ATCS310: Technological Systems II
Performance of Steel Frame Construction

Course Information:
Name: Technological Systems II
Number: ATCS310
Description: Structural Systems. Concrete, wood, steel, and composite materials studied as framing systems. Compression and tension structures, dead and live loads, lateral and seismic loads; design and analysis of trusses, beams, columns, walls, and connections;shear wall and diaphragm systems; long and short span systems.
Prerequisite: DSGN101 OR DSGN110
Credits: (3) semester credit hours
Meeting Place: RMEM204
Meeting Time: TR 02:00-03:15 PM

Instructor Information:
Name: Kentaro Tsubaki, R.A., Assistant Professor
Office: RMEM120
Office Hours:
TR 3:30PM-5:00PM (other times by appointment only)
Office Phone: 504-314-2345
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Course Website:
http://web.me.com/ktsubakix/KT_Studio_KT/+Courses.html

Tutorial Information:
Meeting Place: RMEM305
Meeting Time: Thursday 6:00PM-8:00PM
Tutor Name: Gracey, Royece
E-mail: rgracey@tulane.edu
Tutor Name: Mings, Joshua
E-mail: jmings@tulane.edu

Course Introduction:
"Technology is far more than a method. It is a world in itself. As a method it is superior in almost every respect. But only where it is left to itself, as in gigantic structures of engineering, there technology reveals its true nature. There it is evident that it is not only a useful means but that it is something that has a meaning and a powerful form -so powerful in fact, that it is not easy to name it. Where technology reaches its real fulfillment it transcends into architecture."
Mies van der Rohe, From IIT address, 1950

"It is radical and conservative at once. It is radical in accepting the scientific and technological driving and sustaining forces of our time. It has a scientific character, but it is not science. It uses technological means but it is not technology. It is conservative as it is not only concerned with a purpose but also with a meaning, as it is not only concerned with a function but also with an expression. It is conservative as it is based on the eternal laws of architecture: Order, Space, Proportion."
Mies van der Rohe, From essay on the IIT curriculum

Two contrasting remarks made by Mies van der Rohe suggest the complex relationship between technology and architecture. Recent technological obsessions fueled by the proliferation of sophisticated structural, environmental and visual computer simulations re-ignited the interest in the realm of building performance. However, without a critical understanding of the relationships, these awesome new technologies will limit its potential by merely reaffirming the old functionalist thinking, predicting the predictable. The intention of ATCS310 is to impart students with an innate understanding of the relationships between structural parameters of steel frame construction and its impact on architectural design decisions through the study of scientific principals and historical development. The primary objective is to provide a sound technical knowledge and vocabulary necessary for future architects and architectural designers to communicate effectively with engineers and contractors. It is also intended to give students an opportunity to begin incorporating technical requirements into to their building design.

General Methods:
ATCS310 is a technological systems course which requires a substantial dedication and investment of individual student's time, critical thinking and research skills both during and after official class hours. The lecture will cover the theoretical basis through visual presentations and hands on demonstrations. Frequent quizzes will accompany the lecture supplemented by homework and project assignments. Expect to spend a significant amount of time working on assignments outside of the class. Contact time is 2-1/2 hours 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 relationships amongst the basic components of the structural frame building system.*
- *identify basic structural loads affecting the frame.*
- *analyze and calculate the distribution of structural loads.*
- *determine the required size of the structural components through manual calculations as well as through digital structural simulations.*
- *understand the impact of the structural component design as part of the overall building design.*

These outcomes will be demonstrated through manual structural calculations, representational drawings and models, digital structural simulations etc. and will be assessed though quizzes, projects and exams.

Featured NAAB Student Performance Criteria (2009) for this course:
B. 9. Structural Systems: Understanding of the basic principles of structural behavior in withstanding gravity and lateral forces and the evolution, range, and appropriate application of contemporary structural systems.

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.)
Structural simulation software: Multi-frame (trail version free download)

Calculator:
Minimum of four function (+, −, ×, ÷) calculator is required during the class and the exams.

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 are uploaded to ftp.arch.tulane.edu (login: atcs310fa09 password: atcs310) server.

Textbook Requirements:
Francis D. K. Ching, *Building Construction Illustrated*, John Wiley & Sons. Inc.
Edward Allen, *Fundamentals of Building Construction, Materials and Methods*, John Wiley & Sons. Inc.
Onouye, Kane, *Statistics and Strength of Materials for Architecture and Building Construction*, Prentice-Hall.

