Working Drawings:

Floor Plans

CMCE 1110 Construction Drawings
Professor Anderson
Working Drawings Technical drawings describing the project in pictorial form for the builder to execute, fully explaining what has to be done.

How a building gets built:

• 3 main parties involved:
  1. Owner
  2. Design Professional
  3. Builder

• Typical Contractual Agreements:
  • Owner hires architect to develop a design
  • General Contractor is selected to build the project, usually via competitive bidding

• Key Roles:
  • Architect / Engineer: codes, MEP, structural
  • General Contractor: responsibility for constructing the project
  • Sub-Contractors: independent construction firms that specialize in a specific trade (carpenter, electrician, concrete, etc)
5 Project Phases:
1. Preliminary / Schematic Design: explore ideas for the building, code research
2. Design Development: develop one design exclusively
3. Contract Documents: develop to fully describe the project
   • working drawings
   • Specifications
4. Bid Documents: bidding and negotiation
5. Construction Administration: administer the contract documents, shop drawings and construction sketches. Architect continues to coordinate with the GC to make sure the project is built to the standards defined in the CD’s

Building Codes:
*Working Architectural Drawings must conform with the applicable building codes.
Building Code: laws that provide for the health, safety, and general welfare of the public.

Building Permits:
Plans and specs are submitted and reviewed by building department officials to determine whether the project meets local building codes. A GC must have a building permit to begin construction on the project. Work is inspected by building officials and construction progresses.
Plans

Horizontal section at around 4’ AFF (above finish floor) drawn at a scale that enables one to see the whole plan.

The most important drawing.

- Typically at the beginning of the drawing set
- Refers you to other drawings in the set - Symbols
- Dimensions and Notes to indicate quantity and location of an item or feature

Types of Plans (all drawn at same scale):

- Floor/Roof Plans
- Structural
- MEP
- Code Analysis
Symbols

Symbols and reference markers are necessary for navigating the drawing set. They tell whoever is looking at a drawings where to go to find more information about certain elements.
Escherick House

Louis Kahn, 1959-1961
204 Sunrise Lane, Philadelphia, PA

SECOND FLOOR PLAN

FIRST FLOOR PLAN
CAD Techniques (Review)

- Units
- Text and Dimension Styles
- Construction Lines
- Offset
- Circle
- Arc

Tools we have learned:
- Line and X-Lines
- Offset
- Extend/Trim
- Fillet
- Copy/Paste
- Ortho Mode and Polar Tracking
- Object Snap
- Layers and Color Styles
- Line-types
- Dimensioning

- Paper Space vs Model Space
- Viewports
Drawing Units

1. Click on "Drawing Utilities" in the menu.

2. Select "Drawing Properties".

   - Under "Units", choose your preferred unit type (e.g., Architectural, Decimal).
   - Specify precision if needed.
   - Choose units for scales by selecting "Inches" or any other unit.

* Or type "units"
Adding Text Styles

You will need to create a text style for heading (1/4”) and body text (1/8”) per the associated text scale factor. The text scale factor is based on the scale of the drawing in your viewport.

For example: I draft my floor plan at 1:1 in model space and I want the drawing to print at a scale of 1/4”=1’-0”. I will create a text style for body text with height of 6" (Refer to chart).
Adding Dimension Styles

You will need to create dimension styles for based on the scale of the drawing in your viewport. For example: I draft my floor plan at 1:1 in model space and I want the drawing to print at a scale of 1/4” = 1’-0”. I will create a dimension style with a scale factor of 48 (Refer to chart).
Adding Dimension Styles
Construction Lines

Lines that extend to infinity and can be used as guidelines.

*or type “xl” for x-line
- then “h” for a horizontal line
- or “v” for vertical line
Offset

Offset creates concentric circles, parallel lines and parallel curves.

Resources: Autodesk / To Offset and Oject

*or type “o”
Trim/Extend

Trim objects to meet the edges of other objects.

Resources: Autodesk / Trim Command

1*down arrow for extend command

3*click in upper right corner, then click in lower left corner of trim area
Circle

Access: Click circle button in Home tab or type “C”. Use ↓ to cycle through construction options.

Resources: Autodesk Support: Circle Command

2 (follow dynamic input prompts)
Arc

To create an arc, you can specify combinations of center, endpoint, start point, radius, angle, chord length, and directional values. Arcs are drawn in counterclockwise direction by default.

Access: Home tab or type “arc”

Resources: Autodesk Support: Arc Command

Ex: 3-Point Arc
Arc – Drawing a Door Swing

Arcs can be used to draw window or door swings.
CAD Techniques

- Circle
- Arc
- Ellipse
- Blocks

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Ellipse

For “axis, end” option, the first 2 points determine the location and length of the first axis. The 3\textsuperscript{rd} point determines the distance between the center of the ellipse and the end point of the second axis.

Access: Home tab or type “el”

Resources: Autodesk Support: Ellipse Command
Blocks

A block is a named group of objects that act as a single 2D or 3D object. Use them to create repeated content (symbols, components) such as doors, windows, appliances, fixtures.

Access: Home tab or “b” to define a block and “i” to insert a block.

Resources:
Autodesk Support: Block Command
Autodesk: What is a Block?
Blocks

To define a block, type “b”. Name the block (ex: “door”). Select base point (this is the insertion point for the block) and the objects you want to use to create a block. Check your setting units are inches.
Edit Blocks

By redefining a block, you automatically update all references to that block.

Tip: If the actual linework within your block is on the “0” layer, the linework will display as whichever layer you place the block. This allows for the same block to appear as different line weights.
Process:
1. Regulating Lines
   a) Building Control Lines
   b) Overall Dimensions
   c) Structural Lines
2. Walls
   a) Walls
   b) Doors
   c) Windows
   d) Fixtures
3. Annotation
   a) Symbols
   b) Dimensions
   c) Notes
4. Sheet
   a) Titles
   b) Titleblock
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Assignment Specifications:

• Email your progress drawing at the end of this class. *You must use your City Tech email address and email to the gmail submission email address. Include the assignment title in the email subject line.
• Name files: Last Name First Name – Assignment # Assignment Title.
• Example: Anderson Nicole – Assignment 8 First and Second Floor Plans
• Email final submission *BEFORE THE START OF THE NEXT CLASS*
• Submit 8.5”x11” plot of each drawing *AT THE START OF THE NEXT CLASS* - bind/staple as required