Course Information

Credits: 1-3
Prerequisites: none
Lectures: TTh 12:30-1:30pm
Location: 2104 Art & Architecture Building (lecture hall)
Course dates: Jan. 6 – Feb. 8 (first credit)
Feb. 8 – Mar. 15 (second credit)
Mar. 15 – Apr. 19 (third credit)
Instructor: Scott Johnson (sven@umich.edu)
Office hours: M 12:30-1:30, TTh 3-4, Room 3131 Art & Architecture Building
GSIs: Atul Sharma (atulsh@umich.edu)
Mike Tweed (mjtweed@yahoo.com)
Required texts: none

Description

There are no prerequisites for Arch 411. The course is open to students from any major, although graduating architecture students will be given priority for purposes of granting overrides.

Architecture 411 is an introductory course on computer applications in architecture. It includes a survey of various graphics, modeling, and publishing programs, including software for raster graphics (Photoshop), 2D drafting (AutoCAD), 2-1/2D and 3D modeling (AutoCAD), Building Information Modeling (Revit), desktop publishing (InDesign), and web publishing (Dreamweaver).

2D drafting concepts and techniques will be covered in particular detail. These concepts and techniques will include tools for drawing accurately, re-using drawing symbols, using layers to organize a drawing, dimensioning, etc.

In addition, the course will cover various drafting and architectural graphics concepts. In order to understand how to do an isometric drawing with a CAD system, you need an understanding of isometric drawing; in order to lay out architectural dimensions in a CAD system, you need to understand architectural dimensioning. Therefore, the course will also explain fundamental concepts of architectural drawings.

Format of the Course

Arch 411 can be taken for 1, 2 or 3 credits. Each credit corresponds to 1/3 of the course schedule. For instance, you could take the course for 2 credits, attend the lectures from Jan. 6 through Mar. 15, and do the first 8 (of 12) assignments. During a later semester, if you wished, you could take the course again for 1 additional credit, attend the last third of the lectures, and do the last 4 assignments. You can get no more than 3 credits from the course, total, and you can not repeat any section of the course.

Undergraduate architecture majors should note that they need 3 credits in one or more computing classes in order to graduate from the B.S. program. This course fulfills the computing requirement, and should prove very useful for most architecture majors.

The course will be taught through a series of 2 1-hour lectures per week, with students putting in additional hours to complete lab assignments at various computing labs, at home, or elsewhere.

Instructor

The lecturer for the course is Scott Johnson. Office hours will be held in room 3131 of the Art & Architecture Building Mondays 12:30-1:30 and Tuesdays and Thursdays 3-4pm, or by appointment.

Graduate Student Instructors (GSIs) for the course are Atul Sharma and Mike Tweed.
Software
Approximately 2/3 of the course assignments will use AutoCAD. AutoCAD 2005 will be used for the
demonstrations in the lectures, and should already be installed on PCs on the 3rd floor of the A&A
Building, in the ITCS Sites lab on the 2nd floor of the A&A Building, on PCs in the Media Union, and on
PCs in ITCS Sites labs on Central Campus. However, most of the features found in AutoCAD 2005 are
also present in earlier versions of AutoCAD. It is likely that you can do most or all of the assignments for
Arch 411 using earlier versions, but some of the commands, dialog boxes, and behaviors may be slightly
different in previous versions.

The course will also make brief use of other software, including Adobe Photoshop, Adobe InDesign,
AutoDesk Revit, and Macromedia Dreamweaver. These programs will likewise be installed on College
and University machines.

Required Materials
You are required to purchase a cheap 2-pocket folder. You should write your name clearly on the outside
of the folder. You will use the folder to hand in assignments.

It is very highly recommended that you buy a Zip disk, CD-RW, or USB flash drive on which to store
your work.

It is not necessary to buy any of the software used in this course. However, you may find it convenient to
purchase your own copies of software, so that you can use it in this course, in studio, and in other course
this semester and later on.

No textbooks are required for the course. All necessary information will be given in lectures or be
available through help commands. However, you may wish to buy books on AutoCAD or other software
for your own reference.

Lectures
There will be 2 one-hour lectures per week. These lectures will include demonstrations of how to use
software. They will also include descriptions of key concepts underlying the software, so that you can
better understand what the software is doing, how it represents drawings or documents, what information
it needs to be given, and why it needs it. This information will help “de-mystify” the software and allow
you to better use the software and deal with problems if they occur.

The lectures will also explain requirements for each assignment and conventions used in architectural
drawings. Attendance at the lectures is required.

Grading
Grading will be based on assignments and quizzes. 85% of your grade will be based on assignments,
and 15% on quizzes.

