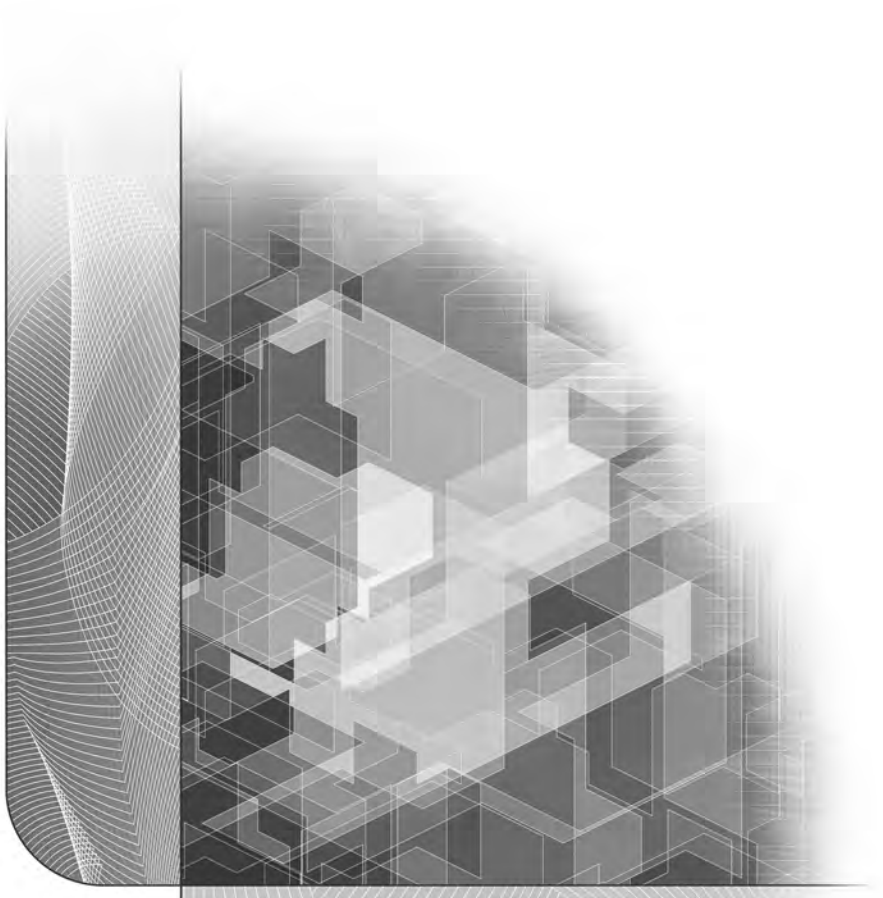

AutoCAD 2013 for Engineers & Designers

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DEDICATION

To teachers, who make it possible to disseminate knowledge
to enlighten the young and curious minds
of our future generations

To students, who are dedicated to learning new technologies
and making the world a better place to live in

THANKS

To the faculty and students of the MET Department of
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INTRODUCTION

AutoCAD, developed by Autodesk Inc., is the most popular PC-CAD system available in the market. Today, over 7 million people use AutoCAD and other AutoCAD-based design products. 100% of the Fortune 100 firms and 98% of the Fortune 500 firms are Autodesk customers. AutoCAD's open architecture allows third-party developers to write application software that has significantly added to its popularity. For example, the author of this book has developed a software package "**SMLayout**" for sheet metal products that generates a flat layout of various geometrical shapes such as transitions, intersections, cones, elbows, tank heads, and so on. Several companies in Canada and United States are using this software package with AutoCAD to design and manufacture various products. AutoCAD also facilitates customization that enables the users to increase their efficiency and improve their productivity.

The **AutoCAD 2013 for Engineers & Designers** textbook contains a detailed explanation of AutoCAD commands and their applications to solve drafting and design problems. Every AutoCAD command is thoroughly explained with the help of examples and illustrations. This makes it easy for the users to understand its function and application in the drawing. After reading this textbook, you will be able to use AutoCAD commands to make a drawing, dimension a drawing, apply constraints to sketches, insert symbols, apply materials, render a scene as well as create text, blocks and dynamic blocks, 3D objects, drafting views of a model, surface objects, mesh objects, and solid models.

The book also covers basic drafting and design concepts that provide you with the essential drafting skills to solve the drawing problems in AutoCAD. These include orthographic projections, dimensioning principles, sectioning, auxiliary views, and assembly drawings. While going through this textbook, you will discover some new unique applications of AutoCAD that will have a significant effect on your drawings. In addition, you will be able to understand why AutoCAD has become such a popular software package and an international standard in PC-CAD.

Formatting Conventions Used in the Textbook

Please refer to the following list for the formatting conventions used in this textbook.

