

Course Description

Arch 610 Winter Term 2009, 2 credit hours

This course introduces computer concepts and techniques for architectural design. It uses applications for developing and communicating two and three-dimensional design ideas to show how software supports design thinking. Students will model and edit 3D forms and spaces, render them in light and present results on the World Wide Web and in print media.

Students are responsible for developing competency in basic computer graphic skills through class and external resources.

Class Schedule

Large group, Tuesdays 10-11:50a in 246 Gerlinger (CRN 20675)

Optional Tutorial Sections:

- Wed 10:00-11:50a in B13 Klamath Mac lab (CRN 20675)
- Wed 10:00-11:50a in 101A McKenzie Windows lab (CRN 20677)
- Wed 6-7:50p Accelerated laptop section in 206 Lawrence (CRN 20678)

Objectives

- To understand how design exploration and analysis is supported by digital media.
- To develop skills in composing space and form with digital methods.
- To develop learning strategies for adapting to changing technology.
- To introduce an integrated architectural "toolbox" with digital and traditional media.
- To focus on the essence of each application and how applications can be used together.
- To address students with different levels of technical and creative backgrounds.

Date	Topic	Software	Assignment
<i>Expressing your work on the Web</i>			
Jan 5-7	1 Online Communication	ePortfolio	"www.yourshowroom.edu"
<i>3D Creation, Rendering & Lighting</i>			
Jan 12-14	2 Modeling I	SketchUp	"Climbing Sculpture"
Jan 21	3 Modeling II and Rendering	SketchUp, IDX Renditioner	"Sculpted Shadows"
<i>Image Manipulation & Rendering Techniques</i>			
Jan 26-28	4 Image Manipulation	Photoshop	"Place to Place"
Feb 2-4	5 Img. Manipulation & Rend.	IDX Renditioner, Photoshop	"Overlay Rendering x2"
Feb 9-11	6 Drawing	Illustrator & SketchUp	"Analytic Exposure"
<i>Visualizing and presenting architectural designs</i>			
Feb 16-18	7 Graphic Layout I	Illustrator	"Supersize It!"
Feb 23-25	8 Graphic Layout II	Illustrator, InDesign	"Design Brochure"
Mar 2-4	9 Conferences	All Tools	"Design Brochure"
Mar 9-11	10 Conferences	All Tools	"Design Brochure"
Mar 16	<i>Final Review, 8-11am</i>		

The class will have instruction weeks 1-8, conferences weeks 9 & 10 and a final review 11. Attendance is expected. Unexcused absences or tardiness diminishes participation points, potentially leading to no credit.

Methodology

Large group sessions will explain design concepts through examples and demonstration, supplemented by hands-on work on student laptops. The tutorial sections are hands-on workshops with hands-on guidance and assistance.

Prerequisites

None. Open to non-architecture majors with instructor's permission.

Expected Behavior

Students are expected to take responsibility for their own learning, accessing online and face-to-face tutorials.

- **Foster a learning community:** Contribute to class discussions, activities and resources. Respect others. Learn from different backgrounds, opinions & talents
- **Come to class prepared.**
- **Communicate:** Learn by asking questions, seek help early. Contact your tutor, come to office hours.

Requirements

- Timely submission of weekly assignments
- Active participation in a group project
- Successful completion of an online quiz
- Final digital portfolio summarizing the term's work
- Class attendance, participation & demonstrated comprehension of assigned readings & websites.

Required Software

All students must have primary access to a graphics personal computer and the required software and accompanying manuals:

- Google Sketchup Pro- version 7
- IDX Renditioner
- Adobe Creative Suite - version 4 preferred
- Mozilla Firefox Web browser

[Sketchup Pro](#), [IDX Renditioner 1.1](#) and [Firefox](#) are available online. Adobe Programs (Adobe Web Collection) are available at [Techhead.org](#).

Required Course Materials

Video tutorials are online at [Sketchup.com](#) and [Lynda.com](#). Students are expected to subscribe to Lynda.com for the term with the class discount rate. Recommended readings are on reserve in the library.

