

CONTENTS

ACKNOWLEDGMENTS	xiii
ABOUT THE AUTHOR.....	xv
PREFACE.....	xvii

LEVEL 1 • Chapters 1–10.....1

CHAPTER 1 AutoCAD Fundamentals: Part I	3
1.1 Introduction and Basic Commands.....	4
1.2 The AutoCAD Environment.....	5
1.3 Interacting with AutoCAD	9
Method 1. Type in the Commands on the Command Line	9
Method 2. Select the Commands from the Drop-Down Cascading Menus	9
Method 3. Use Toolbar Icons to Activate the Commands	10
Method 4. Use the Ribbon Tabs, Icons, and Menus	10
1.4 Practicing the Create Objects Commands	13
Line	13
Circle	14
Arc.....	15
Rectangle	16
1.5 View Objects.....	19
Zoom	19
Pan	19
Regen	19
1.6 Practicing the Edit/Modify Objects Commands	20
Erase	20
Move.....	20
Copy	21
Rotate.....	22
Scale	23
Trim	24
Extend	25
Offset	26
Mirror.....	27
Fillet	28
1.7 Selection Methods	29
1.8 Drawing Accuracy—Part 1.....	30
Ortho (F8).....	30
1.9 Drawing Accuracy—Part 2.....	30
OSNAPs	30
1.10 OSNAP Drafting Settings.....	33
Summary.....	33

CONTENTS

CHAPTER 2	AutoCAD Fundamentals: Part II	39
2.1	Grips.....	40
2.2	Units and Scale.....	41
2.3	Snap and Grid	42
	To Set Snap.....	42
	To Set Grid	43
2.4	Cartesian Coordinate System	43
2.5	Geometric Data Entry.....	44
	Dynamic Input.....	44
	Manual Input	47
2.6	Inquiry Commands	48
	Area.....	49
	Distance	49
	List.....	50
	ID	51
	Radius and Angle.....	52
2.7	Additional Drafting Commands.....	52
	Explode	53
	Polygon	53
	Ellipse.....	55
	Chamfer	56
	Templates	57
	Limits	58
	Save	58
	Help Files	58
	TANgent OSNAP	60
	Summary.....	61
		61
CHAPTER 3	Layers, Colors, Linetypes, and Properties	67
3.1	Introduction to Layers	68
	What Are Layers?.....	68
	Why Use Them?.....	68
	Creating and Deleting Layers	68
	Making a Layer Current.....	69
	Assigning Layer Colors	69
	Layer Freeze/Thaw and On/Off.....	72
	Layer Lock/Unlock	72
3.2	Introduction to Linetypes.....	73
3.3	Introduction to Properties	74
	Properties Palette	75
	Match Properties	76
	Layers Toolbar	76
3.4	In-Class Drawing Project: Floor Plan Layout.....	77
	Basic File Preparation.....	77
	Starting the Floor Plan.....	78
	Drawing the Inner Wall Geometry.....	79
	Drawing the Doors and Windows	80
	Summary.....	83
		83
	SPOTLIGHT ON: ARCHITECTURE	87
CHAPTER 4	Text, Mtext, Editing, and Style	93
4.1	Introduction to Text and Mtext	94
4.2	Text.....	94
	Editing Text.....	95

4.3 Mtext	96
Formatting Mtext.....	97
4.4 Style.....	101
4.5 Spell Check	102
4.6 In-Class Drawing Project: Adding Text and Furniture to Floor Plan Layout	104
Nearest OSNAP	106
Summary.....	107
CHAPTER 5 Hatch Patterns	113
5.1 Introduction to Hatch	114
5.2 Hatch Procedures.....	115
Step 1. Pick the Hatch Pattern You Want to Use	115
Step 2. Indicate Where You Want the Pattern to Go	116
Step 3. Fine-Tune the Pattern by Adjusting Scale and Angle (If Necessary)	118
Step 4. Preview the Pattern and Accept It If OK	119
5.3 Working with Hatch Patterns	120
Exploding Hatch Patterns.....	120
Hatch Pattern Layers and Colors	120
Advanced Hatch Topics.....	122
5.4 Gradient and Solid Fill	123
Solid Fill	125
5.5 In-Class Drawing Project: Adding Hatch to Floor Plan Layout.....	126
Summary.....	127
CHAPTER 6 Dimensions.....	131
6.1 Introduction to Dimensions.....	132
6.2 Types of Dimensions.....	132
Linear Dimensions	133
Aligned Dimension	134
Diameter Dimension.....	135
Radius Dimension.....	136
Angular Dimension	137
Continuous Dimensions.....	138
Baseline Dimensions	139
Leader and Multileader.....	140
Secondary Dimensions	143
6.3 Editing Dimensions.....	145
6.4 Customizing Dimensions.....	145
Dimstyle.....	146
6.5 In-Class Drawing Project: Adding Dimensions to Floor Plan Layout	150
Summary.....	151
SPOTLIGHT ON: MECHANICAL ENGINEERING.....	157
CHAPTER 7 Blocks, Wblocks, Dynamic Blocks, Groups, and Purge.....	161
7.1 Introduction to Blocks.....	162
Difference between Blocks and Wblocks	162
Creating a Block	162
7.2 Insert	164
7.3 Purge.....	166
7.4 Wblocks	167
Inserting Wblocks	168
7.5 Dynamic Blocks	168
7.6 Groups.....	172
Summary.....	176