Convention	Example
• Latest enhancements of AutoCAD are designated by an asterisk symbol at the end of the feature.	**SURFNETWORK***, **SURFPATCH***
• All the exercises that are designated by a double asterisk symbol at the end of the question are courtesy of CADCIM Technologies.	Draw a detail drawing whose top, side, and section views are given in Figure 14-36. Then, hatch the section view.**
• Command names are capitalized and written in boldface letters.	The **MOVE** command
• A key icon appears when you have to respond by pressing the ENTER or the RETURN key.	Enter
• Command sequences are indented. The responses are indicated in boldface. The directions are indicated in italics and the comments are enclosed in parentheses.	Command: **MOVE** Select object: **G** Enter group name: *Enter a group name (the group name is group1)*
• The methods of invoking a tool/option from the **Ribbon**, **Menu Bar**, **Quick Access toolbar**, **Tool Palettes**, **Application menu**, toolbars, Status Bar, and Command prompt are enclosed in a shaded box.	**Ribbon:** Draw > Line **Menu Bar:** Draw > Line **Tool Palettes:** Draw > Line **Toolbar:** Draw > Line **Command:** LINE or L
• Icons are placed near the topics that are relevant for the *Certified Exams*	

Naming Conventions Used in the Textbook

Tool

If you click on an item in a toolbar or a panel of the **Ribbon** and a command is invoked to create/edit an object or perform some action, then that item is termed as **tool**.

For example:
To Create: **Line** tool, **Circle** tool, **Extrude** tool
To Edit: **Fillet** tool, **Array** tool, **Stretch** tool
Action: **Zoom** tool, **Move** tool, **Copy** tool

If you click on an item in a toolbar or a panel of the **Ribbon** and a dialog box is invoked wherein you can set the properties to create/edit an object, then that item is also termed as **tool**, refer to Figure 1.

For example:
To Create: **Define Attributes** tool, **Create** tool, **Insert** tool
To Edit: **Edit Attributes** tool, **Block Editor** tool

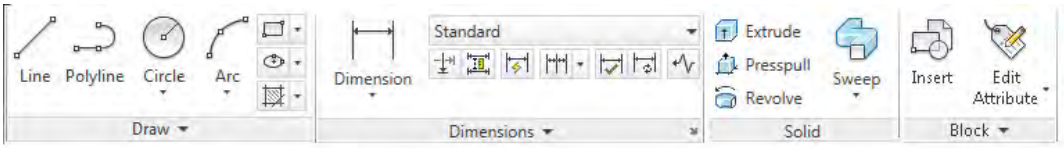

Figure 1 *Various tools in the* ***Ribbon***

Button

If you click on an item in a toolbar or a panel of the **Ribbon** and the display of the corresponding object is toggled on/off, then that item is termed as **Button**. For example, **Grid** button, **Snap** button, **Ortho** button, **Properties** button, **Tool Palettes** button, and so on; refer to Figure 2.

Figure 2 *Various buttons displayed in the* ***Status Bar*** *and* ***Ribbon***

The item in a dialog box that has a 3d shape like a button is also termed as **Button**. For example, **OK** button, **Cancel** button, **Apply** button, and so on. Refer to Figure 3 for the terminology used for the components in a dialog box.

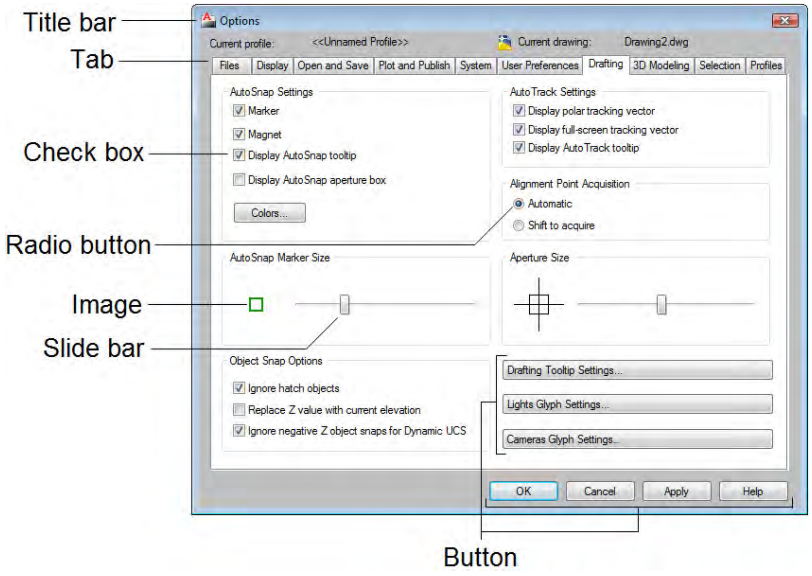

Figure 3 *The components in a dialog box*

Drop-down

A drop-down is one in which a set of common tools are grouped together for creating an object. You can identify a drop-down with a down arrow on it. These drop-downs are given a name based on the tools grouped in them. For example, **Circle** drop-down, **Fillet/Chamfer** drop-down, **Create Light** drop-down, and so on; refer to Figure 4.

