CIV_ENV 295: Structural Art
Course Syllabus

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Course Description: Learn how to interpret and understand the built environment through an examination of the history of structural engineering as a creative art, with particular emphasis on technical, visual, and social analysis and critique of bridges, buildings, and designers.

Course Outcomes: Upon completion of the course, for the structures investigated in class, students will be able to:
1. identify from an image a structure's designer and location
2. explain how form relates to the forces and load path in the structure
3. explain the social, symbolic, and scientific significance of the structure and evaluate the qualifications of the structure as a work of structural art
4. explain qualitatively how the loads are transferred by the structural system to the ground
5. perform calculations to determine the forces in the primary structural elements
6. communicate findings clearly in both written, graphical, and oral presentation form

Prerequisites:
Minimum of one Northwestern course in MATH, or AP Calculus, or consent of instructor

Grading:
Homework: 25%
Midterm Exam: 25%
Final Project: 40%
Teamwork & Participation 10%

Readings
Required text: Billington DP (1983), *The Tower and the Bridge*, Princeton University Press, Princeton, NJ.
Other readings provided on Canvas

Homework: Assigned weekly, due in class on date in calendar. No late HW accepted, however the lowest HW grade will be dropped from the HW average.

Office Hours: Monday 1:30-3:30pm or by appointment

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Course Schedule

Week	Date	Topic / Activity	Reading	Due
1	28-Mar	Course Intro, Monuments and Structural Art		
	30-Mar	Eiffel Tower, Wash Monument and StL Arch	T&B Ch.1-3	HW #1
2	4-Apr	Telford, Brunel, and British Metal Forms	T&B Ch.4,8	
	6-Apr	Eads, Eiffel, and the Forth Bridge	T&B Ch.5	HW #2
3	11-Apr	John Roebling and the Brooklyn Bridge	T&B Ch.7	
	13-Apr	Root and Chicago origins of skyscrapers		HW #3
4	18-Apr	Maillart and origins of Reinforced Concrete	T&B Ch.9	
	20-Apr	New bridge forms; Writing workshop	T&B Ch.10	HW #4
5	25-Apr	Khan and Chicago skyscrapers	T&B Ch.13	
	27-Apr	Field trip to Chicago		HW #5
6	2-May	New York Skyscrapers	T&B Ch.11	
	4-May	The origins of Prestressed Concrete	T&B Ch.12	HW #6
7	9-May	MIDTERM EXAM		
	11-May	Thin shell structures: Nervi, Isler and Candela	TBD	HW #7
8	16-May	Green Buildings from Fathy to Yeang		
	18-May	High strength concrete and modern skyscrapers	TBD	HW #8
9	23-May	Chicago bascule bridges (Field trip alternate)	TBD	
	25-May	Earthquakes, structural failures, and ethics	TBD	HW #9
10	30-May	Project Presentations		
	1-Jun	Project Presentations		
	Final Exam period			Project Report