

**PHILADELPHIA UNIVERSITY**  
**School of Architecture and Design**  
**A841 Experimental Structures — Spring 2002**  
**Lab: Wednesday 2:05 - 4:50**  
**Lecture: Tuesday 4:00 - 5:00**

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<b>Credits:</b>	1-4-3
<b>Type of Course:</b>	Lecture and Laboratory. Advanced elective course for students in the Bachelor of Architecture Program
<b>Instructors:</b>	Deborah Oakley, R.A., P.E. , x 6840, email oakleyd@philau.edu Gary Bolton, AIA, x 2914, email boltong@philau.edu Office hours to be announced.
<b>Course Support Web Site:</b>	<a href="http://faculty.philau.edu/oakleyd/exp_structures">http://faculty.philau.edu/oakleyd/exp_structures</a>
<b>Prerequisite:</b>	A542 — Structures II, 5 <sup>th</sup> year status
<b>Description:</b>	<p>This course will begin with an investigation of elementary structural systems followed by an examination of the architectural potential of form-active structures (including thin shell, tensile membrane and fabric structures), and study of alternate and new materials and methods of construction.</p> <p>Unlike conventional structures that rely on their internal rigidity to carry loads, form-active structures rely on their geometric shape to perform this function. The geometric possibilities of form-active structures provide a base for experimenting with form to create innovative solutions for structural design problems.</p>
<b>Objectives:</b>	<ul style="list-style-type: none"><li>• To provide an understanding of form-active structures including form determination, materiality, lightness and strength.</li><li>• The development of the student's ability to design and understand structures through experimentation and discovery.</li><li>• The continued development of the student's ability to integrate design concepts with structural principles.</li><li>• Introduction of recent developments in materials and methods of construction.</li></ul>
<b>Procedures:</b>	A lecture/lab course consisting of hands-on in-class exercises and experiments followed up and further explored in a series of individual and group projects of increasing scale and complexity. Students will be required to research structural issues related to architecture and design variety of models and prototypes for review. Opportunity to experiment with larger structural models under load in non-destructive as well as destructive testing will be pursued as part of group exercises.
<b>Required Text:</b>	Moore, Fuller, <i>Understanding Structures</i> ; WPB McGraw-Hill, 1999
<b>Recommended Text:</b>	Robbin, Tony, <i>Engineering a New Architecture</i> , New Haven: Yale University Press, 1996

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**Requirements:** Attendance will be taken at every class. More than two (2) absences without proper documentation for medical and/or severe personal reasons will result in the reduction of one letter grade in the final course grade. Consistent tardiness will also adversely affect your grade. Midterm grades will be given to help you assess your progress.

**Semester Assignment:** Each student is to conduct an in-depth case study of an actual built project that exemplifies the principles of form-active structures studied in class. A written report including narrative, images and analysis graphics, as well as an oral presentation to the class, will be required. Details of the assignment will be provided separately.

**Group Project:** One or more group projects will be assigned. Topic to be determined.

**Grading:** The breakdown of your grade will be as follows:

35%: Individual project assignments  
20%: Semester assignment  
45%: Class participation and attendance

Your grades will be based upon the Philadelphia University grading structure:

**A = Excellent:** Awarded to students who demonstrate an excellent understanding of the subject matter, and who have achieved outstanding results in fulfilling the course objectives.

**B = Above Average:** Awarded to students who demonstrate above average understanding of the subject matter, and who show consistent achievement beyond the usual requirements of the course.

**C = Average:** Awarded to students who perform at a satisfactory level, and demonstrate acceptable levels of understanding of the subject matter commensurate for continued study in the successive course.

**D = Below Average:** Awarded to students as evidence of less than average understanding of the subject matters and weak performance. It indicates insufficient preparation for the student to enroll in any course reliant upon an acceptable level of understanding of the particular subject matter.

**F = Failure:** Awarded to students showing poor understanding of the basic elements of the course.

**Student Archives:** Philadelphia University reserves the right to keep your work indefinitely. Student work is retained for the purpose of assessment by NAAB (National Architecture Accreditation Board) during the accreditation process. Each instructor will select work at the end of the semester for submission to the archives.

**Plagiarism:** Plagiarism is prohibited by Article 4 of your Student Code of Conduct. This Article is strictly enforced. If you have any questions, ask your instructors.

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<b>Recommended Reading:</b>	Berger, Horst	<i>Light Structures, Structures of Light</i>
	Engel, H	<i>Structure Systems</i>
	Lin, T. Y.	<i>Structural Concepts and Systems for Architects and Engineers</i>
	Mainstone, Roland	<i>Developments in Structural Form</i>
	Pearce, Peter and Pierce, Susan	<i>Experiments in Form</i>
	Robbin, Tony	<i>Engineering a New Architecture</i>
	Sandaker, Bjorn Norman and Eggen, Arne Peter	<i>The Structural Basis of Architecture</i>
	Schueller, Wolfgang	<i>The Design of Building Structures</i>
	Siegel, Curt	<i>Structure and Form in Modern Architecture</i>
	Thompson, D'Arcy	<i>On Growth and Form</i>
	Wilson, Forrest	<i>Structure: The Essence of Architecture</i>
	Zalewski, Waclaw and Allen, Edward	<i>Shaping Structures: Statics</i>
	<b>Recommended Architects and Engineers:</b>	Ove Arup and Partners
Santiago Calatrava		Felix Candela
Normal Foster		Buckminster Fuller
Nicholas Grimshaw		Chuck Hoberman
Michael Hopkins		Fazular Kahn
August Kommandant		Rober Maillart
Pier Luigi Nervi		Frei Otto
Renzo Piano		Richard Rogers
Eduardo Torroja		