California Polytechnic State University, San Luis Obispo

Construction Management Department

CM 115, Fundamentals of Construction Management, Fall 2019

Instructor:	Thomas Shorey & Dan Knight
Office Location:	Dan Knight 186-204 Thomas Shorey 116-217
Telephone:	Dan Knight 805-756-2613 Thomas Shorey 805-756-6140
Email:	Dan Knight Dknigh01@CalPoly.edu Thomas Shorey TShorey@CalPoly.edu
Office Hours:	Dan Knight; M,W,Tr 11am-1:15pm Thomas Shorey By Appointment {Lab Time 5:15-6:45pm}
Class Days/Times:	M, T, W, TR 12:10-4pm
Classroom:	186-A215
Prerequisite(s):	ARCE 106 or CM 113, Math 141, Phys 141

Course Description

Production of drawings and specifications for residential and light commercial construction. Integration of scheduling, estimating, codes, and contracts with a project based approach. Manual drawing techniques and computer aided drafting with building information modeling develop visualization skills for architectural systems. 4 laboratories, 2 activities.

Course Goals and Learning Outcomes

Course Goals:

As a result of this course, you should be able to:

1. To demonstrate an ability to develop and read a set of residential plans

2. To demonstrate an ability to estimate the quantities of common materials found in a set of residential plans To demonstrate an ability to develop a construction schedule

Course Learning Outcomes (CLOs):

a. To help you develop visualization skills. You need this in order to understand the structure at hand.
   i. Without this, you can't properly estimate the building costs, schedule the sequence of work, or physically build the project.

b. To understand the terminology and symbols used in construction documents (primarily plans and specifications)

c. To understand the content of construction documents

d. To understand materials used in construction

e. To understand how building systems are integrated and how a building is actually built

f. To understand the impact of systems and details used in conventional construction, we will discuss, on occasion, how the project is built, how a sequence of events occur impacting the schedule, the cost implications of various items, the quality and maintenance issues of various items. The purpose is for you to realize how design, quality, cost, schedule, and safety are all interrelated.

Student and Program Learning Outcomes

The American Council for Construction Education (ACCE) is the accrediting body for Cal Poly's construction management program. The ACCE requires achievement of 20 student learning outcomes(SLOs). The construction management program has identified 20 program learning outcomes (PLOs) that equal or exceed the ACCE SLOs and 5 additional idiosyncratic PLOs.

This course supports the following PLOs:

PLO 1: Create written communications appropriate to the construction discipline.
PLO 4: Create construction project cost estimates.
PLO 5: Create construction project schedules.
PLO 6: Analyze professional decisions based on ethical principles.
PLO 7: Analyze construction documents for planning and management of construction processes.
PLO 8: Analyze methods, materials, and equipment used to construct projects.
PLO 10: Apply electronic-based technology to manage the construction process.

Topical Outline, Outcomes, and Method of Assessment

This course has embedded assessment instruments for the PLO(s) listed below:

None in this Course

An overview of content, course learning outcomes, program learning outcomes, instructional activities, and assessment measures, is listed in the table below.

Week	Topical Outline	CLOs	PLOs	Instructional Activities	Method of Assessment
1	QTO 1,2,3,4	A, d, e, f	1,4,8,10	In Class Exercises	Exercises & Midterm Exam
2	QTO 5,6,7,8	A, d, e, f	1,4,6,7, 8,10	In Class Exercises	Exercises & Midterm Exam
3	QTO 9,10,11	A,d ,e, f	1,4,7,8	In Class Exercises	Exercises & Midterm Exam
4	QTO 12,13,14,15	A, d, e, f	1,4,7,8	In Class Exercises	Exercises & Midterm Exam
5	QTO 16,17,18 & Sch 1	D, e, f	1,4, 5,6,7,8	In Class Exercises	Exercises & Midterm Exam
6	SCH 2,3,4	E, f	1,5,7,	In Class Exercises	Exercises & Midterm Exam
7	SCH 5, 6,7,8	E, f	1,5,7	In Class Exercises	Exercises & Midterm Exam
8	SCH 9, 10	E, f	1,5,7	In Class Exercises	Exercises & Midterm Exam
9	Thanksgiving Break				
10	SCH 11,12,13,14	B,c, e, f	1,5,6,7 10	In Class Exercises	Exercises & Midterm Exam
11	SCH: Code Slides and Contractual Relationships , Bim and AutoCAD Models	B,c , d, e, f	6,7,8	In Class Exercises	Exercises & Midterm Exam, Final Projects

