AutoCAD 2017
for Engineers and Designers, 3D and Advanced
(23rd Edition)

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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

SPECIAL RECOGNITION

A special thanks to Mr. Denis Cadu and the ADN team of Autodesk Inc.
for their valuable support and professional guidance to
procure the software for writing this textbook

THANKS

To the faculty and students of the MET department of
Purdue University Northwest for their cooperation

To employees of CADCIM Technologies for their valuable help

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Preface

AutoCAD 2017

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 2017 for Engineers and Designers - 3D and Advanced** textbook contains detailed explanation of AutoCAD commands and their applications to solve design problems. Every AutoCAD command is thoroughly explained with the help of examples and illustrations. This makes it easy for the users to understand the functions and applications of the tools and commands. After reading this textbook, you will be able to create 3D objects, apply materials to objects, generate drafting views of a model, create surface or mesh objects, and render and animate designs.

The book covers designing concepts in detail as well as provides elaborative description of technical drawing in AutoCAD including 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 and designs. In addition, you will be able to understand why AutoCAD has become such a popular software package and an international standard in PC-CAD.

Symbols Used in the Textbook

Note

The author has provided additional information to the users about the topic being discussed in the form of notes.

Tip

Special information and techniques are provided in the form of tips that will increase the efficiency of the users.

New

This symbol indicates that the command or tool being discussed is new.

Enhanced

This symbol indicates that the command or tool being discussed has been enhanced in AutoCAD 2017.

Formatting Conventions Used in the Textbook

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

- Command names are capitalized and written in boldface letters.

  Example: The **MOVE** command

- A key icon appears when you have to respond by pressing the ENTER or the RETURN key.

- 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

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**, refer to Figure 1.

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

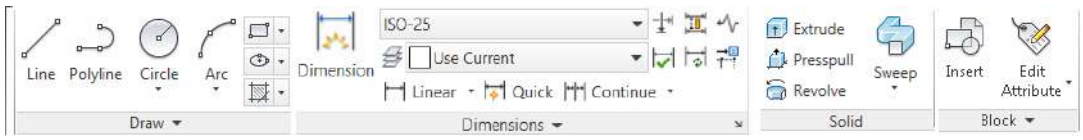

Figure 1 *Various tools in the* ***Ribbon***

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.

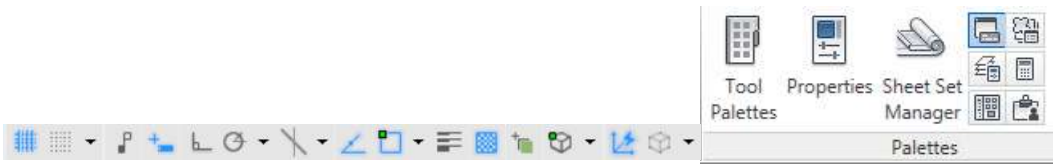

Figure 2 *Various buttons displayed in the* ***Status Bar*** *and* ***Ribbon***

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.

Dialog Box

In this textbook, different terms are used for referring to the components of a dialog box. Refer to Figure 3 for the terminology used.

