

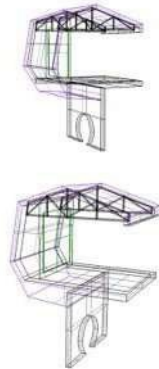
Course Description and Syllabus Spring 2022

Faculty

Janek Dombrowa Class Assistants: Shreya Satodia & Aditya Bahl

Office Hours

Janek Dombrowa, Wednesdays 9:00 – 10:00 am.



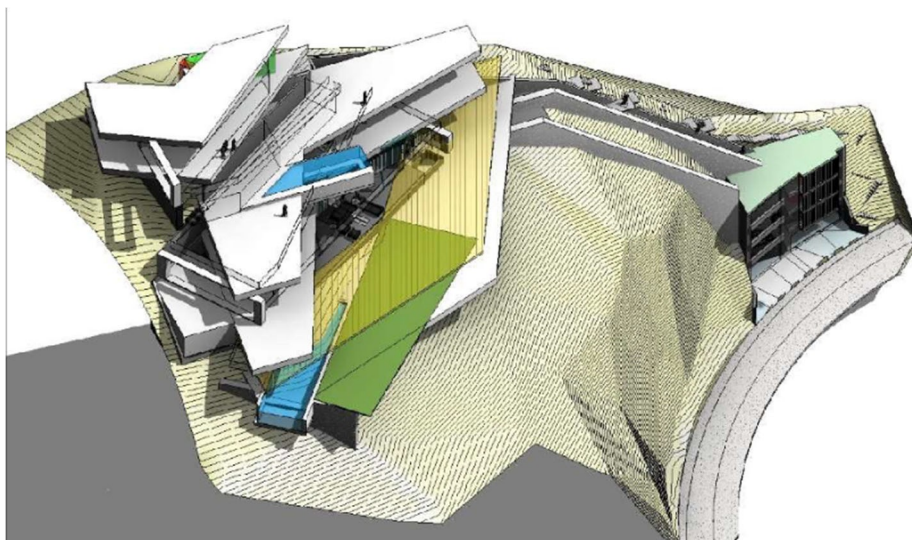
Course Overview:

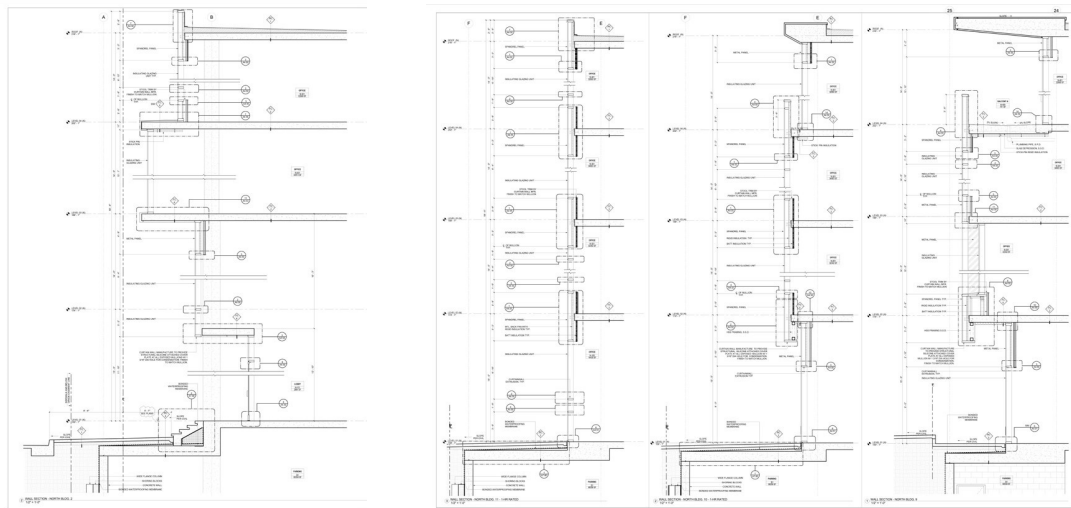
This course deals with the comprehensive manner in which architects communicate built form with technical drawings and documentation to create Construction Documents. This includes a review of the laws and regulations that affect the practice of architecture as they relate to the creation of Construction Documents including: permitting, review and regulatory agencies, planning and building codes. Construction Documents are presented through a thorough review of project documentation, detailing, specifications, drawing formats and project organization. The course includes a Lab/Studio portion to demonstrate comprehensive, fully coordinated, and dynamic Construction Documents via several platforms of Building Information Modeling (BIM).