CHAPTER 8	Polar, Rectangular, and Path Arrays.....	181
8.1	Polar Array.....	182
	Steps in Creating a Polar Array	182
	Additional Operations with Polar Array.....	184
	Legacy Polar Array (Pre-AutoCAD 2012).....	187
8.2	Rectangular Array	187
	Steps in Creating a Rectangular Array	188
	Additional Operations with Rectangular Array.....	189
	Legacy Rectangular Array (Pre-AutoCAD 2012).....	191
8.3	Path Array	192
	Steps in Creating a Path Array	192
	Additional Operations with Path Array.....	193
8.4	In-Class Drawing Project: Mechanical Device	194
	Summary.....	198
CHAPTER 9	Basic Printing and Output	203
9.1	Introduction to Printing and Plotting.....	204
9.2	The Essentials	204
	What Printer or Plotter to Use.....	204
	What Paper Size to Use	205
	What Area to Plot	205
	At What Scale to Plot.....	206
	What Pen Settings to Use	206
	What Orientation to Use.....	207
	What Offset to Use.....	207
	Miscellaneous.....	207
9.3	The Plot Dialog Box	207
	Preview.....	209
9.4	Page Setup Manager.....	210
	Summary.....	211
SPOTLIGHT ON: INTERIOR DESIGN		215
CHAPTER 10	Advanced Output—Paper Space.....	219
10.1	Introduction to Paper Space	220
	What Is Paper Space?	220
10.2	Paper Space Concepts	221
	Layouts	221
	Viewports	227
	Scaling	230
	Layers	233
	Text and dims	237
	Annotation	240
	Summary.....	242
Level 1 • Answers to Review Questions.....		247
LEVEL 2 • Chapters 11–20.....		255
CHAPTER 11	Advanced Linework	257
11.1	Introduction to Advanced Linework.....	257
11.2	Pline (Polyline)	258
	Pedit	259
	Exploding a Pline.....	260
	Additional Pline Options	260

11.3 Xline (Construction Line)	262
11.4 Ray	263
11.5 Spline	264
11.6 Mline (Multiline)	266
Modifying the Mline	267
Mlstyle (Multiline Style).....	267
Medit (Multiline Edit).....	271
Other Mline Properties.....	272
11.7 Sketch	273
Applications of Sketch	275
Level 2 Drawing Project (1 of 10): Architectural Floor Plan	276
Summary.....	277
CHAPTER 12 Advanced Layers	281
12.1 Introduction to Advanced Layers	281
12.2 Script Files	282
12.3 Layer State Manager.....	283
12.4 Layer Filtering.....	286
Level 2 Drawing Project (2 of 10): Architectural Floor Plan	289
Summary.....	290
CHAPTER 13 Advanced Dimensions.....	293
13.1 Introduction to Advanced Dimensions	294
13.2 Dimension Style Manager.....	294
Lines Tab	295
Symbols and Arrows Tab	296
Text Tab	296
Fit Tab	298
Primary Units Tab	299
Alternate Units Tab	300
Tolerances Tab	302
13.3 Introduction to Constraints	303
13.4 Geometric Constraints	304
Types of Geometric Constraints	304
Adding Geometric Constraints	305
Hiding, Showing, and Deleting Geometric Constraints.....	307
13.5 Dimensional Constraints	307
Working with Dimensional Constraints	309
13.6 Dimension Driven Design.....	310
Level 2 Drawing Project (3 of 10): Architectural Floor Plan	311
Summary.....	312
SPOTLIGHT ON: ELECTRICAL ENGINEERING	315
CHAPTER 14 Options, Shortcuts, CUI, Design Center, and Express Tools	319
14.1 Options	320
Files Tab	320
Display Tab	322
Open and Save Tab.....	324
Plot and Publish Tab	326
System Tab.....	328
User Preferences Tab.....	329
Drafting Tab	331
3D Modeling Tab	332
Selection Tab	332

CONTENTS

Profiles Tab	333
14.2 Shortcuts	335
pgp File	335
Altering the pgp File.....	336
14.3 Customize User Interface	337
14.4 Design Center.....	341
14.5 Express Tools	343
Blocks.....	345
Text.....	345
Layout Tools.....	347
Dimension	347
Selection Tools	347
Modify	348
Draw	349
File Tools	349
Web Tools.....	349
Tools	350
Layer Express Tools.....	351
Level 2 Drawing Project (4 of 10): Architectural Floor Plan	354
Summary.....	354
 CHAPTER 15 Advanced Design and File Management Tools	357
15.1 Introduction to Advanced Design and File Management Tools.....	358
15.2 Align	358
15.3 Audit and Recover.....	360
15.4 Blend	361
15.5 Break and Join.....	362
Break, Method 1	362
Break, Method 2	363
Join	363
15.6 CAD Standards	364
15.7 Calculator.....	365
15.8 Defpoints.....	367
15.9 Divide and Point Style	368
15.10 Donut	369
15.11 Draw Order	369
15.12 eTransmit	370
15.13 Filter	372
15.14 Hyperlink	374
15.15 Lengthen	375
15.16 Object Tracking (OTRACK)	376
15.17 Overkill.....	377
15.18 Point and Node	378
15.19 Publish	378
15.20 Raster	379
15.21 Revcloud	380
15.22 Sheet Sets	381
15.23 Selection Methods.....	384
15.24 Stretch.....	386
15.25 System Variables	387
15.26 Tables	387
15.27 Tool Palette	390
15.28 UCS and Crosshair Rotation	391
Method 1	391
Method 2	392