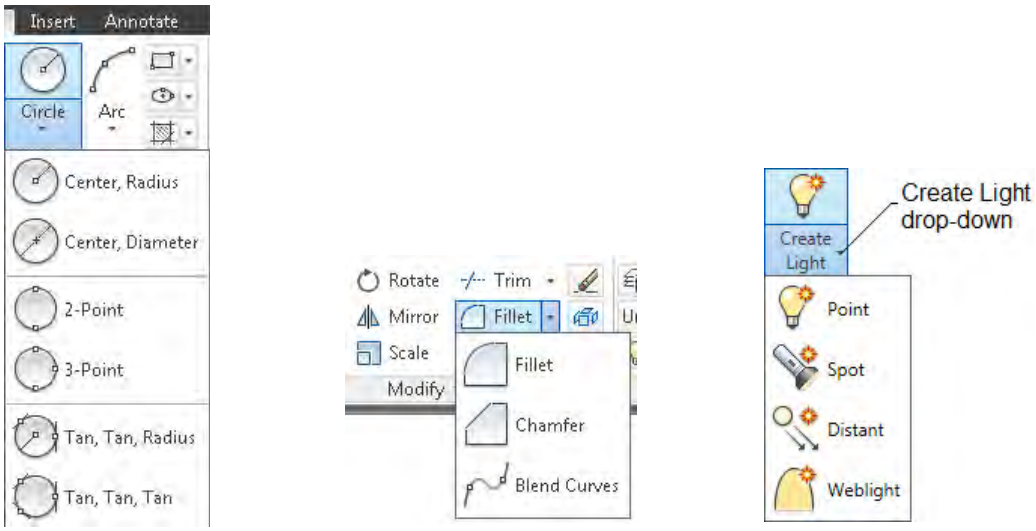

Figure 4 *The* ***Circle***, ***Fillet/Chamfer***, *and* ***Create Light*** *drop-downs*

Drop-down List

A drop-down list is one in which a set of options are grouped together. You can set various parameters using these options. You can identify a drop-down list with a down arrow on it. To know the name of a drop-down list, move the cursor over it; its name will be displayed as a tool tip. For example, **Lineweight** drop-down list, **Linetype** drop-down list, **Object Color** drop-down list, **Visual Styles** drop-down list, and so on; refer to Figure 5.

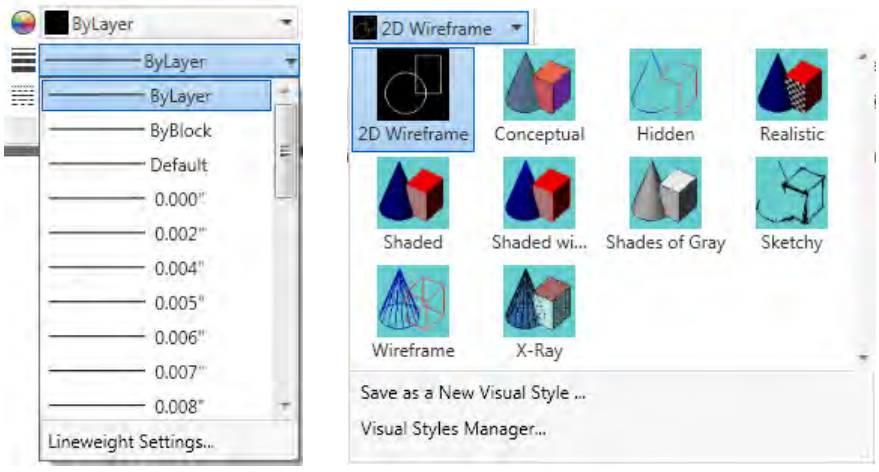

Figure 5 *The* ***LineWeight*** *and* ***Visual Styles*** *drop-down lists*

Options

Options are the items that are available in shortcut menu, drop-down list, Command prompt, **Properties** panel, and so on. For example, choose the **Properties** option from the shortcut menu displayed on right-clicking in the drawing area, refer to Figure 6.

Tools and Options in the Menu Bar

A menu bar consists of both tools and options. As mentioned earlier, the term **tool** is used to create/edit something or perform some action. For example, in Figure 7, the item Box has been used to create a box shaped surface; therefore it will be referred to as the **Box** tool.

Similarly, an option in the menu bar is the one that is used to set some parameters. For example, in Figure 7, the item Linetype has been used to set/load the linetype; therefore it will be referred to as an option.

