

ARCHITECTURAL AND ENGINEERING TECHNOLOGY / CONSTRUCTION MANAGEMENT

Fundamentals of CADD for Building Construction

Syllabus Spring 2014

AET 101

CM A101

 CRN 30176
 Section 051
 CRN 31161
 Section 051

 CRN 35980
 Section 251
 CRN 35990
 Section 251

 January 13 – February 14, 2014 (5-week block class)
 Section 251
 Section 251

Professor Joel Condon Registered Architect / Licensed General Contractor

Contact

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Office Hours Room 132H, University Center M-R @ 9:00-11:00am F by appointment

<u>Précis</u>

AutoCAD has become the ubiquitous tool of choice for drafting in architectural and engineering communities. It is an efficient program that enhances the draftsperson's productive capabilities. But mastering AutoCAD is not simply a matter of maximizing line production per hour. It must be remembered that AutoCAD is a tool for communication, whether it is the communication of aesthetic intent in an architectural design or the assembly requirements for construction documents. As a tool of communication, clarity of expression must be considered.

AutoCAD drawings are often found to lack creativity, conveying an uncomfortable sense of sterility. It is often lamented that drafting has lost the dynamism found in hand drawn work in ink on velum. This is not the unavoidable result of a high tech digital medium: it is the result of an uncritical evaluation of visual content. It is the technician's responsibility to compose drawings that are comprehensible, engaging, and interesting.

The complexity and intricacy of AutoCAD demand prodigious effort to master. But along with mastery comes the responsibility to consider the needs of the reader. The draftsperson must be sensitive to the reader's ability to comprehend a drawing's content without being overwhelmed. AutoCAD has the power to overwhelm. The reader must be engaged and comfortable with a drawing's content: the drawing should rest comfortably on the sheet, not crowding the edge or the text. To invest AutoCAD drawings with originality, creativity, visual dynamism, and graphic integrity is the challenge. It is a matter of developing the expressive potential of the medium. Exploration and experimentation with the power of AutoCAD, combined with an individual sense of composition, leads to the eloquent, articulate drawing.

Course Identification

4-credit cross-listed course:

- AET A101 Fundamentals of CADD for Building Construction
- CM A101 Fundamentals of CADD for Building Construction

Course Meeting Time and Location

This course meets in UC 123 and vial Blackboard Collaborate on Mondays-Thursdays from 12:30 pm to 4 pm. Students in Anchorage may attend in person or via Collaborate.

This is a 5-week block class. The add/drop deadline is 5 pm Wednesday January 15, 2014.

Accelerated Five Week Class

This is an accelerated five-week class which means that 15 weeks in a regular semester length class are compressed into just five weeks. This means that each week is the equivalent of three weeks in a regular semester length course: each day is equivalent to three days. The class requires more than just time spent during the scheduled meeting time. One day's homework in this class is equivalent to three day's homework in a regular class. Be prepared.

Course Description

Introduces basic CADD (computer aided drafting and design) skills necessary in civil, architectural, structural, mechanical, and electrical drafting within the construction industry. Defines the working relationship between design and construction professionals and drafters/technicians.

Course Prerequisites

Proof of eligibility for placement into ENGL A111. Appropriate SAT, ACT or UAAapproved Math Placement Test scores may be used in lieu of MATH A105.

Time of Student Involvement

Total time of student involvement: 180 hours

1)	Lecture:	30 hours

2) Lab: 60 hours

3) Outside: 90 hours

Total time: 180 hours

Class Schedule

See separate document Schedule 101 S14.pdf.

Objectives

- 1. Familiarize students with the AutoCAD environment.
- 2. Develop an awareness and appreciation of drawing composition in the communication of design intentions.
- 3. Establish a working understanding of the commands necessary to function efficiently and accurately in AutoCAD.
- Familiarize students with proper drawing format including title block composition, line weight conventions, and sheet organization.
- 5. Develop orthographic drawing skills and reading proficiency.
- 6. Engender an attitude of exploration and experimentation with AutoCAD.
- 7. Introduce students to fundamental drafting conventions associated with architectural, structural, civil, mechanical, electrical, and plumbing drawings.
- 8. Introduce students to construction methods and materials associated with CADD drawings.