Required Texts/Reading

Required: **CM 115 Fundamentals of Construction Management**

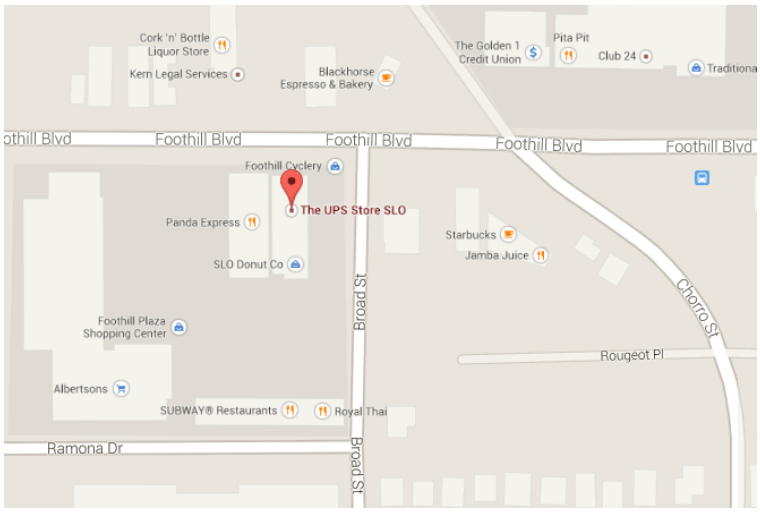
Course Packet: by Paul Weber

Only available at:

The UPS Store
793 E Foothill Blvd., Suite A
San Luis Obispo, CA 93405
Phone (805) 541-9333

Corner of Foothill and Broad

Monday - Friday 8:30 am - 6:30 pm
Saturday 10:00 am - 4:00 pm
Sunday 11:00 am - 4:00 pm



Packets A-H (about 507 pages) + 2" D-ring clear view binder

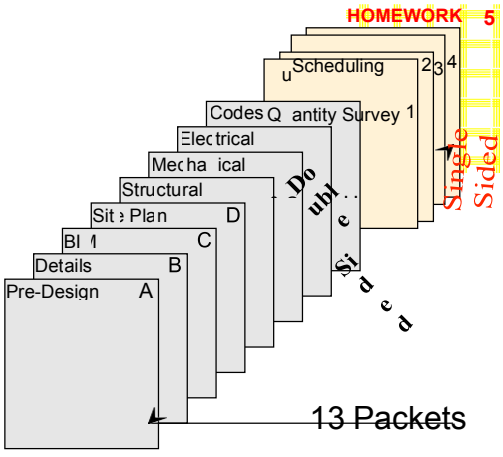
2 blank sets of 5-tab dividers used for **Packets A-H** (see pg. 14).

Packets 1-5 (about 511 pages) + 2" D-ring clear view binder

1 blank sets of 5-tab dividers used for **Packets 1-5** (see pg. 14).

The **1018 page, 2 binder** packet should cost about **$85** including tax.

This cost is less than half price of the quotes I received from FedEx/Kinkos and Staples, so, the UPS folks are giving us a great deal. I don't make a dime off of this. This store is a real convenient place to mail stuff too, by the way!



Other Equipment/Material Requirements

Laptop computer (PC or Mac with Bootcamp) with 2 button mouse (w/ wheel) , calculator, flash drive, hand drafting tools (noted on pages 12-13). MS Word, Excel, PowerPoint, Photoshop or equal.

PC software (on PC's or the PC side of a partitioned MAC). You should know if you have a 32 bit or 64 bit computer. Download free (PC Version):

Autodesk **AutoCAD® 2018** (not AutoCAD Architecture) for PC
Don't use the Mac version of AutoCAD as the user interface is rather dated.

Autodesk **Revit® 2018**

Solid Professor online training **($75)**

Bluebeam Revu (free 30 day trial)

MS Project (free 30 day trial, or use the computer lab)

Classroom Protocol

CLASSROOM CIVILITY

Arrive on time. Do not disrupt the lecture by wandering in and out or by leaving early. Don't chatter or whisper to fellow students during lecture or at other inappropriate times. Turn off your cell phone. No sleeping in class. No dogs or bikes in the classroom. At the end of the period do not cause a disturbance by packing up your things or by starting to leave before the class is dismissed. **Do not plot drawings in the morning when Elbert's class is in session.** Turn your **moby keys** in on time at the end of the quarter as it wastes a lot of staff time tracking you down and disrupts the student's the following quarter if the availability of the **moby** becomes an issue.

WORK LOAD

This class is a lot of work. You'll have to discipline yourself to stay on top of the work. The work load each week varies. It is difficult to arrange assignment work load equally across the quarter.

BACK UP YOUR DATA

Assume you will lose a file due to a malfunction; always **have a back-up**. Don't even bother to complain to me that you lost your file on the computer.

Assignments and Exams

The following assignments and their associated point values are subject to change by the instructor as needed.

Description	**Points**
Exams	1,200 Points (300 per exam)
Drawing Assignments	625 Points
QTOs & SCH exercises	350 Points (10 pts each
Total Points Possible	

Late/Missed Work and Make-Up Policy

No Unexcused Late Work (You Must Have A Note Signed)

Grading Policy

No Unexcused Late Work (You Must Have A Note Signed)

Listed below is the grading scale for this course.