Homework 1	1/27/22
Quiz 1	2/02/22
Homework 2	2/10/22
Midterm	3/9/22
Homework 3	3/23/22
Presentation 1	3/23/22 of Homework 3
Quiz 2	3/30/22
Homework 4	4/20/22
Presentation 2	4/27/22 of Homework 4

Grading Policy

4 Homework Assignments	48%
Midterm	12%
2 Quizzes, 2 Presentations, Participation – (lecture and lab notes)	22% PLEASE TAKE NOTES
Final – date (to be confirmed)	18%





Lecture - Wednesday
Lab - Wednesday

1:00 pm – 2:50 pm
3:00 pm – 4:50 pm

Organization:

The lecture portion of the course is organized in three parts.

Part I. PRINCIPALS OF DOCUMENTATION

- Legally Documenting Projects / Integrated Project Delivery & BIM
- Preconstruction Documents and Considerations
- Project Documentation – Drawings & Specifications
- Environmental Considerations

Part II. BUILDING COMPONENTS & ASSEMBLIES

- Foundation & Sub grade Assemblies
- Structural Assemblies
- Floor / Roof Assemblies
- Wall Assemblies
- Openings & Penetration Assemblies

Part III. ASSEMBLING THE CONSTRUCTION DOCUMENT SET

- Title Sheets / Site Plans / Foundation Plans
- Floor Plans
- Building Sections / Elevations / Wall Sections
- Details, Schedules & Specifications

Part I. PRINCIPALS OF DOCUMENTATION - BIM

A review of the changes in the industry given Integrated Project Delivery and the advent of Building Information Modeling (BIM) will be covered. The Lab portion of the class will apply BIM to the development of Construction Documents that each student will develop.

This portion of the course covers the breadth of architects' legal responsibilities with respect to public health, safety, and welfare; property rights; zoning and subdivision ordinances; building codes; accessibility and other factors affecting building design, and Construction Documentation. Students will be expected to develop an understanding of the codes, regulations, and standards applicable to a given site and building design, including occupancy classifications, allowable building heights, and areas, allowable construction types, separation requirements, occupancy requirements, means of egress, fire protection and structure.

The principals of documentation will be reviewed, including case studies presented by the instructors. Students will develop an understanding of the ways in which architects communicate built form through drawings and specifications. Environmental considerations will be reviewed as they relate to the challenges of Construction Documentation.

Part II. BUILDING COMPONENTS & ASSEMBLIES – DD and BIM

This portion of the course will explore the principals behind various building components and assemblies including examples and case studies presented by the instructors. The breadth of building systems will be reviewed as they relate to manners of Construction Documentation including; systems integration, HVAC, Electrical, Structural, Communication Systems, services, and HVAC. In-depth examinations will include assemblies of building elements including, foundations & sub grade assemblies, structural systems, floor, roof and walls components, and openings and penetrations.

Part III. ASSEMBLING THE CONSTRUCTION DOCUMENT SET

Students will prepare technically precise documentation for the purposes of potential construction in the legal context of a professional service agreement. Students will be asked to document a small project and assess, select, configure, and detail as an integral part of the design, appropriate combinations of building materials, components, and assemblies. These drawings will parallel the Lab portion of the course and involve instruction in Building Information Modeling.

This portion of the course will comprise of several presentations and include the review of the base portions of a Construction Document set the students will draw including Site Plans, Foundation Plans, Floor Plans, Sections, Elevations, Wall Sections, Details and Schedules. Drawings will be due per class schedule.

Homework Assignments

Assignments vary in duration, please consult the dates on the syllabus for the specific due date for each assignment.

LATE ASSIGNMENTS WILL NOT BE ACCEPTED; TURN IN WHAT YOU HAVE ON THE DUE DATE. It is crucial that you turn in whatever you have done on the due date; the assignments build upon each other. When participating in team projects, each team member must turn in a file of their work on Blackboard and the team a CD with names of all participants. Students are strongly encouraged to come by with work in progress for suggestions before the assignment is due and come by after grading to learn how they can improve in the future.

PLEASE NOTE THAT YOU ARE EXPECTED TO COMPLETE ALL HOMEWORK ASSIGNMENTS. COPYING OTHER PEOPLE'S FILES OR TURNING IN WORK THAT YOU DID NOT COMPLETE YOURSELF WILL RESULT IN A FAILING GRADE. IF PART OF A TEAM, YOU WILL ACCOMPLISH A PROPORTIONATE AMOUNT OF THE WORK ASSIGNED.