9. Master the top 21 commands:

array	line	erase
zoom	pan	trim
extend	stretch	move
сору	mirror	donut
offset	spline	fillet
rotate	circle	polygon
sketch	snap	break

10. Understand and apply:

text	layers	Line types
plotting	colors	dimensions
osnaps	blocks	paper/model space

Text Book & Materials

It is highly recommended that students purchase George Omura's, Mastering AutoCAD 2013 and AutoCAD LT 2013 (John Wiley & Sons, Inc., 2012). Although the class is not taught directly from the book, the book is a valuable reference to supplement class material and answer questions that may not be clear in class. The book contains information on virtually all aspects of AutoCAD and will be used for subsequent AET and CM classes.

Required Materials

1. All students must have an **architect** scale ruler.

2. Students who are joining the class from a distance must have a microphone to enable verbal communication with the classroom. Typed communication disrupts the continuity of the class and is counter-productive to integrating distance learners into the classroom.

Computer Requirements

This is a "mixed mode" class meaning that it is delivered in the UAA University Center Computer Lab Rm. 123 and it is simultaneously broadcast to students in remote locations. If you are joining the class from a distance you will need the following:

1. AutoCAD 2013 installed on your computer.

The program is available free from Autodesk as a student version that is fully operational. Go to the Autodesk website to download.

2. A computer with the following capabilities:

- A high-speed connection is recommended (Dial up will not work well at all for this).
- Dedicated graphics cards, RAM (at least 4GB) is highly recommended. Additionally having at least 20GB (for all programs) of free hard drive space for install.
- Students may get by with less than the requirements listed below, but the performance will suffer.
- Minimum requirements for AutoCAD are as follows (this should be sufficient for the other programs as well).

For 32-Bit AutoCAD 2013

- Microsoft® Windows® 7 Enterprise, Ultimate, Professional, or Home Premium (compare Windows 7 versions) or Microsoft® Windows® XP Professional or Home edition (SP3 or later)
- For Windows 7: Intel® Pentium® 4 or AMD Athlon™ dual-core processor, 3.0 GHz or higher with SSE2 technology
- For Windows XP: Pentium 4 or AMD Athlon dual-core processor, 1.6 GHz or higher with SSE2 technology
- 2 GB RAM (4 GB recommended)
- 6 GB free disk space for installation
- 1,024 x 768 display resolution with true color (1,600 x 1,050 with true color recommended)
- Microsoft® Internet Explorer® 7.0 or later web browser. Install from download or DVD

For 64-Bit AutoCAD 2013

- Microsoft Windows 7 Enterprise, Ultimate, Professional, or Home Premium (compare Windows 7 versions) or Microsoft Windows XP Professional (SP2 or later)
- AMD Athlon 64 with SSE2 technology, AMD Opteron® processor with SSE2 technology, Intel® Xeon® processor with Intel EM64T support and SSE2 technology, or Intel Pentium 4 with Intel EM64T support and SSE2 technology
- 2 GB RAM (4 GB recommended)
- 6 GB free space for installation
- 1,024 x 768 display resolution with true color (1,600 x 1,050 with true color recommended)
- Internet Explorer 7.0 or later
- Install from download or DVD

Additional Requirements for 3D Modeling (All Configurations)

- Pentium 4 or Athlon processor, 3 GHz or greater or Intel or AMD dual-core processor, 2 GHz or greater
- 4 GB RAM or more
- 6 GB hard disk space available in addition to free space required for installation
- 1,280 x 1,024 true color video display adapter 128 MB or greater, Pixel Shader 3.0 or greater, Microsoft® Direct3D®-capable workstation-class graphics card.

An online testing of computer compatibility for Blackboard is found at: http://technology.uaa.alaska.edu/blackboard/

Compatibility for eLive!, along with speaker and microphone tests, is found at: http://www.uaa.alaska.edu/elive/

Computer problems, access questions, eLive! and Blackboard questions and their solutions can be addressed with the UAA Information Technology(IT) Call Center, Monday thru Saturday during extended business hours, at 907-786-4646 or Toll Free 877-633-3888.

Class Policies

See also101 Course Policies.pdf.

