

ATCS6330 TECHNOLOGICAL SYSTEMS SEMINAR

Tectonics of Anisotropic Material Properties

Instructor: Kentaro Tsubaki, AIA., Associate Professor



Smocking V5: Composite image of the plaster cast and fabric formwork. Photo: Tsubaki©

Course Information:

Name: Technological Systems Seminar

Number: ATCS6330

Description: An elective course concerned with the advanced study of technical building issues. Concrete, wood, stone, brick - anisotropic materials studied as an experimental masonry structure systems.

Prerequisite: N/A

Credits: (3) semester credit hours

Meeting Place: RM206

Meeting Time: Th10:00-11:50AM

Instructor Information:

Name: Kentaro Tsubaki, AIA., Associate Professor

Office: RM303b

Office Hours:

M/W/F Noon-2:00PM (other times by appointment only)

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Course Website:

http://ktstudiokt.net/ATCS6330_FA16/ATCS6330_FA16/ATCS6330_FA16.html

Course Introduction:

"So Einstein was wrong when he said, "God does not play dice." Consideration of black holes suggests, not only that God does play dice, but that he sometimes confuses us by throwing them where they can't be seen."

Nature of Space and Time, Stephen Hawking and Roger Penrose, p. 26

anisotropic [an, īsə' trōpik, -' trāpik]

adjective Physics

(of an object or substance) having a physical property that has a different value when measured in different directions. A

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simple example is wood, which is stronger along the grain than across it.

Steel and glass; the two isotropic materials dominated the building construction of the post WWII era and defined the tectonics of modern architecture. This is a no coincidence as "isotropic-ness" lends itself to the quantifiable and predictable material behavior, minimizing the risk inherent in the design and construction of an architectural scale object.

However, none of the predominant construction materials prior to the modern era were isotropic. Wood, masonry, concrete all possess anisotropic (orthotropic) property.

Tectonic characteristics of the earlier buildings rose out of and developed through the necessity to compensate and in some cases, take advantage of these less predictable material behavior.

This seminar focuses on the tectonic characteristics of the building and their historical development through the lens of anisotropic material properties. Our research goal is to gain insight into how the visual intention and the material execution are reconciled through the design and construction process, informing the tectonics of the building as a whole. We will also speculate on how the recent technological development in digital fabrication and scripting can influence the tectonic potential of these materials.

General Methods:

ATCS6330 is a technological systems seminar which requires a substantial dedication and investment of individual student's time, critical thinking and research skills both during and after official class hours. Typically, 1/2 of the class time will be dedicated for a discussion of assigned reading materials and 1/2 for a design assignment critiques.

Contact time is 160 minutes per week. The expected time spent outside of the class is an average of 3 times the contact time, approximately 8 hours per week. Experience has shown that students who are good at managing time and working in a corroborative environment have a greater degree of success in the course and in the field of architecture in general. It is absolutely an essential component in the architectural practice due to the sheer scale and complexity of designing and constructing buildings that meet the demands of today's increasingly technological society.

Expected Learning Outcomes:

Student will be able to:

- *identify and understand the material properties of anisotropic materials.*
- *identify and understand the structural implication of anisotropic materials.*
- *identify basic loads affecting anisotropic materials.*
- *analyze and apply the visual and spatial implication of anisotropic materials.*

The result will be demonstrated through representational drawings and models.

Featured NAAB Student Performance Criteria (2009) for this course:

B. 5. Structural Systems: Ability to demonstrate the basic principles of structural systems and their ability to withstand gravitational, seismic, and lateral forces, as well as the selection and application of the appropriate structural system.

B. 8. Building Materials and Assemblies: Understanding of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.

Computer:

Students are required to provide and maintain their own laptop computers for use during the class. See the college website for minimum specifications. Technical difficulties, viruses, crashes, server and print bureau problems, or corrupted files will not be accepted as legitimate excuses. **ALL WORK SHOULD BE CONTINUOUSLY SAVED AND REGULARLY BACKED UP.**

Software:

3D modeling software: AutoCad, Rhino

2D graphics software: Adobe Creative Suite (Photoshop, Illustrator, Acrobat, etc.)

Digital Portfolio:

Digital files (images, drawings, photographs of physical constructs and presentations as well as computer models) will be submitted according to specified formats at designated times throughout the semester. Files will be uploaded to course folder; <ftp.arch.tulane.edu>

Textbook Requirements:

N/A

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Environmental Responsibility:

Aerosol paints, spray glues or fixatives, etc. must not be used inside the building. Violators will be held accountable for their behavior in accordance with the Code of Student Conduct.

Studio Communication:

One of the essential means of studio communication is through University e-mail system. Students are responsible for maintaining active Tulane email accounts and are expected to check their Tulane e-mail minimum of once daily.

Attendance Policy:

Students are responsible for attending class. All absences must be reported to the course instructor in advance; the only excused absences are those for reasons of health, significant outside activity or crisis. Unexcused absences could reduce the course grade, as will late arrival or early departure from class. Three consecutive absences or four nonconsecutive absences will, in normal circumstances lead to WF grade. For further details, refer to the academic policies on Tulane School of Architecture website at:

<http://architecture.tulane.edu/current-students/student-information>

Incomplete and Late Work:

In accordance with School policy, work that is not adequately represented will not be discussed in reviews. Additionally, unexcused absence from a review will result in a failure for that portion of the semester. Late work will only be accepted with the permission of the instructor. Work submitted after the final day of classes is not acceptable without written permission from the Dean. Any late work accepted will be penalized 10% for the first day of lateness, and 5% per day thereafter. (The first day of lateness begins immediately after the deadline, and include weekends). Extensions for medical or family emergencies must be requested immediately after the event and in advance of the deadline, and must be supported by adequate documentation.