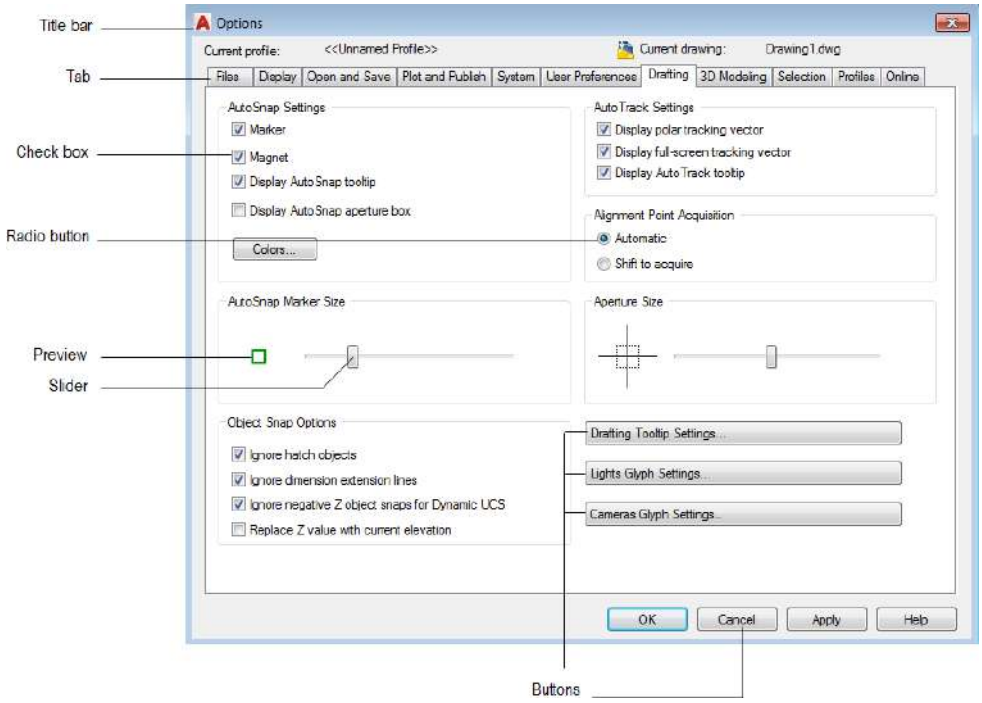

Figure 3 *The components of a dialog box*

Drop-down

A drop-down is the one in which a set of common tools are grouped together. 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.

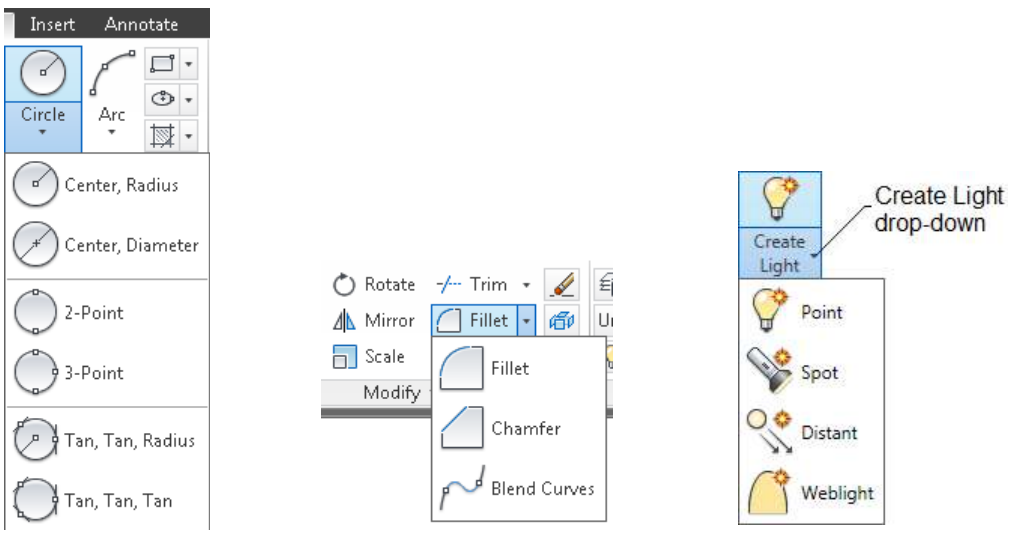

Figure 4 *The* ***Circle***, ***Fillet/Chamfer***, *and* ***Create Light*** *drop-downs*

Drop-down List

A drop-down list is the 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.

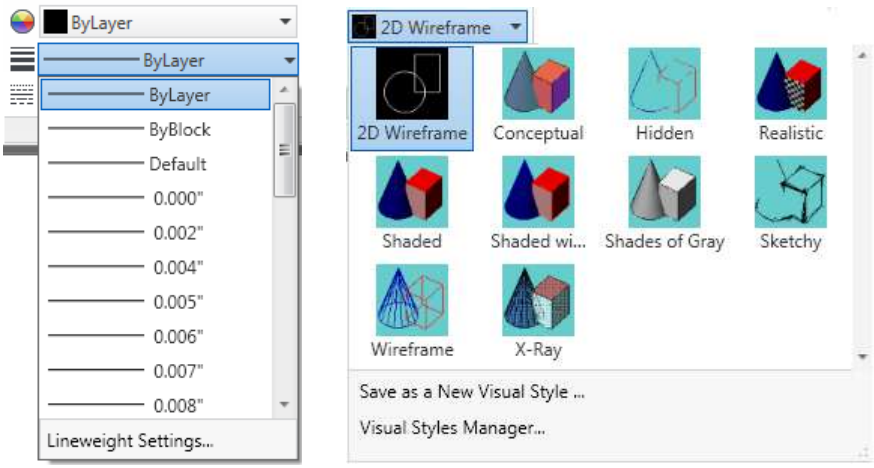

Figure 5 *The* ***Lineweight*** *and* ***Visual Styles*** *drop-down lists*

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 Menu Bar

A menu bar consists of both tools and options. As mentioned earlier, the term **tool** is used to create/edit something or to 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.