Other Required Items

You will need methods for backing up your assignments and for turning them in as required. We recommend cloud storage, portable hard drives and Flash drives. Maintain multiple backups of assignments, save frequently, keep previous versions in chronological order. Label all media with your name and e-mail address. Bring the Flash drive to class each day (with current files). Students will be expected to download reference materials, purchase Flash drives and output materials, including 11"x17", 24"x36" plots, color printouts, and materials for fabrication.

You will need to use your **USC account** for posting some assignments to Blackboard and reading your email (please check your email every day). Go on-line and verify that your USC account is working. Call 0-5555 if you have problems accessing your account. Also verify that your Blackboard account is set to forward to you any posted class announcements.

Software for the Class

Please download the following software. Contact class faculty if you have problems

Autodesk Revit Architecture current version, <http://students.autodesk.com> .

Course Texts:

PLEASE BUY:

Building Information Modeling, Karen M. Kensek, Routledge, New York, NY, 2014.

Reference Texts and Materials:

Green BIM: Successful Sustainable Design with Building Information Modeling, Krygiel, Eddy and Nies, Bradley, copyright 2010. Available in the AFA Library. .

Chapter 6: *Sustainable BIM: Building Systems, Using BIM for Energy Analysis*, pp. 178 – 192

Integrated Project Delivery: A Working Definition, AIA California Council, McGraw Hill Construction, 2007.

The Professional Practice of Architectural Working Drawings

Wakita, Osamu A. John Wiley & Sons Inc., 4th edition 800-225-5945 Hoboken, N.J.

Architecture Student's Handbook of Professional Practice

Hricak, Michael John Wiley & Sons Inc., Fifteenth edition 2017 800-225-5945 Hoboken, N.J.

Architectural Graphic Standards, Student Edition, abridged from the AIA 11th Edition

Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler (Editor) John Wiley & Sons Inc.,

Architectural Graphic Standards

AIA Ramsey, Sleeper, John Wiley & Sons Inc., 12th edition

Heating, Cooling, Lighting: Sustainable Design Methods For Architects

Norbert Lechner, John Wiley & Sons, Third Edition

Concrete Architecture, Catherine Croft, Gibbs Smith, Layton, Utah 2007

Liquid Stone New Architecture in Concrete, Cohen, Jean Louis & Moeller, Martin G., Princeton Architectural Press, New York, 2006

Detail, Technology and Form, Christine Killory and Rene Davids ed. AS-Built, Princeton Architectural Press, New York, 2012

Glass Construction Manual, Schittich, Staib, Balkow, Schuler, Sobek, Birkhauser Publishers, Basel, Boston, Berlin, 2007 2nd ed.

Thermally Active Surfaces, Moe, Kiel, Princeton Architectural Press, New York, 2010

On-line Software References for Revit

Autodesk Revit Architecture 2022 Tutorials

Brief video tutorials are designed to get you started using Autodesk Revit. The videos in the Revit Basic Concepts category are recorded using one Revit discipline. However, the concepts and procedures apply to all Revit disciplines. Additional videos are designed to introduce a topic or procedure that is specific to Revit Architecture.

Revit Architecture 2022 User Assistance

[YouTube - Revit 2022 Tutorials](#)

You Tube - Various Tasks

For additional tutorials and various tasks you will be asked to use YouTube videos as an additional resource.

BUILDING INFORMATION MODELING: PRINCIPALS OF DOCUMENTATION

Week 1

Wednesday, January 12

Lecture Topic: Class Introduction, overview of class structure, testing, course assignments, grading

If you are experiencing computer equipment or Internet connection difficulties, please contact the faculty or Class Assistants following the first class We will assist you.

Wednesday, January 12

Lab Topic: Revit Architecture 2022: Introduction to modeling and viewing.
References: revit_architecture-2022-user-guide. **Homework 1 announced**

Week 2

Wednesday, January 19

Lecture Topic: BIM Overview

1. The Evolving AEC Business Model
2. Inefficiencies of Traditional Approaches
3. BIM: New Tools and New Processes
4. What are the Benefits of BIM? What Problems Does it Address?
5. What Challenges can be Expected?
6. Designing and Building with BIM
 - Integrated Project Delivery
 - 1. Definition
 - 2. Essential Principles and Business Models
 - 3. Building and Integrated Team
 - 4. Differences in Integrated and Traditional Project Delivery
 - Principals of Documentation
 - 1. Project Documents and Document Sub-sets
 - 2. 10 Rules in Construction Documentation
 - 3. Organization of Documents
 - 4. Professional Liability
 - 5. Reducing Liability
 - 6. Required language in contracts
 - 7. Architect's and Consultant's license stamps
 - 8. Shop drawing process and purpose
 - 9. Other legal issues – project budgets, building budgets, presence on site during construction

Wednesday, January 19

Lab Topic: Hands-on session in Revit. Please join us by downloading the shared class model.