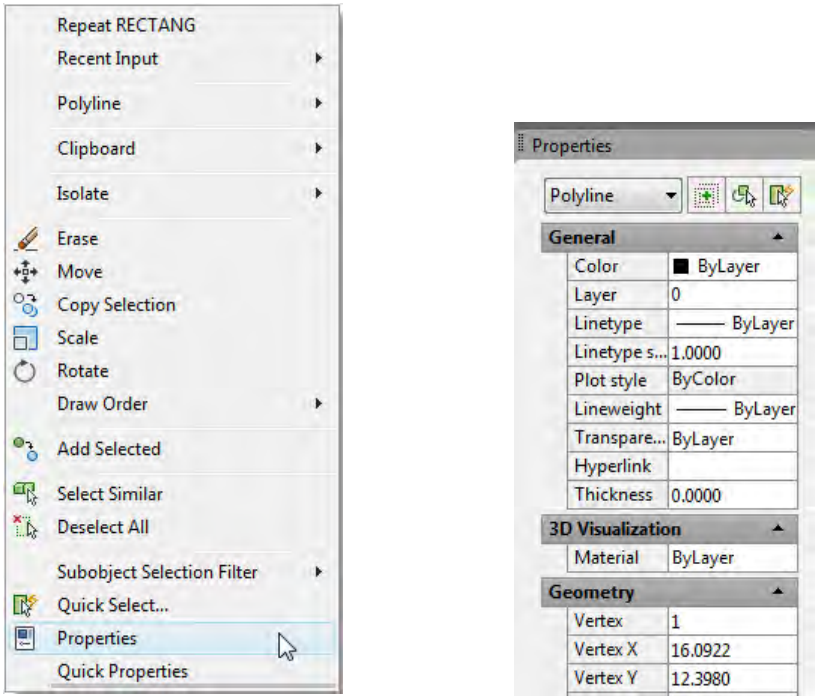

Figure 6 *Options in the shortcut menu and the* ***Properties*** *palette*

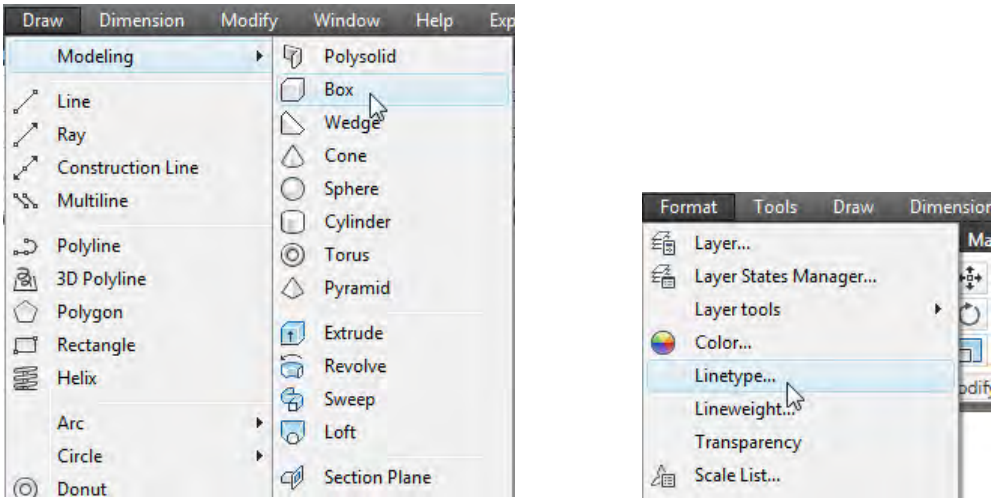

Figure 7 *Tools and options in the menu bar*

Free Companion Website

It has been our constant endeavor to provide best textbooks and services at affordable prices. In this effort, we have come out with a free companion website that will facilitate the process of teaching and learning of AutoCAD 2013. On purchasing this textbook from our website (*www.cadcim.com*), you will get access to the companion website that has the following additional resources for the faculty and students.

- **Tech Support**
  You can get the online technical support by contacting *techsupport@cadcim.com.*

- **Instructor Guide**
  Instructor guide containing solutions to all review questions and exercises is provided. (For Faculty only)

- **PowerPoint Presentations**
  The contents of the book are arranged in the powerpoint slides that can be used by the faculty for their lectures. (For faculty only)

- **Part Files**
  The parts (wire files) used in illustrations and examples are available for free download. If you are a faculty member, you can download the exercise files also.

- **Chapters for Free Download**
  Two chapters available for free download covering the Surface Evaluation and the Sketching tools.

AutoCAD Part I

Author's Website

For Faculty: If you are a faculty member, please contact the publisher at *sales@cadcim.com* or the author at *stickoo@purduecal.edu* or *tickoo525@gmail.com* to access the website that contains the following teaching resources:

1. PowerPoint presentations, program listings, and drawings used in this textbook.
2. Syllabus, chapter objectives and hints, and questions with answers for every chapter.

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