Letter Grade	**Percentage**	**Performance**	**Definition**
A	93 – 100%	Excellent Work	Superior Attainment of Course Learning Outcomes
A-	90 – 92%	Mostly Excellent Work	
B+	87 – 89%	Very Good Work	Good Attainment of Course Learning Outcomes
B	83 – 86%	Good Work	
B-	80 – 82%	Mostly Good Work	
C+	77 – 79%	Very Acceptable Work	Acceptable Attainment of Course Learning Outcomes
C	73 – 76%	Acceptable Work	
C-	70 – 72%	Mostly Acceptable Work	
D+	67 – 69%	Mostly Poor Work	Poor Attainment of Course Learning Outcomes
D	63 – 66%	Poor Work	
D-	60 – 62%	Very Poor Work	
F	0 – 59%	Failing Work	Non-Attainment of Course Learning Outcomes

University Policies

Participation and Attendance

Attendance Requirement and Make-up Policy

This course will enforce the Class Attendance Policy, found the Cal Poly Catalog: http://catalog.calpoly.edu/universitypolicies/

1. Attendance: Some of the finer points in executing an assignment are covered in lecture which requires you to be on time.

2. Time management: Managing your time is one of the most import lessons you may learn in this class. I'm assuming you are only taking 12 - 15 units and do not have a job. Students that have **procrastination** habits will suffer and eventually learn to get out
of that habit or may not graduate from Poly. Help is available at the Student Academic Services via seminars. http://www.sas.calpoly.edu/asc/sss.html

Students are responsible for knowing the University policy regarding class attendance. See this link on Class Attendance Policy provided on the university website.

Add/Drop Policy

Students are responsible for knowing the University policies, procedures, and schedule for dropping or adding classes. See this link on Add/Drop Policy provided on the university website.

Academic Integrity

Students are responsible for knowing the Academic Honesty Policy.

Students with Disabilities

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Disability Resource Center, Building 124, Room 119, at (805) 756-1395, as early as possible in the term, as accommodations may take several weeks to arrange. If you are a student with a disability, please consider discussing your needs and possible accommodations with me as soon as possible, and visit the DRC Website for additional information.

SensusAccess

SensusAccess is a self-service, alternate media solution made available by Kennedy Library to automatically convert files into a range of alternate media including audio books (MP3 and DAISY), e-books (EPUB, EPUB3 and Mobi) and digital Braille. The service can also be used to convert inaccessible files such as image-only PDF files, JPG pictures and Microsoft PowerPoint presentations into more accessible and less tricky formats. This service is available at no charge for all Cal Poly students, faculty, staff and alumni. For additional information, visit SensusAccess at the Kennedy Library.

Technical Support and Contact Information

Support is available for troubleshooting and access issues for PolyLearn. Please visit the PolyLearn Student Support Web Site for further information.

Campus Resources to Support Student Learning

Cal Poly offers programs and resources that are available to assist students during your academic studies, such as the Cal Poly Student Academic Services Web Site.

Additional Information and Reference to Syllabus

PRINTING AND PLOTTING:

Here are the steps for **installing a printer driver** onto your computer

1. Download the proper driver. (go to hp.com)

   HP DesignJet T790ps ePRINTER (*ps = post script*)

   HP LaserJet 5200dtn

   HP LaserJet 5200 PostScript driver

2. Go to the Add Printer Wizard. *hit next*
3. Choose add a Local Printer (do not automatically detect printers). *hit next*
4. Create a new TCP IP port. *hit next*
5. Click Next
6. Insert the **IP address** in the top field. *hit next*

   Building 186, **Room B215,** Rossi Lab
   B 302 Rossi HP LaserJet 5200 Series PCL 5
   HP LaserJet 5200dtn 11" x 17" B & W laserjet IP: **On Back of Printer**

   B 302 Rossi HP Designjet T790ps 24in HPGL2
   HP DesignJet T790 PostScript ePRINTER 24" color plotter IP: **On Back of Printer**

7. Choose Have Disk, and browse to the files you have downloaded from HP
8. Choose the correct printer driver. *hit next*
9. Select the proper printer. *hit next*
10. *hit next*

These directions will walk you through installing a printer on an XP computer; Mac and Vista users will have different instructions.

FINDING THE PRINTER OR PLOTTER

Search google and enter “caed shared server cal poly” and review the information.

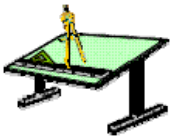
Let me know if theses directions need to be modified for the students next quarter.

The CAED Tech Specialist are Steve, Danny and Michael, 05-106, caedtech@calpoly.edu

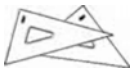
You have to have Mustang Wireless running in order for you to print or plot.

Supplies and Tools

(prices @ El Corral, Sept. 2014 - subject to change)

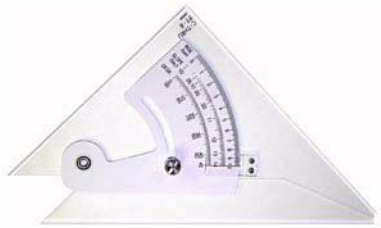


Place your name on these!