Email Policies

Most assignments are submitted via email. As a general rule, files attached to emails should be labeled with an assignment (or test) number, followed by your initials. Be sure to **follow specific instructions** for file submission. This is an issue of file management which is crucial in the digital environment. Improperly labeled submissions will be docked five (5) points.

The file formats that can be read are Rich Text format (nnn.rtf), Microsoft Word (nnn.doc and nnn.docx) and Excel (nnn.xls and nnn.xlsx). Other formats will be returned unopened.

eLive! / Collaborate Issues

If you are participating in an Elluminate Live (eLive!) / Collaborate session and the session crashes, try to log back on. Typically an email will be sent out to clarify the situation and advise on how to proceed.

It is the intention to record all sessions but do not rely on these recordings; it is a courtesy and not a privilege. Recordings have been lost for many reasons and a session will not be repeated because of a recording failure.

Communication

Communication about any issue of concern is encouraged and appreciated. My goal as an instructor is to optimize the learning process and facilitate student success; any input towards this end is most valuable. Conversations can be initiated personally, by letter, telephone, or email and will be held in confidence.

Requests for reasons of personal faith should be discussed early and will be honored without prejudice or penalty.

Changes to the Syllabus

Changes may be made to this syllabus and to the class schedule at any time. Each class is unique with its own dynamic and trajectory; this can create unanticipated situations that require adjustment to the class structure. Any changes are intended to optimize the learning process and enhance the educational experience.

Evaluation (Drawings, Tests, Exercises, Attendance)

Grades are determined by competency-based criteria. Students are evaluated on individual performances and are not graded in comparison with other students or normal curve distribution.

Faculty initiated withdrawals for non-attendance, plagiarism, and disruptive behavior is per current UAA Catalog guidelines.

Drawings:

Drawing assignments are worth 100 points each. Drawings are evaluated on the basis of:

- 1. Accuracy
- 2. Completeness
- 3. Program proficiency
- 4. Efficiency of process
- 5. Presentation quality
- 6. Timely delivery

Tests:

Tests are worth 100 points each, except the final exam which is worth 300 points.

Exercises:

Exercises are evaluated on a credit / no credit basis with each exercise worth

10 points.

Attendance:

Attendance is crucial for success in this class. The five-week schedule means that each day is equivalent to three days in a regular fifteen-week semester length class. Students will be docked ten (10) points for each day missed. Any material missed due to non-attendance will not be repeated and will not be provided later.

Make up tests will not be given unless arrangements are made at least three (3) days prior to the examination or if a legitimate doctor's excuse is presented.

Class begins promptly at the scheduled time. Students who fail to arrive on time will be docked five (5) points. Students who leave before the scheduled end of class will be docked five (5) points.

Drawings should be submitted on the stated due date. Drawings will be penalized five (5) points for each day late.

Students are encouraged to keep a comprehensive, well-organized notebook of all lecture material, handouts, notes, sketches, etc. Tests will include this material.

Originality, individual initiative, and class participation is highly encouraged. Student work is expected to be their own. Copying and other forms of plagiarism will not be tolerated.

Grading Scale

- A 93%, or more, of total points: beyond expectation
- B 85%, or more, of total points: better than expected
- C 78%, or more, of total points: satisfactory, meeting expectations
- D 70%, or more, of total points: not meeting expectations

Evaluation of Formal Written Work

In the field of construction and design, written communication skills are extremely important. The complexity of assemblies, the amount of information exchanged, the number of people participating, and the sums of money involved demand clear, accurate, and concise writing.

Written assignments will be evaluated based on the depth of investigation, the relevance of material, clarity of communication, organization of material, and the proper use of the English language. Superficial perusal of the internet is not considered rigorous research. All material gathered must be properly cited in either footnote or endnote form. *Turnitin* will be used to check submitted documents for plagiarism. Any violation of university policy regarding plagiarism will be referred to the Dean's office for disciplinary action. Information regarding plagiarism and academic integrity at UAA can be found at:

http://www.uaa.alaska.edu/deanofstudents/academic-integrity/

Written assignments should contain an introductory statement of intent and a summary statement of results. Investigation should follow a clear and rational method of inquiry. Unsubstantiated opinions and unnecessary embellishment of text are not appropriate. All submitted work must be checked for spelling and edited for grammar and clarity of thought.