15.29 Window Tiling	393
15.30 Wipeout.....	394
Level 2 Drawing Project (5 of 10): Architectural Floor Plan	398
Summary.....	399
CHAPTER 16 Importing and Exporting Data	403
16.1 Introduction to Importing and Exporting Data.....	403
16.2 Importing and Exporting to and from MS Office Applications.....	404
Word into AutoCAD	404
AutoCAD into Word	404
Excel into AutoCAD	405
AutoCAD into Excel	406
PowerPoint into AutoCAD.....	406
AutoCAD into PowerPoint.....	407
16.3 Screen Shots	407
16.4 JPG.....	407
16.5 PDFs	407
16.6 Other CAD Software	409
16.7 Exporting and the Save As Feature	411
16.8 Inserting and OLE.....	412
Level 2 Drawing Project (6 of 10): Architectural Floor Plan	414
Summary.....	416
SPOTLIGHT ON: AEROSPACE ENGINEERING.....	417
CHAPTER 17 External References (Xrefs)	421
17.1 Introduction to Xrefs	422
What Is an Xref?.....	422
Why Do We Need an Xref? What Is the Benefit?	422
17.2 Using Xrefs	423
Xref Menu	425
17.3 Layers in Xrefs	426
17.4 Editing and Reloading Xrefs	427
17.5 Multiple Xrefs	428
17.6 Ribbon and Xrefs	429
Level 2 Drawing Project (7 of 10): Architectural Floor Plan	430
Summary.....	430
CHAPTER 18 Attributes	433
18.1 Introduction to Attributes	433
18.2 Creating the Design	434
18.3 Creating the Attribute Definitions	434
18.4 Creating the Attribute Block.....	437
18.5 Attribute Properties and Editing.....	438
Exploding Attributes.....	438
Inserting Attributes	439
18.6 Attribute Extraction	439
18.7 Invisible Attributes	444
Level 2 Drawing Project (8 of 10): Architectural Floor Plan	445
Summary.....	445
CHAPTER 19 Advanced Output and Pen Settings	449
19.1 Introduction to Advanced Output and Pen Settings.....	450
19.2 Setting Standards	450

19.3 The ctb File	451
Step 1.....	454
Step 2.....	454
Step 3.....	455
19.4 Additional ctb File Features.....	455
19.5 The lwt Option	456
Level 2 Drawing Project (9 of 10): Architectural Floor Plan	457
Summary.....	459
 SPOTLIGHT ON: CIVIL ENGINEERING	461
 CHAPTER 20 Isometric Drawing.....	465
20.1 Introduction to Isometric Perspective	466
Why Use Isometric Perspective Instead of 3D?	466
When Not to Use Isometric Perspective.....	466
20.2 Basic Technique	466
20.3 Ellipses in Isometric Drawing.....	469
20.4 Text and Dimensions in Isometric Drawing.....	470
Level 2 Drawing Project (10 of 10): Architectural Floor Plan	471
Summary.....	474
 Level 2 • Answers to Review Questions.....	479
 Appendices	485
 APPENDIX A Additional Information on AutoCAD.....	487
Who Makes AutoCAD?.....	487
What Is AutoCAD LT?	487
How Is AutoCAD Purchased and How Much Does It Cost?.....	488
Are There Significant Differences between AutoCAD Releases?.....	489
Is There an AutoCAD for the Mac?	489
A Brief History of Autodesk and AutoCAD	491
AutoCAD Releases	492
Major Autodesk Products.....	493
AutoCAD Related Websites.....	493
 APPENDIX B Other CAD Software, Design and Analysis Tools, and Concepts.....	497
 APPENDIX C File Extensions	503
 APPENDIX D Custom Linetypes and Hatch Patterns.....	505
 APPENDIX E Principles of CAD Management	509
Part 1. Know the Seven Golden Rules of AutoCAD	509
Part 2. Know the Capabilities and Limitations of AutoCAD	510
Part 3. Maintain an Office CAD Standard	512
Part 4. Be an Effective Teacher and Hiring Manager.....	513
Part 5. Stay Current and Competent.....	514
 APPENDIX F PC Hardware, Printers and Plotters, and Networks	515
 APPENDIX G AutoCAD Certification Exams	519
 APPENDIX H AutoCAD Employment	521
 APPENDIX I AutoCAD Humor, Oddities, Quirks, and Easter Eggs	523
 INDEX.....	527