Week 3

Wednesday, January 26

Lecture Topic: BIM - **case study – small building**, client role, SD,DD,CD model /coordination/ technical documentation

Initial Preparation Phase for Construction Documents

1. Working guidelines for preparing Construction Documents
2. Transition from preliminary Documents to Construction Documents
3. Building code requirements
4. Primary material analysis
5. Selecting the primary structural system
6. Consultant Requirements
7. Regional considerations
8. Energy conservation
9. Interrelationships of information (for ex. Soils/Structural)
10. Project program

11. Office procedure and planning strategy
12. Tracking a set of documents - BIM
13. Project book – file organization
14. Drawing Sequence - BIM

Specifications / Project Manual

1. CSI format – definitions and organization
2. Performance Specifications – generic
3. Performance Specifications – product specific

Project Document Coordination

1. Information coordination – consultant documents – architect's role
2. Cross-referencing of documents
3. Repetition of information
4. Text coordination – specifications
5. Who shows what and where – information management
6. Basic Drafting Requirements, Standards and Techniques
7. Sheet Layouts and Organization of Consultants' Work

Wednesday, January 26

Lab Topic: Documentation in Revit. **Homework 2 announced Homework 1 Due 1/27**

Week 4

Wednesday, February 2

Lecture Topic: BIM – **case study – medium building** -SD,DD,CD model /coordination/documents, and construction implications.

Environmental and Human Considerations

1. Sustainable architecture
2. Lateral forces
3. Energy
4. Sound
5. Fire /smoke
6. Temperature forces / comfort
7. Deterioration
8. Drainage / rainfall /capture/ filtration
9. Underground gas control
10. Water table
11. Frost line / snow
12. Termites / fungi
13. Human Considerations / Universal Design
14. CEQA

Other Environmental Considerations

1. Soils Engineering
2. Geology
3. Soils Engineer / Geologist
4. Contour Grading / Natural Form Grading / Cut & Fill issues

Topic 2: BIM - accessibility, life safety, model /coordination/documents.

Pre-Construction Documents and Considerations

Building Codes and Regulatory Agencies

1. National, State, Municipal
2. Coastal Commission as example of State Regulatory Activity
3. Occupational Safety and Health Agency (OSHA)
4. Americans with Disabilities Act (ADA)

Planning and Zoning Codes, Subdivision Laws

1. Rights of way, easements, set-backs
2. Height limits, view corridors
3. Conditions, Covenants and Restrictions (CC&Rs)
4. Building Codes, IBC, CBC, LABC
5. Local Adaptation of National and State Codes

Permit Procedures

1. Permitting Processes (entitlements/building permits)
2. Agencies Involved
3. Variances and Modifications of Building Ordinances
4. Conditional Use Permits

Types of Construction as they relate to safety, cost, code and the development of project Fire Ratings

1. location on the property
2. based on area/height
3. type of occupancy
4. openings and opening protection
5. types of construction Type I – Type V
6. minimum fire exiting intent and guidelines

Wednesday, February 2

Lab Topic: BIM as Database

BUILDING COMPONENTS & ASSEMBLIES – DD and BIM

Week 5

Wednesday, February 9

Lecture Topic: BIM - **case study – large building** SD,DD,CD
model /coordination/documents in the Construction Field.

Building Component Definition

1. Systems Integration
2. Elements Controlled Typically:
3. Building Services
4. Power Supply
5. Waste Disposal
6. Water / Gas
7. Communication
8. HVAC

Methods of Assembly

1. On Site
2. Off Site
3. Dimensional Tolerance
4. Materials
5. Fabrication Methods

Construction Methods and Materials

1. Wood Floor Systems
2. Wood wall systems
3. Wood roof systems
4. Concrete
5. Steel floor system
6. Steel stud wall framing system
7. Steel decking roof systems
8. Light steel roof framing systems
9. Masonry as a wall system
10. Composite systems and combinations of materials