It is strongly recommended that students refer to <u>The Elements of Style</u> by William Strunk, Jr. and E. B. White as a guide to composition techniques and the use of proper grammar.

Student Outcomes

After successful completion of the course, students will be able to do the following:

1. Explain the working relationships and primary roles of the participants in the construction process.

- 2. Describe how construction drawings and their accompanying written specifications are coordinated for a single project.
- 3. Explain construction drawing set organization including drawing subsets (civil/site, architectural, structural, mechanical, electrical, and others as required by the needs of the project), the information conveyed by each subset, and how the subsets are related.
- 4. Define the basic commands and techniques used with computer-aided design and drafting (CADD) software including file, draw, edit, modify, insert, format, dimension, and text commands.
- 5. Compute drawing scales for blocks, line type, hatch, and plotting in CADD.
- 6. Produce civil/site development drawings, architectural drawings, mechanical drawings, structural drawings, and electrical drawings using CADD software.
- Apply drafting conventions including: drawing sheet sizes, sheet numbering, drawing sheet layout, line types, drawing views, dimensions, coordinate systems, scales, symbols, hatching, notation, basic terminology, and abbreviations used in architectural, civil, mechanical, electrical, and structural drawings.

Student Course Evaluation

The IDEA student course evaluation will be available through the Blackboard site for the course during the final week of the class. The responses are tallied independently to assure anonymity. The intent is to improve this course: it is important. Please take the time to complete the survey and be as specific as possible.

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ARCHITECTURAL AND ENGINEERING TECHNOLOGY / CONSTRUCTION MANAGEMENT

Fundamentals of CADD for Building Construction Spring 2014 University policies

Student Responsibilities

- 1. *Attendance* Students are required to attend regularly and participate actively. Students are responsible for class work even if there is a legitimate excuse for their absence. (See Chapter 7, page 67 of the UAA 2014-2015 Catalog)
- 2. Conduct Students are expected to exercise self-discipline and appropriate behavior. Conduct which obstructs or disrupts the teaching process will not be tolerated. (See Chapter 5, page 42-43 of the UAA 2014-2015 Catalog) NOTE: Class participation – There may be new, diverse ideas and perspectives presented during this course. It is my expectation that each person will demonstrate respectful behavior during our class sessions. It is my responsibility to facilitate our class discussions so that each student has an opportunity to participate. Having side conversations with others during class discussions, monopolizing class discussions, failing to yield the floor when requested, failing to follow faculty instructions all detract from the academic environment and the exchange of ideas. Those students who continually engage in these behaviors may be asked to no longer participate in class and may be referred for disciplinary action for alleged UAA Student Code of Conduct violations.
- 3. *Communication* UAA uses email to communicate with students on many important matters. The University automatically assigns each student an official email account at the time of admission and registration. Students are responsible for knowing and, when appropriate, acting on the contents of all university communications sent to their official UAA email account. To receive communication at a different email address, students may forward email from their assigned UAA accounts to any valid third party email address of their choice that accepts forwarded email. (See Chapter 5, page 43 and Chapter 7, page 71 of the UAA 2014-2015 Catalog)
- 4. *Back-ups* Students are solely responsible for backing-up any data placed on the UAA Sdrive. UAA specifically denies all responsibility and liability for the loss of data placed on the S-drive by students.
- 5. *Cheating* Academic integrity is a basic principle which requires that students take credit only for ideas and efforts that are their own. Cheating is not tolerated at UAA and is grounds for dismissal from the University. (See Chapter 5, page 41-43 of the UAA 2014-2015 Catalog) If you have questions regarding academic integrity, there is a tutorial on the Library home page. Suspected cheating will be referred to the Dean of Students Office for review.
- 6. *Tobacco Use* Smoking is not permitted inside the building at the University Center. Also, smoking is not permitted within 20 feet of UAA facility entrances (EHS Policy 19). Additionally, tobacco use of any kind is not permitted in the classroom (this includes smokeless tobacco and e-cigarettes).
- 7. *Right-to-Know Information* Hazard Communication Program. There are no known chemical hazards in the AET Department.