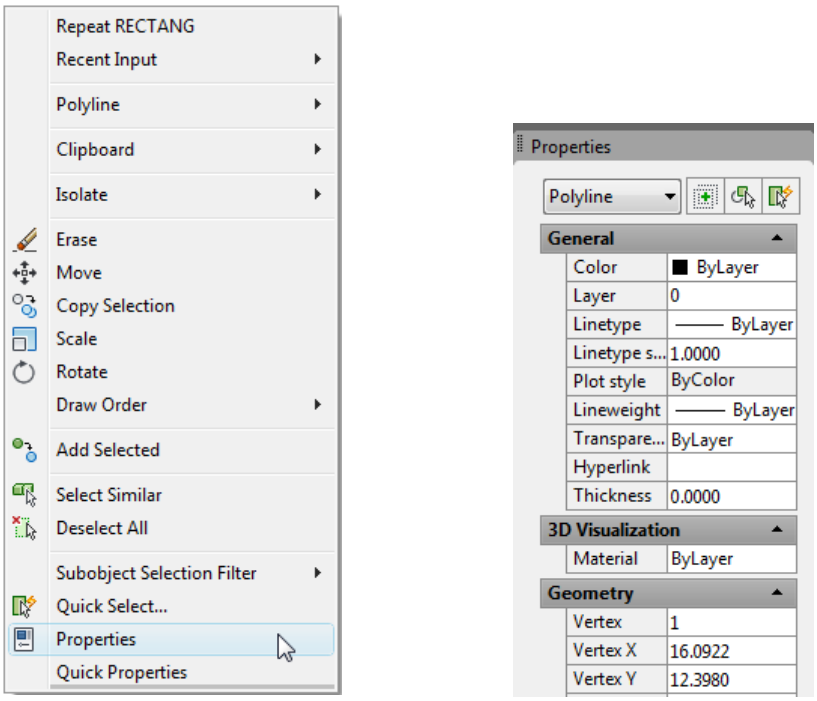

Figure 6 *Options in the shortcut menu and the* ***Properties*** *palette*

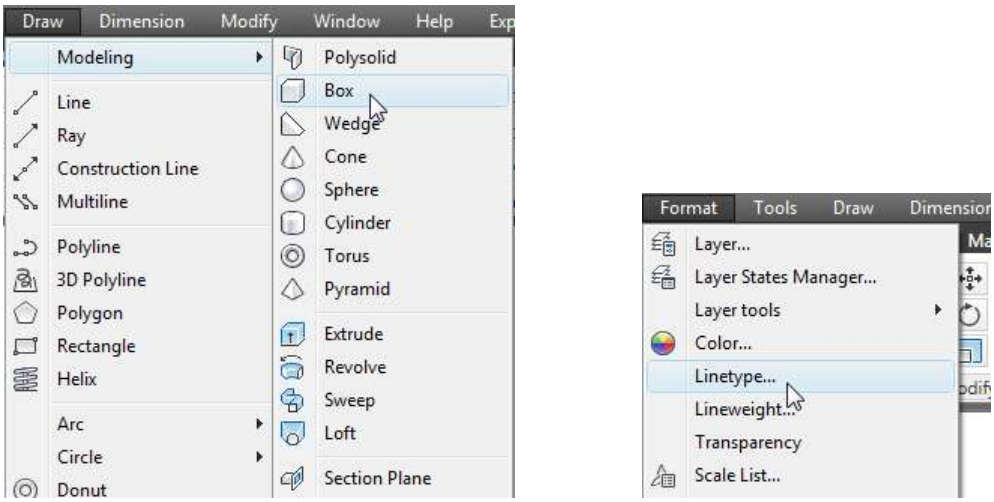

Figure 7 *Tools and options in the menu bar*

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The following resources are available for the faculty and students in this website:

Faculty Resources

- **Technical Support**
  The faculty can get online technical support by contacting ***techsupport@cadcim.com***.

- **Instructor Guide**
  Solutions to all review questions and exercises in the textbook are provided in this guide to help the faculty members test the skills of the students.

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

- **Part Files**
  The part files used in illustrations, examples, and exercises are available for free download.

- **Drawing Files**
  The drawing files used in examples and exercises.

Student Resources

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

- **Part Files**
  The part files used in illustrations and examples are available for free download.

You can access additional learning resources by visiting ***http://allaboutcadcam.blogspot.com***.

If you face any problem in accessing these files, please contact the publisher at ***sales@cadcim.com*** or the author at ***stickoo@pnw.edu*** or ***tickoo525@gmail.com***.

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