Environmental Responsibility:
Aerosol paints, spray glues, super-glues, or fixatives, etc. must not be used. Violators will **FAIL** the course.

Attendance Policy:
Students are responsible for attending class. All absences must be reported to the course instructor; the only excused absences are those for reasons of health or crisis, and must be justified with written documentation. Unexcused absences could reduce a student's course grade, as will late arrivals or early departures from class. Three consecutive absences or four nonconsecutive absences will, in normal circumstances, mean that the instructor may give a WF grade to the student. For further details, refer to the academic policies on Tulane School of Architecture website at:
http://architecture.tulane.edu/students/academic-policies

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://www.tulane.edu/~jruscher/dept/Honor.Code.html

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://studentconduct.tulane.edu/

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 ACTS310 will be an aggregate of following components weighed accordingly:

Results of the daily quizzes in (5) point scale: (20%)
Result of the assignments (weekly projects) in (5) point scale: (30%)
Result of the exams converted in (5) point scale: (50%)

All requirements and deadlines must be met in a timely manner. There will be no extensions to due dates. 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.

ATCS310 FA09 Course Calendar (subject to change/adjustment)

Meeting	Date	Agenda	Projects	TSA Events
Week 1				
	8/24			Classes begin
1	8/25	Introduction		
2	8/27	Statics (Ch2. Onouye/Kane)	P1. statics	
Week 2				
3	9/1	Properties of Iron/Steel and the Development of Steel Frame Construction I (Ch11. Allen)		
4	9/3	Properties of Iron/Steel and the Development of Steel Frame Construction II (Ch11. Allen)	P2. structural representational bay-model	
Week 3				
	9/7			Labor Day Holiday
5	9/8	Properties of Iron/Steel and the Development of Steel Frame Construction III (Ch11. Allen)		
6	9/10	Open for schedule adjustments		
Week 4				
7	9/15	Building System Overview, Design Loads (Ch4. Onouye/Kane)		
8	9/17	Load Tracing and Tributary Area (Ch4. Onouye/Kane)	P3. tributary area and beam/column reactions	
Week 5				
9	9/22	Foundation I (Ch2. Allen) (Ch4. Onouye/Kane)		
10	9/24	Foundation II (Ch2. Allen) (Ch4. Onouye/Kane)	P4. critical footing	
	9/25			Last day to drop w/o record
Week 6				
	9/28			Yom Kippur / Holiday
11	9/29	Lateral Stability and Framing Connection I (Ch4. Onouye/Kane)		
12	10/1	Lateral Stability and Framing Connection II (Ch4. Onouye/Kane)	P5. lateral bracing	
Week 7				
13	10/6	Strength of Materials and Elastic Theory I (Ch5. Onouye/Kane)		
14	10/8	Strength of Materials and Elastic Theory II (Ch5. Onouye/Kane)	P6. stress-strain diagram, thermal effect	
Week 8				
15	10/13	Exam I. (Week 1 thru 6: External Forces)		
	10/15	No Class		Fall Break
Week 9				
16	10/20	Connection Design (Ch11. Allen) (Ch10. Onouye/Kane)		
17	10/22	Open for schedule adjustments	P7. connection design	
Week 10				
	10/26			Last day to drop
18	10/27	Cross-Sectional Properties of Structural Members I (Ch6. Onouye/Kane)		
19	10/29	Cross-Sectional Properties of Structural Members II (Ch6. Onouye/Kane)	P8. moment of inertia	
Week 11				
20	11/3	Shear, Bending and Deflection of Simple Beam I (Ch7/8. Onouye/Kane)		
21	11/5	Shear, Bending and Deflection of Simple Beam II (Ch7/8. Onouye/Kane)	P9. simple beam design	

Week 12				
22	11/10	Behavior of Slender Columns I (Ch9. Onouye/Kane)		
23	11/12	Behavior of Slender Columns II (Ch9. Onouye/Kane)	P10. critical buckling stress	
Week 13				
24	11/17	Steel Framing Design through Analytical Modeling I		
25	11/19	Steel Framing Design through Analytical Modeling II	P11. Comprehensive Final Project (digital structural model analysis)	
Week 14				
26	11/24	Exam II. (Week 7 thru 12: Internal Forces)		
27	11/26	No Class		Thanksgiving Holiday
Week 15				
28	12/1	Fire Prevention/Protection I (Ch11. Allen)		
29	12/3	Fire Prevention/Protection II (Ch11. Allen)		
	12/4			Last day of class
Week 16				
30	12/10	Comprehensive Final Project Due		
Week 17				
	12/15			Last day of Exam week