Triangles

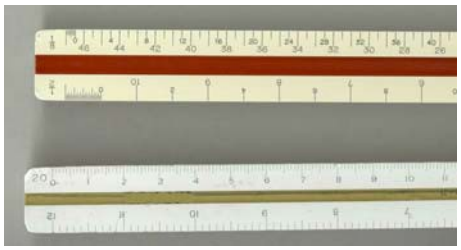
1 plastic: 8", - 30-60-90^0 ($3.95 @ El Corral)
1 plastic: 8", - 45^0 ($3.95 @ El Corral)
1 plastic: 8", adjustable (45^0 when closed)
($13.95 @ El Corral)
1 plastic: 4" 30-60^0 or 45^0 for lettering



Architect's Scale

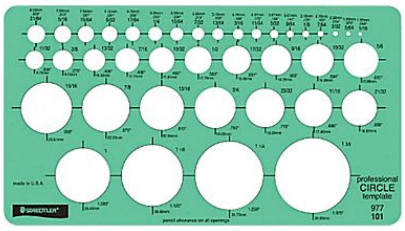
12" long, triangular in shape: it has a number of scales on it.
Full Scale (1 to 12 inches shown with 1/16" divisions)
3" and 1-1/2" 1" and 1/2"
3/4" and 3/8" 1/4" and 1/8"
3/16 and 3/32"

The lower triangle shape scale is an engineer's scale as it subdivides an inch into 10ths, 20ths, 30ths... You don't need one of these for this class.
($3.65, non-packaged @ El Corral)



Circle template:

Architectural (1/2", 1/4", 1/8", ...),
not engineering (1/10, 1/20.....)
It may have metric diameters
(4" x 8" : $5.45 @ El Corral)



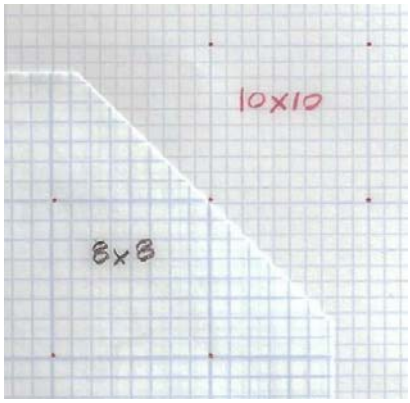
Tape

1 roll of drafting tape (or masking), 3/4" wide (or 1/2"), or drafting dots

French Curve

For curved arrows on hand drawn details
($3.95, @ El Corral)

Paper — Vellum; 17" x 11" Clearprint 1000 HP-**8** with 8x8 fade-out grid. The vellum has eight cells per inch or grid lines 1/8" apart **(don't get the HP-10; that's for engineers)** You'll only need about 10 sheets so four you folks might buy a pack. ($29.95, @ El Corral)



Eraser — White vinyl eraser ($1.95, @ El Corral)

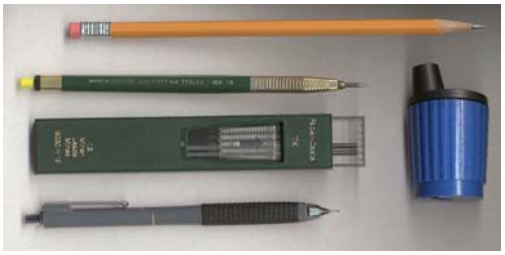
Eraser Shield — Stainless Steel ($0.95, @ El Corral)

Drafting Brush — ($4.95, @ El Corral)

Mechanical Pencil — To hold the lead ($4.95, @ El Corral)

Lead Grades — Recommended **Grade H** (optional grades are 2H, H, F, HB) ($1.95, @ El Corral)

Rotary Lead Pointer — To sharpen lead (pack this in a zip-lock bag) ($5.65, @ El Corral)