Assignments
There are a total of 12 weekly assignments (4 per credit). Assignments are due at the start of class on
Tuesdays. Each assignment will have certain minimum requirements. If you fulfill the minimum
requirements, you will get an 80% on the assignment (essentially a “B-”). If you omit something that you
were supposed to do, or do something incorrectly—e.g., if your lines do not meet neatly, if you plot at the
wrong scale, or if you don’t use layers correctly—points will be deducted.

In addition to the minimum requirements, assignments will ask you to “embellish” the drawing further, by
exploring and using commands on your own. You might be asked to try additional commands on your
own and show the results, or add embellishments like trees, cars, or adjacent buildings to a floor plan or
site plan. You will not be graded on your architectural design skill or knowledge of construction
techniques, but you will be graded on how well you demonstrate mastery of the software tools, and on the

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quality and amount of work you do. Embellishment will be worth up to 20 points on each assignment, so an assignment that fulfills the minimum requirements and has numerous well-crafted embellishments will receive 100 points.

Assignments are due at the start of class on Tuesdays. **DO NOT MISS THE START OF CLASS IN AN ATTEMPT TO FINISH AN ASSIGNMENT.** The assignment will still be counted as late, and you will cause yourself to miss the daily quiz. If an assignment is turned in after the due date but before the start of the first subsequent lecture, 5 percentage points will be deducted from its grade. If it is turned in after the start of the first subsequent lecture but before the start of the second subsequent lecture, 10 points will be deducted, and so forth. At most 20 points will be deducted in this manner.

Some students may occasionally do poorly on an assignment. If you wish to improve your grade on an assignment, you can re-submit the assignment with corrections. All re-submitted assignments will have 10-30 points deducted from their grades, depending on how quickly they are resubmitted. An assignment re-submitted at the next class after it is handed back will have 10 points deducted; an assignment re-submitted at the next class after that will have 15 points deducted, and so forth (up to 30 points). This mechanism is intended to help you recover from a catastrophically bad grade on an assignment; it is of little or no use if you only missed a few points on an assignment.

Note that there is no final project in this class—only weekly assignments. All assignments are worth the same number of points. This means that your grade is determined by your sustained performance throughout the term. If your scores have been weak throughout the term, you should not expect to raise your grade much by doing a fantastic job on the last assignment; by that point, around 93% of your grade has already been determined.

You are required to do your own work. Group projects or using another student’s drawings are not allowed.

**Quizzes**

There will be a quiz at the start of each class session. It will be one question, usually multiple choice. You will get a score of 50% on a quiz just by showing up and writing your name on the top. You will get 100% if you also get the quiz question right.

Quizzes will generally not cover command syntax. A quiz question will never be anything like “Under what menu will you find the ‘PEDIT’ command?” Quizzes will cover concepts from the lectures about what the software does, how it represents drawings, and strategies for using the software. Example quiz questions might be:

- “Why is it easy to erase part of a line in Photoshop, but difficult to do it in AutoCAD?”
- “Which of the following characteristics describes symbols (BLOCKs) rather than copies?”
- “What is a bit?”

You should do well on the quizzes if you attend lectures and understand what you are doing when you do the assignments.

If you are late to class and miss a quiz, see a Graduate Student Instructor for a quiz. You will not be credited with answering the quiz question correctly, but you can still write your name on the quiz for partial credit.

Quizzes will not be handed back, but answers will be announced immediately after the quizzes are given. The course will also include a small number of unannounced “pop” quizzes near the end of class, spaced at irregular intervals through the term. These quizzes will have the same format as the regular daily quizzes.

Your average quiz score will count for 15% of your grade. Your lowest 3 quiz scores (or lowest 1 or 2 quiz scores, if you are taking the course for only 1 or 2 credits) will not be counted when computing your average quiz score.
Attendance

Lecture attendance is mandatory, and is enforced through the daily quizzes. If you need to miss a class, tell the instructor beforehand, and you will be given a make-up quiz upon your return. Absences without prior notification will count off from your grade, unless you have a doctor’s note or other valid excuse.

If you are taking the course for less than 3 credits, you need only attend the course during the dates shown near the top of the first sheet.

Schedule

A preliminary schedule of topics to be covered in the course is shown below.

Classes Associated with First Credit of Course

Thurs. Jan. 6: Course introduction and policies; computer hardware; raster graphics; RGB color. Syllabus distributed.

Tues. Jan. 11: Requirements for the Photoshop assignment; Photoshop tools and palettes; pencil; paintbrush; color; eyedropper; selection tools; paint bucket; rubber stamp; RGB color vs. indexed color, .TIFFs; .GIFs; .JPEGs; saving and backing up files. Photoshop assignment distributed.

Thurs. Jan. 13: More Photoshop commands; tools and strategies for combining images; changing brightness, contrast, or color balance; resolution; raster vs. vector graphics.

