Department of Architectural Technology

ARCH 1291   **VISUAL STUDIES II**
                    1 classroom hour, 2 lab/studio hours, 2 credits

Course Description: Visual Studies II builds on the knowledge of architectural representation and visualization obtained in ARCH 1111 and ARCH 1191. This course is taken in tandem with ARCH 1211
(Architectural Design II: Foundations), and focuses particularly on: precise crafting of physical and analogue models and architectural presentations, analogue and digital rendering techniques, and representation of geospatial information. The course provides the tools for students in their design work by strengthening their skills visually, verbally, and graphically so they may demonstrate their fluency in and understanding of key design vocabulary, concepts, and visual techniques.

Course context: This course is a requirement and serves as the basis for all courses involving presentation and representation including the Design Studio sequence and the Building Technology sequence.

Prerequisites: ARCH 1110: Architectural Design I Foundations I with a grade of
C or greater

                         ARCH 1191: Visual Studies I with a grade of C or greater

Co-requisites: ARCH 1210: Architectural Design II: Foundations

Required Texts:
Lupton, Ellen, *Graphic Design: The New Basics.* 2008, New York: Princeton Architectural Press.
Rhino Level I and II Training Manuals (Free downloadable from:
http://download.rhino3d.com/Rhino/4.0/Rhino4Training)

Recommended Texts:
Ching, Frank, *Architectural Graphics.* 2009, Hoboken, NJ: John Wiley & Sons.
Pottman, H. et al. *Architectural Geometry.* 2010, Philadelphia: Bentley Press.
Tufte, Edmund, *Envisioning Information.1990*, Cheshire, CT: Graphics Press.
Tufte, Edmund, *Beautiful Evidence.* 2006, Cheshire, CT: Graphics Press.
Samara, Timothy, *A Handbook of Basic Design Principles Applied in Contemporary Design.* 2008,
        Providence: Rockport Publishers.
Zell, Mo*, Architectural Drawing Course: Tools and Techniques for 2D and 3D Representation,* 2008, Boston:
        Barron's.
McCandles, David, *Visual Miscellaneum.* 2009, New York, NY: Collins Design Publishers.
websites: Visual Economics, Information is Beautiful, Mathematica, and Google Earth/Maps resources

Attendance Policy: No more than 10% absences are permitted during the semester. For the purposes of record, two lateness are considered as one absence. Exceeding this limit will expose the student to failing at the discretion of the instructor.

Course Structure: This course will be offered as a lecture/lab format with hands on tutorials that introduce concepts, techniques and methods needed for completion of the assignments. Students will produce a series of projects through hand tools and techniques and digital means that communicate ideas and incorporate data of increasing complexity in a variety of presentation

formats. These assignments will be presented as part of in class presentations or in conjunction with Design Foundation II presentations.

Grading:

In-class Exercises and Homework	75%
Electronic Submittal of all course work	10%
Class Participation	10%
Sketchbook	5%

Academic Integrity: Students and all others who work with information, ideas, texts, images, music, inventions and other intellectual property owe their audience and sources accuracy and honesty in using, crediting and citation of sources. As a community of intellectual and professional workers, the college recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension and expulsion.

Learning Objectives
Upon successful completion of this course, the student will:
1. **Distinguish** between types of drawing techniques and **apply** as appropriate in architectural contexts (Knowledge)
2. **Demonstrate** understanding of computer hardware and software methods and standards as used in architectural practice (Knowledge and Skill)
3. **Demonstrate** knowledge of graphic conventions and methods of digital file organization (Knowledge and Skill)
4. **Communicate** ideas and information through oral presentations. (Gen Ed)
5. **Recognize** and **use** design concepts and vocabulary (Gen Ed and Skill)
6. **Create** digital 3-D models (including BIM) of medium geometric complexity and produce orthographic, axonometric, and perspective views. (Skill)
7. **Create** digital two-dimensional orthographic drawings. (Skill)
8. **Manipulate** vector and raster files. (Skill)
9. **Create** analogue and digital renderings. (Skill)
10. **Perform** form generating parametric modeling. (Skill)