The pen shown at the bottom is NOT the type to draft with

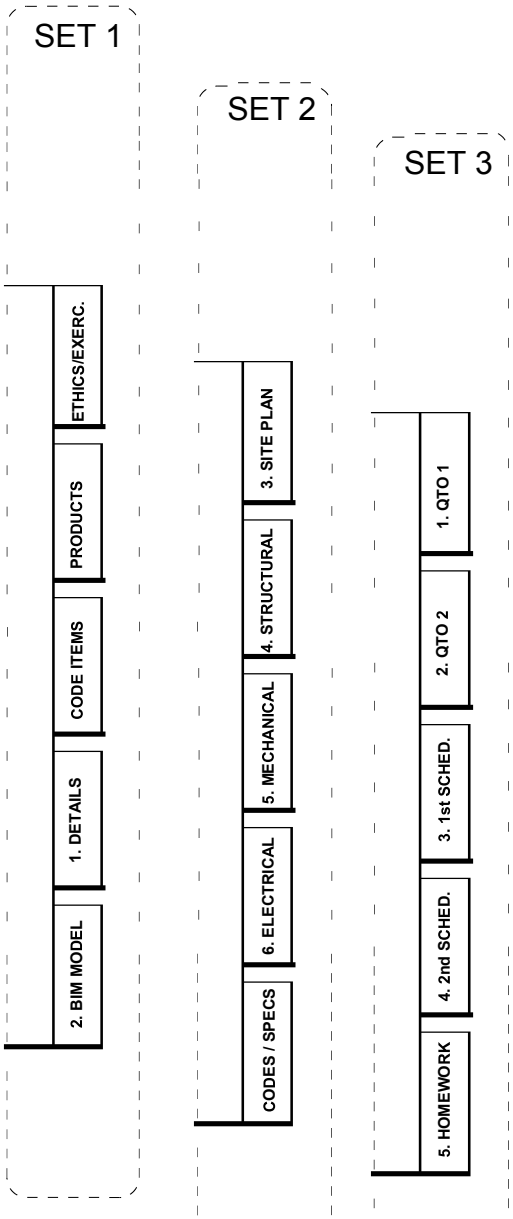
Tab Dividers

Place **tabs** in your binder:

I'll provide you a small sticker sheet that you can peel, then cut, then paste onto the tabs.

Use **3** packages of **blank 5-tab dividers**

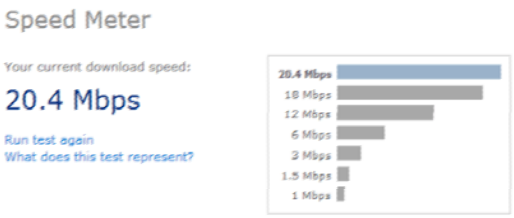
Tab Name	Packet Page	
ETHICS/EXERCISES	A	1
PRODUCTS	A	103
CODE ITEMS	A	135
1. DETAILS	B	1
2. BIM	C	1
3. SITE PLAN	D	1
4. STRUCTURAL	E	1
5. MECHANICAL	F	1
6. ELECTRICAL	G	1
CODES / SPECS	H	1
1. QTO 1	1	1
2. QTO 2	2	1
3. 1st SCHEDULING	3	1
4. 2nd SCHEDULING	4	1
5. HOMEWORK	5	1



It is easier to peel off the whole sheet from the backing then cut the labels into 15 pieces

compared to peeling 15 tiny pieces.

Autodesk® software



DO this ASAP.

Test the speed of your Internet access.

go to **http://www.2wire.com** to test your download speed (Speed Meter). I have 20 Mbps at the moment in my office so it didn't take too long to download the software (about 15 minutes each). It could take 5 hours at 1 Mbps so it will be quicker to do this at school compared to home. I believe student laptops on campus can obtain this speed on the wireless.

Go to Autodesk for free software.

You should know if you have a 32 bit computer or a newer 64 bit computer.

The Student Design Community sponsored by Autodesk® is a FREE website for design students in the fields of architecture, construction, civil engineering and mechanical engineering. Design students and faculty can download free three year licenses, but you'll want to upgrade, free, every spring (Late March, early May).

Go to: http://www.autodesk.com/education/free-software/all

So they know you are a student, use your **calpoly.edu** e-mail address.

Download:
* Autodesk **AutoCAD 2018** ® (not AutoCAD Architecture)
(free vs $4,525)

* Autodesk **Revit** 2018 ® (2014 is ok if 32 bit is what you have)
(free vs $6,825)

Take note of your: **Serial Number: ### - ########**

Product Key: ####

Remember (save it somewhere) your Autodesk **User ID** and **password** as you create an account.
Install as ACTIVATED software, not a 30 day trial; should be good for 3 years.

USE BROWSER DOWNLOAD OPTION

Don't cancel in the middle of the download

After downloading, install the software. As you "install" the downloaded software, make sure all other applications (web browser, email, music, etc.) are closed! This can take 10 to 20 minutes depending on your computer. There are about 10 parts in the install process and one (or two) part may take a lot longer (10 to 15 minutes) than others (you almost think something is wrong, wait, be patient). Launch the software, see if it opens.

Make sure you have up to date Antivirus:

http://www.security.calpoly.edu/content/antivirus/antivirus-download

For 2018-2019 Academic year:

Free MS Office, including MS Project: check out http://calpoly.onthehub.com

These are the instructions on how to download and install VirtualBox for the Mac and the link for getting free Microsoft Software and to get a Windows 10 serial number for VirtualBox. Make sure to click the "DreamSpark Premium" tab to see more software.
http://calpoly.onthehub.com

Step 1)
Download and install "VirtualBox for OS X hosts"
https://www.virtualbox.org/wiki/Downloads

Step 2)
Download and install "VirtualBox Oracle VM VirtualBox Extension Pack for All supported platforms"
https://www.virtualbox.org/wiki/Downloads

Step 3)
The are 2 different downloads you can choose from.
"Windows_10_Base_Student" is a base install with no CAD programs
"Windows_10_AutoDesk_Student" has Revit and AutoCAD and needs your student registration
Once the download is complete and you have already installed VirtualBox and the Extension Pack just double click the downloaded file
https://caedshared.calpoly.edu/index.php/apps/files/?dir=%2FAll%20Students%2FVirtualBox

For questions, email us at: caedtech@calpoly.edu

When you create a model in Revit you can export an image or you can use the *print screen* button on your PC keyboard.