Grading

Assignment grades are based on the following criteria:

- Concept - appropriateness to the assignment
- Design Quality
- Technical Competence
- Completeness

Requirement	Points
Weekly Assignments - 7 * 7 weeks	49
Final Group Project	14
Self-access quiz	7
Portfolio	20
Participation	10
TOTAL	100

For each 7 point assignment, 7 = A, 6 = B, 5 = C, 4 = D, 0-3 = F. 83 points are required for a Pass.

At the end of the term, students will vote to award bonus points for Most Improved Beginner and Most Helpful Student as well as Best Overall Performance. The instructor and GTF's will assess the final portfolio and poster for the ability to apply technical tools to creative design problems. The portfolio must include assignments 1-7 and may optionally include other applications of digital media.

All assignments are must be uploaded before the weekly lecture session unless noted otherwise. To encourage timeliness, students need to submit a draft on time to have the potential to earn full points, late assignment hand-ins will be penalized. You may submit revised work for periodic re-evaluation if you have submitted a draft on time. It is your responsibility to make sure that your GTF knows your assignment is completed. If disaster strikes you may an e-mail or hardcopy.

Students who require special conditions for optimal learning and students who prefer to be graded by Prof. Cheng rather than their GTF, should inform the professor.

Arch 610 Introduction to Computer Graphics

Assignment 1: "WWW.YOURSHOWROOM.EDU"

Student Role: Curator

- Launch of the UO[v]MoMA website: your virtual exhibition space
- Orientation to learning resources
- Web communications in architectural design and education
- Form and Content: Website structure, embedded images, linked files and formatting
- Copyright and intellectual property guidelines
- Software: Plone ePortfolio blog or an existing website, Photoshop

You will create your own virtual museum, University of Oregon (virtual) Museum of Modern Art on the ePortfolio website. UO[v]MoMA is the hub for the student art and design work. In the role of the curator, you will set up your personal showroom, beginning with a creative project summary and its inspiration. Over the next weeks you will add work to this virtual display to culminate in a final version at the end of the term. Like any other museum, the individual presentation areas must be able to display different forms of expression under a single identity.



Purpose

This exercise introduces Internet communication as a personal expression and guides students in establishing an online presence.

Objectives

To understand

- the relationship of form, content, and perception in graphics/li>
- applying fair use guidelines for intellectual property
- how to download files from remote locations to the local disk
- how to scan, crop, improve and resize images
- how to format text and graphics on a web page and create links

PLEASE NOTE: In order to kickstart the UO[v]MoMA, item I is due Wednesday Jan 7. The rest is due, as all subsequent assignments, the following lecture session from when they are introduced.

I. SELF IMAGE

Use a digital camera or scanner to capture your face or a self-portrait. Open the picture in Photoshop and crop and Resize the image to create both a 200 x 200 pixel and a 100 x 100 pixel image. Name the picture lastname_firstname.jpg. Send an e-mail to your GTF, including your name, section info and attach the smaller picture.

II. PLAN

Plan your virtual showroom on the Eportfolio system: Think about who is in your audience and what you want to showcase. Find or create an art or design piece that has a strong

relationship to an inspiration. Write about 300 words to describe your project and its inspiration.

- How was the creative process shaped by tools and methods?
- How was the work's visual presentation shape viewer perceptions?
- Include a citation of the Author, title, source and the year of the work.

III. STUDY

1. Login to [Lynda.com](http://www.lynda.com) and watch Photoshop Essential Training: 1. The interface, 2. Basics (especially resizing) and 6. PhotoManipulation (cropping).
2. Watch the first two [Plone introductory videos](#), and read the [tutorial](#).
3. Read enough about [Copyright](#) to pass the [Copyright Challenge](#).

IV. PREP IMAGES

Prepare at least 3 graphic images, starting with scans, digital photos or downloaded public domain images:

1. a face-photo or self-portrait ~200 x 200 pixels (part I.)
2. a visual art or design piece you have created ~600 x 600 pixels
3. an inspiration for your creative work ~100 x 100 pixels

Resize, improve and crop the images in Photoshop. Using the "Save for Web" command, save the image as a high quality JPEG. Images for the first assignment should be named 610.1a.jpg, 610.1b.jpg, 610.1c.jpg, etc. (this facilitates automatic collection).