Assessment
To evaluate the students' achievement of the learning objectives, the professor will do the following:
1. **Review** students' selection of drawing techniques. (Lo: 1)
2. **Observe** students' progression from simple to complex thinking as shown in sketches and completed projects. (Los: 1, 4, 7)
3. **Observe** students' use and manipulation of computer hardware and software. (Los: 2, 3, 6, 8)
4. **Inspect** students' digital files for use/application of professional standards. (Lo: 3)
5. **Inspect** students' portfolios for quality of documentation and editing as well as organization. (Los: 3, 6)
6. **Review** student digital files for use/application of professional standards. (Lo: 3)
7. **Review** students' drawing and modeling work where students must exhibit their visual representation skills (2-D and 3-D). (Los: 3, 4, 5, 6, 7, 8, 9, 10, 11)
8. **Assess** the students' use of professional vocabulary during oral presentations. (Los: 4, 5)

Course Outline:

Visual studies is closely correlated with Architectural Design II: Foundations; therefore, the following outline sequences skills to support project development. All digital files should be submitted in native and PDF formats.

WEEK 1: MATERIALS
Introduce the topic of materials, both model making and construction. This will partially be review from ARCH 1110 as the students have worked with several media already. Assign an individual model making material to each student and have them build a 2" cube. In class discuss and rank the cubes for various properties: strength, flexibility, color, transparency, translucency, ease of working, ease of adhering/joining, and affect. Review 3D digital modeling basics through the production of a simple subtraction cube problem. Introduce form generation through additive and subtractive Booleans.
Concepts & Vocabulary: Scale, Size, Form, Shape, Texture
Hand Skills: Techniques of modeling in various materials; Forming, Molding, Shaping, and attaching
Digital Skills: Review/Reinforcement of 3D modeling interface and drawing/editing tools, Boolean operations
Assignment: Digital models of Supercube/Uncube project

WEEK 2: SURFACE CREATION
Working in tandem with ARCH 1210 curvilinear forms, recreate the complex curved surfaces in a digital 3D model. Introduce surfacing editing and analysis tools in pursuit of "water-tight" models. Reinforce best management practices for file names, folder structure, and layer management.
Concepts & Vocabulary: Scale, Size, Form, Shape, Geometric and Spatial Relationships
Digital Skills: Surface Modeling and Transformation, Normals, Edge Editing, Cage Editing, Trim, Slice, Join
Assignment: Surface/shell topologies

WEEK 3: COLOR BASICS
Introduce digital color calibration to compliment color discussions in ARCH 1210. In vector/raster based software (Illustrator/Photoshop) demonstrate CMYK, RGB, and grayscale color modes and explain the uses of each. Explore color libraries such as Pantone colors. Create a framework to test color combinations.
Concepts & Vocabulary: Color (Hue), Saturation, RGB Value Combinations
Digital Skills: 2D Vector Graphics Software interface, drawing and color related tools
Assignment: Munsell chart color transfer

WEEK 4: CURVES AND COMPLEXITY
Increase the complexity of 2D drawings with Bezier curves, circles, ellipses, and freeform drawing tools. Further explore editing tools such as blend, cut, scale, rotate, live trace and filters.
Concepts & Vocabulary: Color (Hue), Saturation
Digital Skills: Paths and path editing, clipping masks, form editing and generation, filters
Assignment: Integrating color transparencies with geospatial information mapping

WEEK 5: RESEARCH METHODS
Visit the library for a demonstration of how to search for books, periodicals, and images within City Tech, CUNY, and New York City, and web-based research tools. Analysis of types of geospatial data available for a given site in New York City (physical, socio-economic, and cultural). Utilize the research skills to gather geospatial data for a given site. Discuss this data in terms of its' usefulness in site analysis in architecture and urban design.
Concepts & Vocabulary: Introduce Geospatial Data, Analysis, and Mapping
Digital Skills: Large File Data Management, Review Excel data manipulation/editing skills
Assignment: Introductory GIS layer mapping

WEEK 6: MAPPING
Using the data gathered in the previous exercise, develop a graphic notation, or mapping system, to show this information spatially. Reinforce concepts learned in previous exercises such as color, scale, and hierarchy.
Concepts & Vocabulary: Reinforce concepts of Geospatial Data, Analysis, and Mapping
Digital Skills: Interfacing Illustrator capabilities with Google Maps/Earth, Color, Transparency, Illustrator Livetrace
Assignment: Outputting GIS to Illustrator for further refinement

WEEK 7: DRAFTING
Introduce the interface and basic drafting tools to the industry standard 2D drafting software. Reinforce best practices for folder organization, file names, layer management, and text styles. Introduce the concepts of blocks, hatching, and external referencing. Work with the house plans, sections, and elevations being researched in ARCH 1210.
Concepts & Vocabulary: Drawing and Model scales,
Digital Skills: Creating and manipulating views of drawing in 2D vector program, X-Refs, drawing/editing, text styles, hatching, and blocks.
Assignment: 2D drawing/refinement and diagramming