For Mac users, try:

> Hold down Apple key ⌘ + Shift + 4 and release all
> then use your mouse to click on the screen

.

Online training for Revit and AutoCAD from Solid Professor

https://www.solidprofessor.com/student-store/

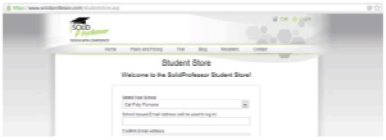
Students: **$75** for multiple titles vs about $500 for each title for businesses
See separate handout

SolidProfessor Student Store Instructions

SolidProfessor is the most complete SolidWorks & Autodesk video library available anywhere. Your school is participating in the SolidProfessor technology grant program which provides you access to SolidProfessor's vast library of resources for your required curriculum for just $75.

SolidWorks Student Editions are also available for a preferred rate. Talk to your instructor for details.

Visit this website to purchase your SolidProfessor License:
http://www.solidprofessor.com/student-store/

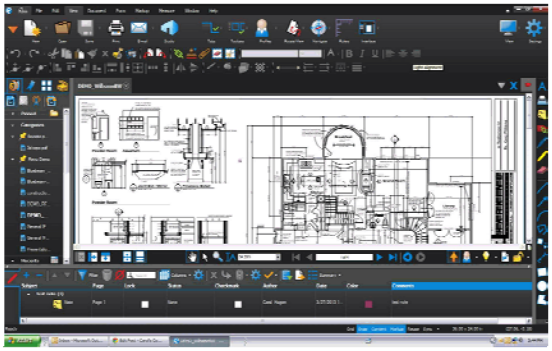


Later in the quarter we'll use free 30 day trials of **Bluebeam Revu** (take-offs and 3D pdf's in Revit) and **MS Project** (Scheduling exercise).

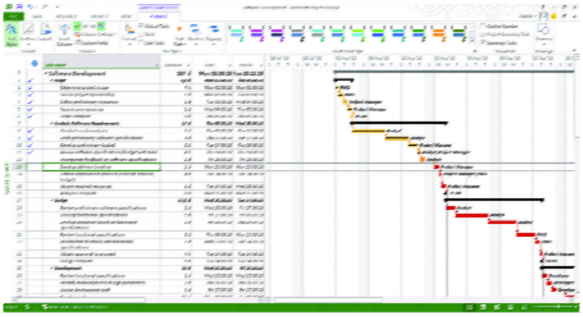
DON'T download them yet. Bluebeam

Revu (30 day free vs $219).

Mac users can run Revu using Boot Camp



MS Project (30 day free vs $589.99).



Mac Users

In order to run Autodesk's **Revit 2016,** Mac users will need to use software so your Mac will run PC software. There is a Mac version for AutoCAD (ugly and old looking UI though) but not Revit. Use the PC one, stay on the PC side of your Mac. You'll need to partition your hard drive (partition at least half of the hard drive: 500 GB in a 1 TB drive) and install Boot Camp (*recommended*), then download the PC version of **AutoCAD 2016** and **Revit 2016** on the PC side of your hard drive running on Boot Camp. You'll need print drivers on the PC side too.

Software to run PC on a Mac:

Boot Camp go to apple.com (students have pretty good luck with this) ~~Parallels parallels.com~~ (avoid this - it makes your computer real slow)

Other?: VMware Fusion (www.vmware.com) or ~~Virtualbox (www.virtualbox.org);~~ Don't use Virtualbox

Additionally, **you'll need the Windows operating system** (**Windows 7** is OK (cheaper), or 8.1 *w/ touch screens, do Mac's have touch screens?*) to run the Autodesk software on the PC (Boot Camp) side of your Mac. I don't know the best place the purchase this (Amazon, Bestbuy, Bookstore, Microsoft). A first-time purchase is more expensive than an "upgrade." Get a legit version (not Bit Torrent = illegal, viruses, old versions) or you'll be hammered with updates.

Drivers: On the same PC side of your Mac you'll need HP printer/plotter drivers (hp.com) for an HP LaserJet 5200dtn 11" x 17" B & W laserjet and a HP DesignJet T770 24" color inkjet plotter. *You would need a Mac version of these driver if you print/plot, in what ever software, on the Mac side of your computer.*

Study Guide

A VERY IMPORTANT NOTE: The exams will emulate what you'll be doing in each exercise. Do the exercises yourself and understand the exercise thoroughly. Be able to do a similar one under the pressure and the time constraints you'll experience in the exams and, eventually, in an office situation. (subject to some changes)