V. CREATE (see the detailed [tutorial](#))

1. Create a Home page to become familiar with the visual editor: the title should be your full name so it can be searched.
2. Set up the directory structure. Inside the Home folder or Root directory, create a Graphics folder and inside that, a folder called A1 for your first assignment.
3. Upload the images and insert them onto the pages, make links between pages.

FOR THE ADVANCED

- Develop an existing website
- Create custom graphics
- Start on the Sketchup tutorials.

REFERENCES

Bill Buxton's Sketching User Experiences

<http://www.billbuxton.com/>

Yale Web Style Guide: a classic breakdown of what matters for the web

<http://webstyleguide.com/>

Fair Use Guidelines : quick overview

http://w2.eff.org/IP/eff_fair_use_faq.php

Stanford University Library's Copyright & Fair Use site: thorough, well-written

http://fairuse.stanford.edu/Copyright_and_Fair_Use_Overview/

Test yourself with the Copyright Challenge

<http://www.copyrightkids.org/quiz/quizindex.htm>

Creative Commons

<http://creativecommons.org/about>

BSK Arkitekten's Swedish Post

http://www.bsk.se/thinktank/english/thinktank_content.html

Learning and Working in the New Collaborative Age

<http://www.edutopia.org/randy-nelson-school-to-career-video>

Arch 610 Bibliography: Digital Architectural Design

Nancy Yen-wen Cheng – revised Jan 3, 2009

DIGITAL MEDIA – GENERAL

- Kerlow, Isaac Victor, **The Art of 3D Computer Animation and Imaging**, New York: Van Nostrand Reinhold 2004. Computing Ctr Docs Rm F710 /K 4 (3rd Ed.), AAA T385.K45(2nd ed.) In-depth view of modeling, rendering, animation, and post-processing with concepts and practical guidelines clearly spelled out. Covers production with insight into the industry. Eye-popping graphics.
- Ashford, Janet & J. Odam, **Getting Started in 3D**, TR897.5 .A85 1998:
A fun, picture-filled introduction to computer modeling and rendering. Examples are oriented towards using graphics for illustration rather than realistic representation.
- Birn, Jeremy, **Digital Lighting & Rendering**, AAA T385 .B557 2000
Exquisitely illustrated book explains how to achieve professional results, explaining the process without a bias towards one specific software.
<http://www.3Drender.com>
- Spalter, Anne Morgan, **The Computer in the Visual Arts**, N72.E53 S65 1999:
Textbook with clear technical explanations of digital graphic tools and artistic applications. Strong creative examples. Not focused on architecture, dated.
- *Weishar, Peter, **Digital Space: Designing Virtual Environments**, NA2728 .W43 1998:
Oriented towards creating virtual sets for the entertainment industry, this book is filled with useful how-to tips and tricks for 3D modeling and rendering.

DIGITAL MEDIA - ARCHITECTURAL

- Association for Computer Aided Design in Architecture (**ACADIA**) conference proceedings:
Papers present digital media theory, tool developments, teaching and practice applications. (see CUMINCAD paper index: <http://cumincad.scix.net> for latest)
- Burry, Mark (editor): **Cyberspace: the World of Digital Architecture**, 2001. NA2700 .C93 2001 <http://books.google.com/books?id=8MPR2AEnM7sC>
- *Eastman, Chuck et. al., **BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractor**, 2008. [TH437 .B53 2008](#) Explains the new generation of coordinated intelligent 3D models.
- Iacovoni, Alberto, **Game Zone**, Basel, 2003. NA2728 .I24 2004
- Kelay, Yehuda, **Architecture's New Media**. Cambridge, MA: MIT Press, 2004. NA2728 .K35 2004. Explains CAAD topics from virtual environments to automated construction.
- Liu, Yu-Tung (editor): **Diversifying Digital Architecture**, 2003 FEIDAD Award, 2004, NA 2543.T43.D645 2004. Competition reflecting trends in digital design.
- Rahim, Ali, **Catalytic Formations: Digital Design in Architecture**, Routledge, 2006. AAA NA2728 .R33 2006. Connects concepts to cutting-edge processes, forms and resulting experiences
- Uddin, M. Saleh, **Digital Architecture**, New York: McGraw-Hill 1999, NA2728 .U327 1999:
Categorizes and explains different ways that computer graphics can be used for architectural design. Excellent images.
- Oosterhuis, Kas. **Hyperbodies : toward an e-motive architecture**. NA2728 .O6713 2003
Responsive architecture