- 8. *Student ID Cards* Students are advised to carry UAA Student ID cards (the Wolf Card) at all times while they are on campus. Your Wolf Card will also be needed to access the CADD Labs (card readers on the east entrances). Cards can be obtained or renewed at the Wolf Card office near the main entrance by taking your current registration paperwork with you.
- 9. *Personal Safety* Students should use the buddy system when going in and out of buildings at night. Walk in well-lit areas. The phones in the CADD Labs can be used to reach the Campus Police by dialing 61120.

Support services

- 1. *Disability support services -* Disability Support Services (DSS) is responsible for coordinating support services for UAA students who experience disabilities. To access support services, students must contact DSS and provide current disability documentation that supports the requested services. Additional information may be accessed at the DSS Office in Rasmuson Hall (RH105) or on-line at www.uaa.alaska.edu/dss.
- 2. *IT Services Call Center* Is staffed 7 days per week, 363 days a year. They can assist you with password and PIN reset, software understanding, technical requests, as well as general questions about technology.
 - a. Hours of Operation
 - b. Monday Friday 6:00 AM 12:00 AM
 - c. Saturday & Sunday 8:00 AM 5:00 PM
 - UAA Holidays 8:00 AM 5:00 PM

In Anchorage: (907) 786-4646, option 1

Toll Free: (877) 633-3888, option 1

Safety

- 1. Online UAA will never send you an unsolicited e-mail asking you for your password or other personal information. If you receive such a message, please delete it. If you have any concerns, contact the IT Call Center at (907) 786-4646, menu option 1, or via email at callcenter@uaa.alaska.edu. If you experience cyberbullying, cyberstalking, or other inappropriate conduct as part of your involvement in a UAA class, please notify your instructor immediately.
- 2. On campus Safety is a priority at UAA. All members of the academic community are encouraged to take responsibility for their own safety by taking the time to locate the nearest exits and emergency telephones when they are in campus buildings. Safety concerns may be brought to the attention of UAA faculty or staff, or the University Police at (907) 786-1120 (V/TTY). For more safety information and the most recent campus crime report, visit www.uaa.alaska.edu/safety.
- 3. *Student ID Cards* Students are advised to carry UAA Student ID cards (the Wolf Card) at all times while they are on campus. Your Wolf Card will also be needed to access the CADD Labs (card readers on the east entrances). Cards can be obtained or renewed at the Wolf Card office near the main entrance by taking your current registration paperwork with you.

- 4. *Personal Safety* Students should use the buddy system when going in and out of buildings at night. Walk in well-lit areas. The phones in the CADD Labs can be used to reach the Campus Police by dialing 61120.
- 5. *Campus Police/Call Team Services* The UAA Campus Police will jump start vehicles and retrieve keys from inside locked vehicles (be sure to have ID with you!). 786-1120
- 6. *Parking* Park in the UAA designated areas only at the University Center. If you typically utilize the southwest entrance (near La-A-Boy), please keep in mind that the spots nearest the door are reserved for customers of the mall.

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SCHEDULE AET / CM A101 FUNDAMENTALS OF CADD FOR BUILDING CONSTRUCTION / S14 / Condon