Exam #1 * *Drawing Topics (Packets A-H)*

Part	Topic	Exhibits	
1	CSI MasterFormat 1995 (16 Divisions)		
*2**	*Wall Section Sketch*	*Exhibit A*	*Wall Section Sketch*
*3**	*Elevation Sketching from Roof Plan*	*Exhibit B*	*Elev. Sketch of Roof Plan*
*4**	*Codes: Windows, Stairs, Framing Terms*	*Exhibit C*	*Isometric of Framing Terms*
	Window: egress: size/area; light/ventilation; type Stair: Rise, run, width, headroom		
	Framing: terms, blocking vs continuous		
5	Construction Math		
6	Roof Calculations		
7	Dump Truck Cycle Time		
	Earth Work Calculation	Exhibit D	Earthwork Calculations (Site plan with contours)
8	Concrete Take-off (Length + Area)	Exhibit E.1	Foundation Plan
9	Concrete Take-off (Volume)	Exhibit E.2	Foundation Detail
10	Formwork Wood (Plywood)		
	Formwork Wood (2x's)		

Exam #2 * *Drawing Topics (Packets A-H)*

Part	Topic	Exhibits	
*1**	*Graphical Problem Solving: Wall Sketch*	*Exhibit 1A*	*Wall Section Sketch*
		Exhibit 1B	*AISC Steel Table*
*2**	*Solve Roof Plan & Elevation Sketching*	*Exhibit 2*	
*3**	*Using the C.B.C. Structural Tables*	*Part 3:*	*5 CBC Tables* *(back of the exam)*
4	QTO: Rebar	Exhibit 4A	Foundation Plan
	QTO: CMU	Exhibit 4B	Foundation Detail
		Exhibit 4C	ASTM Rebar Table
5	Metal	Exhibit 5A	Plan
		Exhibit 5B	AISC Tables
6	Floor Framing and Subfloor	Exhibit 6	Floor Joist Framing
7	Plate Framing	Exhibit 7A	Small Cottage Floor Plan
	Insulation	Exhibit 7A	Small Cottage Floor Plan
	Drywall	Exhibit 7A	Small Cottage Floor Plan
	Common Rafters, Valley Flashing, Fascia	Exhibit 7B	Cottage Framing Plan
	Board Feet & Material Prices		
8	Floor Area	Exhibit 8A-F	1st and 2nd Floor Plan
	Ridge Cap		Exterior Elevations
	Siding		Roof Framing Plan
9	CSI MasterFormat 1995 (16 Divisions)		

Exam #3 ** Drawing Topics (Packets A-H)*

Part	Topic	Exhibits
1	AOA Diagrams	
2	CSI MasterFormat 2012 (50 Divisions)	
3	Type of Schedules	
4	Duration Calculation	9 RS Means tables
5	Miscellaneous Factors	4 RS Means tables
6	Gantt Chart	
7	CPM Diagrams (AOA)	
8	CPM Diagrams (AON)	
9	Wall Section	
	Stair Questions	
	Roof Framing	
10	Ethics	

Exam #4 ** Drawing Topics (Packet H)*

Part	Topic	Exhibits
A	Crashed AOA CPM	AOA Crashing Diagram
B	AON Free Float Analysis	AON Free Float Diagram
C	Crashed LBD (diagram)	3 Line Balance Diagrams
D	Crashed LBD (table)	
E	Cumulative Questions	Floor, Foundation, Framing Plans
F	CSI MasterFormat 2012 (50 Divisions)	
*G**	*Specifications*	
*H**	*Mech. + Framing Terms*	
*I**	*Misc. Code Questions*	
*J**	*Occupancy Classifications*	
*K**	*Fire-resistive Requirements*	
*L**	*Allowable Building Area*	
*M**	*Occupant Loads and Exiting*	
*N**	*Widths of Exiting Components*	

COMPONENTS OF GRADING

Exams

	Exam No.	Points	Track your score
	Exam 1 Bring Scantron Form 882-E	300	
	Exam 2 Bring Scantron Form 882-E	300	
	Exam 3 Bring Scantron Form 882-E	300	
	Exam 4 Bring Scantron Form 882-E	300	
		1,200	
	No questions will be answered during the exam.		

Drawing Assignments

No.	Assignment	Points	Track your score
	Ethics assignments 9 @ 5 points	45	
	Solid Professor?		
	Exercise A. Lettering Exercise	10	
	Exercise B. Scaling Exercise		
	Exercise C. Wall Section Exercise (Exam 2)		
	Exercise D. Wall Section to Elevation Exercise		
	Exercise E. Roof Plans		
	Exercise F. Roof Plan with Four Elevations Exercise (Exam 2)		
	Exercise G. Floor Plan Dimensioning Exercise		
	Exercise H: Structural Layout (Exam 3)		
1	12 Architectural and Structural Details (10 points each)	120	
2	Initial BIM Model	50	
	Intermediate BIM prints (5 to 20 pts)	TBA	
3	AutoCAD Site Plan and Roof Plan	100	
	Intermediate AutoCAD prints (5 to 20 pts)	TBA	
4	AutoCAD Structural Plans	100	
5	AutoCAD Mechanical Plan	100	
6	AutoCAD Electrical Plan	100	
2	Final BIM Model (Renderings)	50	
		625	