Wednesday, February 9

Lab Topic: Design Development. **Homework 3 announced Homework 2 Due 2/10**

Week 6

Wednesday, February 16

Lecture Topic: Building Components and Assemblies, Structural Components

1. Building Geometry
2. Cost Implications
3. Structural Stability
4. Basic Foundation Systems
5. Retaining Walls, Piles, Shoring
6. Moisture Control

Structural Components and Integration

1. Steel components
2. Concrete components
3. Wood components

Wednesday, February 16

Lab Topic: Design Development and Ethical/Legal Considerations

Week 7

Wednesday, February
23

Lecture Topic: Building Components and Assemblies, Floor / Roof Components & Wall components

Floor and Roof Assemblies

1. Floor Systems
2. Roof Systems / Types of Roofs
3. Forces and related deformations
4. Ceilings
5. Flooring
6. Materials: Steel, Wood, Concrete

Building Envelope / Enclosure systems

1. Wall Systems
2. Bearing wall systems
3. Curtain
4. Infill / partitions

Elements

1. Insulation
2. Sealants
3. Waterproofing
4. Sheathing

Finishes / Coatings

1. Substrate Effect on Coatings
2. Cement/Concrete Finishes
3. Glass/Plastics Types
4. Wood
5. Metal
6. Rain Screens

Wednesday, February 23

Lab Topic: Development of Student Project Documents, and **Quiz 1**

Week 8

Wednesday, March 2

Lecture Topic: Building Components and Assemblies, Floor / Roof Components & Wall Components

Floor and Roof Assemblies

1. Floor Systems
2. Roof Systems / Types of Roofs
3. Forces and related deformations
4. Ceilings
5. Flooring
6. Materials: Steel, Wood, Concrete

Wednesday, March 2

Lab Topic: Design Development, Dimensional Controls

Week 9

Wednesday, March 9

Midterm

Wednesday, March 9

Lab Topic: Design Development, Dimensional Controls, Material Systems

Week 10

March 13
- March 20

SPRING BREAK (NO CLASS)

Week 11

Wednesday, March 23

Presentation of Homework 3

Wednesday, March 23

Homework 4 announced Homework 3 Due 3/23

Week 12

Wednesday, March 30

Lecture Topic: Building components for openings and penetrations Building Envelope / Enclosure systems

1. Wall Systems
2. Bearing wall systems
3. Curtain
4. Infill / partitions

Elements

1. Insulation
2. Sealants
3. Waterproofing
4. Sheathing

Finishes / Coatings

1. Substrate Effect on Coatings
2. Cement/Concrete Finishes
3. Glass/Plastics Types
4. Wood
5. Metal
6. Rain Screens

Openings

1. Window types, glazing types
2. Curtain walls
3. Door types
4. Skylights

Penetrations

1. Flashing, Trim Accessories and Principle Details
2. Expansion Joint Covers
3. Roof Penetrations

Wednesday, March 30

Lab Topic: Development of Student Project Documents, and **Quiz 2**

ASSEMBLING THE CONSTRUCTION DOCUMENT SET

Week 13

Wednesday, April 6

Lecture Topic: Assembling the Construction Documents Set: Title Sheet, Survey, Soils and Geology, Site Plan, Foundation Plan, Floor Plans

Site & Grading Plan

1. Plat vs Survey
2. Topographic mapping
3. Soils and geology mapping
4. Climatic mapping – zero footprint
5. Utility Plan
6. Grading Plan
7. Storm Drainage Plan – collection, filtration, recharge
8. The Landscape and Irrigation Plan
9. Site improvement plan: off-site improvements

Foundation Plan

1. Types of Foundations
2. Summary of typical conventions
3. Examples

Floor Plan

1. Types of Floor Plans
2. Symbols
3. Examples

Drawing conventions:

1. Information notation
2. Horizontal and vertical controls
3. Drawing standards
4. Dimensioning standards
5. Scales and references to other drawings

Wednesday,
April 6

Lab Topic: Development of Student Project Documents

Week 14
Wednesday,
April 13

Lecture Topic:
Assembling the Construction Documents, Building Sections /
Elevations / Wall Sections

Building Sections & Elevations

1. Types of Sections
2. Building Sections
3. Wall sections
4. Full & Partial Sections
5. Examples

Exterior Elevations

1. Exterior elevations – exterior volume and material description
2. Exterior openings
3. Material designations
4. Notes
5. Dotted lines
6. Controlling factors

Drawing conventions:

1. Information notation
2. Drawing standards
3. Notation
4. Dimensioning standards
5. Scales and references to other drawings and details
6. Describing building assembly through wall sections
7. Vertical controls

Wednesday,
April 13

Lab Topic: Development of Student Project Documents

Week 15

Wednesday,
April 20

Lecture Topic: Review of Homework 4, **Homework 4 Due 4/20**

Lab Topic: Review of Homework 4 modeling & documentation of model

Week 16

Wednesday,
April 27

Homework 4 Final Submission & Presentation of Homework 4

Final Exam

Time to be confirmed.