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1.13 1 AUTOCAD ENVIRONMENT PAPER SPACE / MODEL SPACE SCALE RULER REQ'D TAB, PANEL, COMMAND LINE PRE-REQUISITES ESC: TO CLEAR INTRODUCTION ENTER/SPACE BAR -SELF ZOOM / VIEW -DRAWING EXAMPLES SAVE / SAVE AS CIRCULAR / REPETITIVE 3D-2D SETUP DRAW / MODIFY COMMANDS SELECTING (RT. / LFT)	1.14 2 DRAWING SET DRAWING SET-UP NOUN / VERB OSNAP GRIPS ORTHO UNDO / CTRL Z OPTIONS (RT. CLICK) SCALE HATCH (intro.) COPY PROFILES PAPER SPACE / MODEL SPACE VIEWPORTS ASSIGNMENT 1: PRIMAPY CEDMETPIC	1.15 3 SYMBOLS AND DRAWING NAVIGATION / STRUCTURAL, MEP KEYBOARD COMANDS ICON vs. TEXT DISTANCE LINE TYPE BLOCKS / ATTRIBUTES GRAPHIC SCALE LIST / PROPERTIES LEADERS INTRO: DUE: ASSIGNMENT 1 INTRO: ASSIGNMENT 2	1.16 (4) WRITTEN TEST 1 LAB
1.20 NO CLASS	LINE WEIGHT: COLOR PRIMART GEOMETRIC 1.21 5 USE OF SCALE RULER TEXT / LEADERS / DIMENSIONS (Set Up) SCALE FACTORS ENTERING DIMENSIONS 7-5/16, 8'9-1/4 OUTPUT (INTRO: PDF) DRAWING FONTS ASSIGNMENT 3 EXERCISE: SCALE RULER	ORTHOGRAPHIC PROJECTION SYMBOLS 1.22 6 LINE TYPE (cont.) PSLTSCALE HATCH (cont.) LINE WEIGHT PAPER SPACE DIT (Polyline Edit) TEXT: MODEL SPACE INTO PAPER SPACE TITLE BLOCK (DETAIL) EXERCISE: TITLE BLOCK	1.23 7 IN CLASS PRESENTATION: SYMBOLS DUE: ASSIGNMENT 2 RESEARCH
1.27 8 TEST 2 DRAWING FLOOR PLANS PLAN / SECTION / ELEVATION ASPECTS OF COMPOSITION FLOOR PLAN LINE WEIGHT (cont.) DUE: ASSIGNMENT 3	1.28 9 DOORS / WINDOWS IN PLAN LAYERS (NCS) FLOOR PLAN GRID (STRUCT. GRID, GRID SNAP) ANNOTATIVE TEXT / DIMENSIONS / LEADERS	1.29 10 ELEVATIONS CONSTRUCTION LINES REFLECTED CEILING PLAN ELEVATION SYMBOL EXERCISE: RCP LINE WEIGHT IN ELEVATION DOOR / WINDOW PROTOCOL ROOF PITCH DUE: ASSIGNMENT 4 X-REF DWG	1.30 TEST 3 WRITTEN SHEET SET TITLE SHEET SHEET LABELS (NCS)
2.03 12 SECTIONS LONGITUDINAL / TRANSVERSE LINE WEIGHT IN SECTION STAIRS CODES (IBC) STAIRS LAYOUT HANDRAIL / GUARDRAIL ELEVATION DUE HANDRAIL / GUARDRAIL SECTION	EXERCISE: ANNOTATIVE TEXT, DIM, LEADER 2.04 13 BASICS OF RESIDENTIAL CONSTRUCTION STICK FRAME STUD LENGTH DOOR / WINDOW HEIGHT PLATFORM / BALLOON FRAMING RAFTER WALL CONNECTION FOUNDATION COMMON ROOF TYPES	2.05 14 CIVIL DRAWINGS TOPOGRAPHY SITE DRAWINGS GRADING TOPOGRAPHIC PROFILE SPLINE (Fit / CV) ASSIGNMENT 6 SECTION DUE LINE WEIGHT ASSIGNMENT 7: TOPOGRAPHY	2.06 15 TEST 4 WRITTEN OUTPUT PLOTTER OPERATION PRINT SET UP Changing Paper Printer Selection Paper Size Preview LINE WEIGHT (cont.)
STAIR LAYOUT SECTION 2.10 16 MODULAR CONSTRUCTION CMU, PLYWOOD, OSB, CURTAIN WALL, ETC. MASONRY CONSTRUCTION (INTRO) LINE WEIGHT (NCS) cont. HATCH ASSIGNMENT 7 HATCH TRANSPARENCY TOPOGRAPHY DUE X-REF IMAGE ASSIGNMENT 8: RASTER IMAGE UNDERLAY	2.11 17 PROJECT DYNAMICS SPECIFICATIONS CSI MASTERFORMAT PROJECT PHASES SPECIFICATION TYPES DESCRIPTIVE PROPRIETARY PERFORMANCE REFERENCE STANDARD	2.12 18 REVIEW COLD CLIMATE CONSIDERATIONS LAB	2.13 19 TEST 5: FINAL WRITTEN AND DRAWING ASSIGNMENT 8: AS-BUILT ELEVATION DUE