1/3 exams, and 1/3 the final project.

Key Dates
All due dates are provided on the course web page: www.ce.jhu.edu/perspectives.

Assignments & Readings
All assignments and readings are provided on the course web page: www.ce.jhu.edu/perspectives.
Ethics
The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.

Working with other classmates on any assignment is encouraged. However, you must attribute their contribution. Homework without attribution to those you collaborate with may be deemed as simply copying and subject to a violation.

Plagiarism may easily be avoided by attributing in quotations the work that is being relied upon and providing attribution for any images you use. Words or images without attribution are assumed to be your own. If they are not, then it is plagiarism, and will be treated as such. A writing assignment that is nothing more than text in quotes with references may be lazy and ineffective, but it is not plagiarism. The same assignment, passed off as your own work, without attribution will be treated harshly. Academic integrity is all we have, it is easily lost and nearly impossible to regain.

Report any violations you witness to the instructor.

You can find more information about university misconduct policies on the web at these sites:

- For undergraduates: http://e-catalog.jhu.edu/undergrad-students/student-life-policies/
- For graduate students: http://e-catalog.jhu.edu/grad-students/graduate-specific-policies/

Students with Disabilities
Any student with a disability who may need accommodations in this class must obtain an accommodation letter from Student Disability Services, 385 Garland, (410) 516-4720, studentdisabilityservices@jhu.edu.

ABET Outcomes

- Ability to apply mathematics, science and engineering principles (a).
- Ability to design and conduct experiments, analyze and interpret data (b).
- Ability to design a system, component, or process to meet desired needs (c).
- Ability to function on multidisciplinary teams (d).
- Ability to identify, formulate and solve engineering problems (e).
- Understanding of professional and ethical responsibility (f).
- Ability to communicate effectively (g).
- The broad education necessary to understand the impact of engineering solutions in a global and societal context (h).
- Recognition of the need for and an ability to engage in life-long learning (i).
- Knowledge of contemporary issues (j).
- Ability to use the techniques, skills and modern engineering tools necessary for engineering practice (k).