ACCREDITATION STATEMENT

“The USC School of Architecture’s five year BARCH degree and the two year M.ARCH degree are accredited professional architectural degree programs. All students can access and review the NAAB Conditions of Accreditation (including the Student Performance Criteria) on the NAAB Website.

REHABILITATION ACT (LAB 504) AND THE AMERICANS WITH DISABILITIES ACT (ADA)

The University of Southern California is committed to full compliance with the Rehabilitation Act (Lab 504) and the Americans with Disabilities Act (ADA). As part of the implementation of this law, the University will continue to provide reasonable accommodation of academically qualified students with disabilities so those student can participate fully in the University's educational programs and activities. Although USC is not required by law to change the "fundamental nature of essential curricular components of its programs in order to accommodate the needs of disabled students," the University will provide reasonable academic accommodations. The specific responsibility of the University administration and all faculty serving in a teaching capacity is to ensure the University's compliance with this policy. The general definition of a student with a disability is any person who has "a physical or mental impairment which substantially limits one or more of such person's major life activities," and any person who has "a history of, or is regarded as having, such an impairment." Reasonable academic and physical accommodations include but are not limited to: extended time on examinations; substitution of similar or related work for a non-fundamental program requirement; time extensions on papers and projects; special testing procedures; advance notice regarding book list for visually impaired and some learning disabled students; use of academic aides in the classroom such as note takers and sign language interpreters; early advisement and assistance with registration; accessibility for students who use wheelchairs and those with mobility impairments; and need for special classroom furniture or special equipment in the classroom.

Obtaining Accommodations

Physical Accommodations

Students with physical disabilities should contact Disability Services and Programs (DSP) prior to or during the first week of class attendance or as early in the semester as possible. The office will work with classroom scheduling, the course instructors and their departments, and the students to arrange for reasonable accommodations.

Academic Accommodations

Students seeking academic accommodations due to a physical or learning disability should make the request to the course instructor prior to or during the first week of class attendance, as well as registering with DSP as early in the semester as possible. Course instructors should require that a student present verification of documentation when academic accommodations are being requested. For assistance in how to provide reasonable accommodations for a particular disability, course instructors are encouraged to consult with Disability Services and Programs (DSP). Students requesting academic accommodations who do not have DSP documentation should be referred to that office.

Summary

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. **Please be sure the letter is delivered to Janek Dombrowa by the end of the second week of class.** DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Tuesday through Friday.

Disability Services & Programs: (213) 740-0776

STATEMENT ON ACADEMIC INTEGRITY

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:

<http://www.usc.edu/dept/publications/SCAMPUS/gov/>

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at

<http://www.usc.edu/student-affairs/SJACS/>

Here is a website link for assistance in avoiding plagiarism:

http://www.usc.edu/student-affairs/student-conduct/ug_plag.htm

Specifically for graduate students, but also useful for undergraduate students:

http://www.usc.edu/student-affairs/student-conduct/grad_ai.htm

RELIGIOUS HOLIDAYS

The University of Southern California recognizes the diversity of our community and the potential for conflicts involving academic activities and personal religious observation. The University provides a guide to such observances for reference and suggests that any concerns about lack of attendance or inability to participate fully in the course activity be fully aired at the start of the term. As a general principle students should be excused from class for these events if properly documented and if provisions can be made to accommodate the absence and make up the lost work. Constraints on participation that conflict with adequate participation in the course and cannot be resolved to the satisfaction of the faculty and the student need to be identified **prior to the drop/add date for registration**. After the drop/add date the University and the School of Architecture shall be the sole arbiter of what constitutes appropriate attendance and participation in a given course.

Please contact Janek Dombrowa by the end of the second week of class if you anticipate conflicts with religious holidays including missing lectures, inability to finish homework assignments on-time, or other items that may hinder your work in this class.

IMPERATIVE STATEMENT

Our work should engage the environment in a way that dramatically reduces or eliminates the need for fossil fuels.