Quantity Take-Off and Scheduling Assignments

No.	Assignment (flip to collect)	Points	Track your score
EXAM 1	*Quantity Take-Off*		
QTO 1	Introductory Assignment (Construction Math)	10	
QTO 2	Volume Calculations (new this quarter)	10	
QTO 3	Roof rafter, hip, valley, and roof area calculations	10	
QTO 4	Bid Format and Spreadsheet	10	
QTO 5	Sitework Excavation	10	
QTO 6	Sitework Excavation Spreadsheet	10	
QTO 7	Concrete Foundation	10	
QTO 8	Concrete Flatwork and Backfill	10	
QTO 9	Concrete Formwork	10	
EXAM 2	*Quantity Take-Off*		
QTO 10	Concrete Reinforcing (Rebar)	10	
QTO 11	Masonry (CMU and Brick Veneer)	10	
QTO 12	Metals (Structural Steel)	10	
QTO 13	Rough Lumber 1 (Floor Joist Framing)	10	
QTO 14	Rough Lumber 2 (Wall Framing)	10	
QTO 15	Rough Lumber 3 (Roof Framing)	10	
QTO 16	Roofing, Valley Flashing and Gutters	10	
QTO 17	Siding, Stucco, and Wall Flashing	10	
QTO 18	Insulation, Gypsum Wallboard, and Paint	10	
TDB	*Bluebeam assignments*	*10*	
TDB	*Revit to Excel assignments*	*10*	
TDB	*Revit 3D pdf via Bluebeam assignments*	*10*	
EXAM 3	*Scheduling*		
Sch. 1	Miscellaneous Factors (Size, Inflation, Location)	10	
Sch. 2	Duration Estimations	10	
Sch. 3	Bar Chart	10	
Sch. 4	Residential Bar Chart	10	
Sch. 5	ADM (AOA) and PDM (AON) Diagrams	10	
Sch. 6	ADM, (AOA) Forward/Backward Pass, Float	10	
Sch. 7	PDM, (AON) Forward/Backward Pass, Float	10	
Sch. 8	Residential Cash Flow	10	
EXAM 4	*Scheduling*		
Sch. 9	Matrix Schedule	10	
Sch. 10	Free Float	10	
Sch. 11	Crashing the (AOA) Schedule	10	
Sch. 12	Line of Balance Diagrams	10	
Sch. 13	3 span bridge using MS Project	10	
Sch. 14	Advanced Microsoft Project	**10**	

GRADING SCALE

Grading of Drawing Assignments

Leniency or harshness of grading will also take plan size and complexity into account as some student's plans are more complex to draw. The grading is based on the following criteria:

A **Superior** or **Outstanding**. Exemplary work of professional quality.

B **Excellent**. Work that has minimal room for improvement.

C **Good** or **Average**. This is assumed. Work that has some room for improvement.

D **Below Average**. Should really be much better. A poor set of documents leads to too many requests for information (RFI's), which wastes time, leads to inflated bids, and law suits.

F **Unsatisfactory**. We really need to sit down and discuss things.

	A = 93.0+	A- = 92.9 - 90.0
B+ = 89.9 - 87.0	B = 86.9 - 83.0	B- = 82.9 - 80.0
C+ = 79.9 - 77.0	C = 76.9 - 73.0	C- = 72.9 - 70.0
D+ = 69.9 - 67.0	D = 66.9 - 63.0	D- = 62.9 - 60.0
F = < 60	*I curve a bit at the end of the quarter.*	

The various "hats" I'll wear will affect you in varying ways: As your *professor*

As your *boss* (in an office that produces drawing such as a design-build firm)
How you pay attention to lectures, the assignment requirements, and the "client's needs" is an important skill for employment.

As a *building official* (checking your work for code compliance) As your *client*

I'll be checking your work for a design that meets my needs as the client.

When you read building plans in the future, you'll have to take two dimensional drawings and specifications and build the project three dimensionally in your mind in order for you to do:

Engineer: Understanding what tributary areas affect structural members Estimate costs: Quantity surveys of: material, labor, and equipment costs Develop schedules: Sequence of activities based on plans and details Value engineering: Proposing modified materials, methods, and systems

If you are required to schedule a project, you'd have an easier time if you have done the estimate for the project. If you had to estimate the project , you'd have an easier time if you have done the drawings (typically not done by contractors, except for some residential projects).

Fall 2018 CM 115 notes 11 x

17 copies of your details

ARCE students - use the machine ion the ARCE hallway by your labs, 1st floor Bldg. 21

CM students - in the CM computer lab, use your Cal Poly student ID card, the "code" is your student ID # but not the 1st two digits (probably zeros) of your ID#

Missing Revit Family

If you are missing a Revit Family, you can use a flash drive to get one from your friend.

In partitioned Apples (w/ Bootcamp... something similar w/ virtual box I assume) the directory path will be:

BOOTCAMP (C:)
ProgramData
Autodesk
RVT 2016
Libraries
US Imperial

For PC's I imagine you won't see the Bootcamp part.

http://www.caed.calpoly.edu/techsupport