Academic Integrity:

Tulane University values student self-governance and the development of a strong ethical foundation. The Honor Code is a central element of the University's identity. All academic work must be the result of the student's own efforts, except when collaboration has been explicitly allowed. Any student behavior that has the effect of interfering with education, pursuit of knowledge, or fair evaluation of a student's performance is considered a violation and will be prosecuted through the procedure outlined in the Honor Code. For further details, refer to the Honor Code on the Tulane University website at:

<http://tulane.edu/college/code.cfm>

Civility in the Classroom:

All individuals and/or groups of the Tulane University community are expected to speak and act with scrupulous respect for the human dignity of others, both within the classroom and outside it, in social and recreational as well as

academic activities. By accepting admission to Tulane University, a student accepts its regulations and acknowledges the right of the University to take disciplinary action, including suspension or expulsion, for conduct judged unsatisfactory or disruptive. For further information, refer to the code of student conduct on Tulane University website at: <http://student-conduct.tulane.edu/>

TULANE ONE WAVE:

One Wave is a program at Tulane that aims to encourage a culture of safety and a community of engaged and proactive bystanders that do not tolerate any form of violence: <http://tulane.edu/health/onewave/index.cfm>

Tulane University recognizes the inherent dignity of all individuals and promotes respect for all people. As One Wave, Tulane is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence, and stalking. If you (or someone you know) has experienced or experiences gender-based violence, know that you are not alone. Learn more at onewave.tulane.edu.

Tulane One Wave Campus Resources

Strictly Confidential	Mostly Confidential
Except in extreme circumstances, involving imminent danger to one's self or others, nothing will be shared without your explicit permission.	Conversations are kept as confidential as possible, but information is shared with key staff members so the University can offer resources and accommodations and take action if necessary for safety reasons.
Counseling & Psychological Services (CAPS) (504) 314-2277	Coordinator of Violence Prevention (504) 314-2161
Student Health Center (504) 865-5255	Tulane University Police (504) 865-5911
SAPHE Hotline (504) 654-9543	Office of Institutional Equity (504) 862-8083

ADA Statement:

It is the policy and practice of Tulane University to comply with the Americans with Disabilities Act (Pub. L. No. 101-336), Section 504 of the Rehabilitation Act of 1973 (Pub.

L. No. 93-112, § 504, as amended), and state and local requirements regarding individuals with disabilities. Students who seek accommodation are responsible for registering their disabilities with the Office of Disability Services (ODS) at the Center for Educational Resources and Counseling, requesting the specific accommodations they may need and providing adequate documentation that substantiates their disabilities and shows the need for the requested accommodations. For further details, refer to the Overview of Accommodations Procedures for Students with Disabilities on the Tulane University website at:

<http://www.tulane.edu/~erc/disability/AccOverview.htm>

Grading/Evaluation:

Evaluation of student performance in ACTS6330 will be an aggregate of following components weighed accordingly:

Class discussion participation: (20%)

Weekly Project: (40%=10%x 6)

Final Project Documentation: (20%)

All requirements and deadlines must be met in a timely manner. There will be no extension to due date. Late or incomplete work will result in a substantial reduction of the semester grade defined as follows:

A (excellent) exceptional performance; exceeding the requirements of the course, showing strong academic initiative and independent resourcefulness.

B (good) performance above the norm; accurate and complete; beyond the minimum requirements of the course; work demonstrates marked progress and initiative.

C (average) satisfactory work that adequately meets minimum requirements and demonstrates satisfactory comprehension, communication skills, and effort; demonstrates little initiative to investigate the problem without substantial prodding of the instructor; work shows little improvement.

D (inferior) unsatisfactorily meets minimum requirements; demonstrates minimum comprehension, communication skills, and effort at an inferior level; initiative lacking; improvement not noticeable.

F (failing) does not meet minimum requirements; fails to adequately demonstrate comprehension, communication skills, and effort.

ATCS6330 FA16 Course Calendar (subject to change/adjustment)

Meeting	Date	Agenda	TSA Events
Week 1			
1	09.01	Course Introduction / Reading Assignment 1 Discussion + Project 1 Intro	
Week 2			
2	09.08	P1. pin-up critique 1	
Week 3			
3	09.15	P1. pin-up critique 2	
Week 4			
4	09.22	P1. pin-up critique 3	
Week 5			
5	09.29	P1. pin-up critique 4	
Week 6			
6	10.06	Project 1. Review / Reading Assignment 2 Discussion + Project 2 Intro	
Week 7			
	10.13	No Class	Fall break
Week 8			
7	10.20	P2. pin-up critique 1	
Week 9			
9	10.27	P2. pin-up critique 2	
Week 10			
10	11.03	P2. pin-up critique 3	
Week 11			
11	11.10	P2. pin-up critique 4	
Week 12			
12	11.17	Project 2. Review + Exhibit	
Week 13			
	11.24	No Class	Thanksgiving
Week 14			
13	12.01	Design Review Week - open for adjustment	
Week 15			
14	12.08	Design Review Week - open for adjustment	
Week 16			
	12.15	Studio Walk Through / Project Documentation Due	