DIGITAL MEDIA - ARCHITECTURAL FABRICATION

- Aranda, Benjamin & Chris Lasch, **Tooling**, AAA NA2728 .A58 2006 Explains how algorithms can create interesting form.
- Beesley, Philip and Nancy Cheng, Shane Williamson. **Fabrication: the digital practice of architecture**, 2004. [TH1095 .A53 2004](#) Conference proceedings
- Kieran, Stephen & James Timberlake, **refabricating ARCHITECTURE: How Manufacturing Methodologies Are Poised to Transform Building Construction**, AAA TH213.5 .K54 2004
- Kolarevic, Branko, **Architecture in the Digital Age: design and manufacturing**, 2003, NA2543.T43 A724 2003
- Larson, Kent, **Louis I. Kahn : unbuilt masterworks**, 2000. NA737.K32 L37 2000. Beautiful architectural visualizations show the power of computer graphics.
- Marcosandmarjan : **interfaces / intrafaces**, NA2728 .M38 2005. Inhabitable, mimetic sculptures created with lasercutting – from the London Bartlett school.
- Menges, Achim and Michael Hensel, eds, "Techniques and Technologies in Morphogenetic Design," **AD Architectural Design**, vol. 76/2, March/April 2006
- . "Emergence: Morphogenetic Design Strategies" **AD Architectural Design**, July 2004
- Neumann, Oliver & Philip Beesley, **Futurewood : innovation in building design and construction**, Riverside Architectural Press, 2007
- *Schodek, Daniel and Martin Bechthold, James Kimo Griggs, Kenneth Kao, Marco Steinberg, **Digital Design and Manufacturing: CAD/CAM Applications in Architecture and Design**, Wiley 2004. Survey of fabrication techniques, tools and applications.
- Stacey, Michael, **Digital Fabricators**. TH1095 .D54 2004

DESIGN PROCESS, VISUALIZATION & COGNITION

- *Buxton, Bill, **Sketching User Experiences: Getting the Design Right and the Right Design**, Morgan Kaufman, 2007. TS171 .B89 2007 Vivid explanation of user-centered design process, dynamic illustrations and stories of what did or didn't work. Product and web design focus translates easily to architecture.
- Lawson, Bryan. 1990. **How designers think: The design process demystified**. 2nd ed. Oxford: Butterworth. Walks through sketching processes, includes well-known architects
- *March, L., and P. Steadman. **The geometry of environment. An introduction to spatial organization in design**. London: RIBA, 1971. NA2750 .M26 1974 Classic demonstration of how geometric transformations are used in architecture.
- Schön, D.A. **The reflective practitioner. How professionals think in action**. New York: Basic Books, 1983. Classic analysis of design process, influential in education, engineering and other fields.

DESIGN DRAWING

- *Leggitt, Jim, **Drawing Shortcuts / AAA** NC730 .L44 2002 Hand-rendering book includes use of digital wireframes, photo-retouching, cameras, etc. Explains overlay rendering.
- Cheng, Nancy, **Digital Sketching website**. <http://sketching.uoregon.edu> Animated sketches reveal design process and thinking.

DIAGRAMMING

- White, Edward T., **Site analysis : diagramming information for architectural design /** NA2540.5.W48 1983. What information to seek, how to record and analyze it, how to use it for design.
- *Tufte, Edward, **Envisioning Information / QA90** .T914 1990. Lush illustrations illustrate information design principles.