Tues. Jan. 18: **Photoshop assignment due.** Requirements for the Fountain assignment; Cartesian vs. polar coordinates; relative vs. absolute coordinates; drawing entities; AutoCAD command entry methods; autosave; HELP; LINE; ARC; CIRCLE; ERASE; selecting entities; UNDO; ZOOM; PAN; drawing full scale; GRID; SNAP; object snapping. Fountain assignment distributed.

Thurs. Jan. 20: Object snapping; construction lines; TRIM; EXTEND; FILLET; BHATCH; UCS; drawing accurately; strategy for drafting; PLOT.

Tues. Jan. 25: **Fountain assignment due.** Requirements for the Floor Plan assignment; Plan drawing conventions; ORTHO; POLAR snapping; object tracking. Floor plan assignment distributed.

Thurs. Jan. 27: ARRAY; COPY; grip editing, STRETCH; multiline; EXPLODE; text; lineweights.

Tues. Feb. 1: **Floor plan assignment due.** Requirements for the Symbols assignment; symbols; symbols vs. copies; BMAKE; INSERT; WBLOCK; downloading the symbols library. Symbols assignment distributed.

Thurs. Feb. 3: Doors and windows from the symbols library; scale factors of -1; attributes; EXPLODE; redefining blocks; the Design Center.

Tues. Feb. 8: **Symbols assignment due.**
Classes Associated with Second Credit of Course

Tues. Feb. 8: Requirements for the Layers assignment; layers; AIA CAD layering guidelines; "ByLayer" color and lineweight; layer "Defpoints".

Layers assignment distributed.

Thurs. Feb. 10: Layouts; paper space vs. model space; viewport scaling (zooming); plotting layouts; plotting with layers and color tables.

Tues. Feb. 15: **Layers assignment due.** Requirements for the Site Plan assignment; site plans; contour lines; surface runoff; .DXF files; polylines; PLINE; PEDIT; lineweights; linetypes; linetype scales.

Site plan assignment distributed.

Thurs. Feb. 17: Sections; projecting lines; viewports for diagonal sections.

Tues. Feb. 22: **Site plan assignment due.** Requirements for the Dimensioning assignment; architectural dimensions: dimension lines, extension lines, what to dimension, placement of dimensions; dimensioning commands; dimension styles; dimension variables.

Dimensioning assignment distributed.

Thurs. Feb. 24: Dimensioning commands, dimension styles; dimension variables; alternate CAD dimensioning strategies.


Tues. Mar. 8: **Dimensioning assignment due.** Requirements for the Details assignment; drawing template files; sheet files; XREFs; wall sections; wall construction; standard hatching patterns; batt insulation; isometric drawings.

Detail drawings assignment distributed.

Thurs. Mar. 10: Isometric drawings; isometric snapping; isoplanes; isocircles; external references; file management; portrait plotting.

Tues. Mar. 15: **Details assignment due.**
Classes Associated with Third Credit of Course

Tues. Mar. 15: Requirements for the 3D assignment; extrusion; 2-1/2D surface modeling; THICKNESS; ELEV; _DDVPOINT; HIDE; PLAN; 3DFACE; perspective vs. paralline views; DVIEW.

3D assignment distributed.

Thurs. Mar. 17: ORBIT; Surface vs. solid modeling; surface and solid modeling primitives; surface modeling system variables; set operations: UNION, INTERSECT, SUBTRACT.

Tues. Mar. 22: **3D assignment due.** Requirements for the Revit assignment; Building information modeling; organization of Revit; object snapping; zooming; object properties; wall alignment; 3D views.

Revit assignment distributed.

Thurs. Mar. 24: More Revit commands; doors and windows; extracting schedules; roofs; floors; components; stairs; sections; dimensioning; site contours.

Tues. Mar. 29: **Revit assignment due.** Discussion of Revit/Building information modeling; requirements for the InDesign assignment; producing an .EPS file in AutoCAD; basic InDesign commands; guides; frames, masters; placing images; fitting images and frames to each other.

InDesign assignment distributed.

Thurs. Mar. 31: More InDesign commands; stories and threading; text wrapping; adding and removing pages; adding and applying masters; independent vs. in-line graphics; embedded vs. linked images.

Tues. Apr. 5: **InDesign assignment due.** Requirements for the HTML assignment; the Internet and the World-Wide Web; Uniform Resource Identifiers; characteristics of good web page design; copyright issues; basic HTML file organization; HTML tags; Dreamweaver organization and commands.

HTML assignment distributed.

Thurs. Apr. 7: Images; hyperlinks; Dreamweaver commands; proper HTML file location; file transfer

Tues. Apr. 12: **HTML assignment due.** Other software commands; CAD strategies; office standards; groupware issues.

Thurs. Apr. 14: Topics in CAD research.