WEEK 8: MORE DRAFTING
Continue to refine drawings from previous exercise. Introduce conventions for exporting and importing CAD between various software. Import 2D drawings into a 3D modeling software and extrude a basic massing model. Additional architectural detail will be added as appropriate.
Concepts & Vocabulary: Massing vs. presentation models.
Digital Skills: Review 2D software concepts from Week 8. Reinforce extrusion tools; introduce window, door, and mullion creation, as well as file export/import between software used. Creation of topographic site models. Introduction to photorealistic rendering (V-Ray)
Assignment: Extrusion/ lofting for watertight models, and rendering exercise (material importing)

WEEK 9: LASER CUTTING & ASSEMBLY
Working with the 2D drafted drawings and /or model from the previous exercises, set-up a file to be sent to the laser cutter. A presentation on fabrication and digital fabrication should be given to demonstrate how automated manufacturing is changing design. At least one portion of the student's project for ARCH 1210 should utilize the laser cutter for fabrication.
Concepts & Vocabulary: Additive vs. subtraction fabrication; surface vs. contour modeling with subtractive processes
Digital Skills: Drawing adjustments for model building; Unroll Surface Commands; Laser Cutter Operation
Assignment: Physical model fabrication and rendering exercise (mapping)

WEEK 10: PHOTOREALISTIC RENDERING
Working with the 3D model from the previous exercise, map a selection of materials to the surfaces. Add lights and cameras. Utilize a photorealistic rendering engine (V-Ray) to build upon rendering previously learned rendering skills.
Concepts & Vocabulary: Transparency/Opacity, Mapping Types
Digital Skills: Mapping; V-Ray Lighting and Material Setup; Manipulating Existing Materials; Mapping
Assignment: Paleotology model rendering

WEEK 11: MULTI-PAGE LAYOUT
Demonstrate multi-page layout software (InDesign) and present examples of printed, projected, and bound documents. Discuss page layout and composition for various types of output. Show examples of graphic communication techniques including information visualization, and architecture specific examples of presentation boards, magazines, books, and lecture series posters. Create master pages, and set-up styles for document consistency.
Design Concepts & Vocabulary: Hierarchy, Alignment, Balance in Page Composition; Master Pages; Text Design Integration, Kerning, and Justification
Digital Skills: Text Tools, Master Pages
Assignment: Presentation layouts

WEEK 12: PUTTING THINGS TOGETHER
Create a simple multi-page document which includes all work from ARCH 1110, ARCH1191 and ARCH 1210. Each page should include the project title and a brief description. Drawings should be to scale and should have a resolution appropriate for printing.
Concepts & Vocabulary: Class Portfolios
Digital Skills: Review scanning, image resolution and manipulation, multi-page presentation tools
Assignment: Layout production

WEEK 13: PARAMETRIC MODELING
Introduce the concept of relationship-based parametric modeling and compare and contrast the logic with traditional analog modeling, and explicit 3D digital modeling. Geometry is essential for parametric modeling, so review basic shapes and how they are

defined. Create a simple module with a precise underlying geometry. Deploy this model over a surface to create a tiled effect. The resulting pattern should inform design decisions for the lamp design project in ARCH 1210.

Concepts & Vocabulary: Rule Based Design; Vectors, Sets & Lists, Parameters, Sine Curves, Delauney and Voronio Patterns

Digital Skills: Program Interface (Grasshoppper), Setting up Lists,

Assignment: Tiling

WEEK 14: 4D REPRESENTATION

Desk crits for final presentation layouts. Introduce simple movie-making techniques (MovieMaker) and concepts including sequencing, narrative, and composition. Create a short movie clip of a light effect coordinated with the ARCH 1210 lamp design project. Post-process the movie to add a title and sound.

Concepts & Vocabulary: Story Boards, Frame Composition

Digital Skills: Introduction to Creating Narrative and Editing Film Sequence; Addition of Text and Sound Elements

Assignment: Making movies/layout finalization

WEEK 15: FINAL DIGITAL SUBMITTAL

Submit a single PDF document archiving all progress in this course and co-requisite course ARCH 1210.

Digital Skills: all skills learned should be utilized to complete this exercise.