

Learn Excel 365 Expert Skills

With The Smart Method

Who is this course for?

This isn't a beginner's course. If you are an absolute beginner you need the *Essential Skills* course in this series. This book is for Excel 365 users who:

- Want in-depth coverage of all Excel 365's more powerful features
- Want to learn Power Pivot, Get & Transform, data modeling and DAX
- Want to master the other OLAP "power" tools
- Need to provide advanced Excel training courses in schools and universities

Why this course is different

At *The Smart Method* we've trained a vast number of people, from all ability levels and backgrounds. We've used years of experience from our classroom courses to perfect our teaching method.

This course uses the same teaching techniques to enable you to master Excel's most advanced features in a fraction of the time needed when learning from conventional text books. Here are some of the unique features of our course:

- The course is carefully structured into sessions and lessons
- Each lesson is presented upon two facing pages
- Skills are taught in the context of actual business problems
- The presentational style allows you to learn only the skills you need
- Interest is maintained by hands-on involvement
- Sample files are from the real world of business

What you will learn

Amongst other things you'll learn how to:

- Import and shape data for Power Pivot using Get & Transform (Power Query)
- Master Excel's data modeling features to define table relationships
- Create optimal Snowflake and Star schema data models using Power Pivot
- Master DAX expressions to add calculated measures and columns
- Use OLAP pivot tables to visualize OLAP Power Pivot data models
- Use Excel's 3D Maps feature to create interactive video tours
- Use advanced Excel functions to solve real-world business problems
- Perform What-If analysis to model and compare business scenarios
- Create intuitive user interfaces using form controls and recorded macros
- Master dynamic tables and structured table references
- Create Append and Merge queries to de-normalize relational data
- Break the million-row limit with Power Pivot's Big Data capability

Companies who have taken Smart Method courses include:

Time Warner, Daimler Chrysler, HSBC, Barclays, American Express, Allied Irish Banks, Imperial Tobacco, Motorola, Volvo, The BBC, British Petroleum, The Foreign and Commonwealth Office, Unilever, The Institute of Chartered Accountants, The Ministry of Defence, The United States Army, Keele University, Deutsche Bank, HBOS, Transport For London, The Performing Rights Society, Scottish Power, The Office of the Parliamentary Ombudsman, BAE Systems, RBS, The British Museum, The National Gallery, Pokerstars, Virgin, O2, BMW... and many, many others.

About The Smart Method

The Smart Method develop and run IT courses.

We've trained many of the world's large companies in England, Europe and America.

This book is used as the basis for The Smart Method's Excel 365 Expert Skills course and is equally useful for self-learning.

Our unique teaching method is fun, absorbing and virtually 100% effective.

When you've tried The Smart Method you won't want to learn any other way.

ISBN 978-1-909253-41-4



COMPUTERS/Spreadsheet

Contents

Introduction	19
Feedback.....	19
Downloading the sample files.....	19
Problem resolution.....	19
The Excel version and locale that were used to write this book.....	19
Typographical Conventions Used in This Book	20
How to use this course	22
Three important rules.....	22
How to work through the lessons.....	23
How to best use the incremental sample files	23
Session One: Tables, and Ranges	25
Session Objectives	25
Lesson 1-1: Check that your Excel version is up to date	26
Lesson 1-2: Change the Office Theme	28
Lesson 1-3: Apply a simple filter to a range.....	30
Lesson 1-4: Apply a top 10 and custom filter to a range	32
Lesson 1-5: Apply an advanced filter with multiple OR criteria.....	34
Lesson 1-6: Apply an advanced filter with complex criteria	36
Lesson 1-7: Apply an advanced filter with function-driven criteria.....	38
Lesson 1-8: Extract unique records using an advanced filter	40
Lesson 1-9: Add totals using Quick Analysis	42
Lesson 1-10: Add percentage and running totals using Quick Analysis	44
Lesson 1-11: Convert a range into a table and add a total row.....	46
Lesson 1-12: Format a table using table styles and convert a table into a range.....	48
Lesson 1-13: Create a custom table style.....	50
Lesson 1-14: Sort a range or table by rows	52
Lesson 1-15: Sort a range by columns	54
Lesson 1-16: Sort a range or table by custom list.....	56
Lesson 1-17: Name a table and create an automatic structured table reference.....	58
Lesson 1-18: Create a manual structured table reference	60
Lesson 1-19: Use special items in structured table references	62
Lesson 1-20: Understand unqualified structured table references.....	64
Session 1: Exercise	67
Session 1: Exercise Answers	69
Session Two: Data Integrity, Subtotals and Validations	71
Session Objectives	71

Lesson 2-1: Split fixed width data using Text to Columns	72
Lesson 2-2: Split delimited data using Text to Columns.....	74
Fixed width data	74
Delimited data.....	74
Lesson 2-3: Automatically subtotal a range	76
Lesson 2-4: Create nested subtotals	78
Lesson 2-5: Consolidate data from multiple data ranges.....	80
Lesson 2-6: Use data consolidation to generate quick subtotals from tables	82
Lesson 2-7: Validate numerical data	84
Lesson 2-8: Create user-friendly messages for validation errors	86
Lesson 2-9: Create data validation input messages	88
Lesson 2-10: Add a formula-driven date validation and a text length validation.....	90
Lesson 2-11: Add a table-based dynamic list validation.....	92
Lesson 2-12: Use a formula-driven custom validation to enforce complex business rules	94
Lesson 2-13: Remove duplicate values from a table	96
Lesson 2-14: Use a custom validation to add a unique constraint to a column	98
Session 2: Exercise.....	101
Session 2: Exercise Answers	103

Session Three: Advanced Functions 105

Session Objectives	105
Lesson 3-1: Understand precedence rules and use the Evaluate feature.....	106
Lesson 3-2: Use common functions with Formula AutoComplete.....	108
Lesson 3-3: Use the Insert Function dialog and the PMT function.....	110
Lesson 3-4: Use the PV and FV functions to value investments	112
Present Value.....	112
Future Value	112
Lesson 3-5: Use the IF logic function	114
Lesson 3-6: Use the SUMIF and COUNTIF functions to create conditional totals	116
Lesson 3-7: Understand date serial numbers.....	118
Lesson 3-8: Understand common date functions	120
Lesson 3-9: Use the DATEDIF function.....	122
Lesson 3-10: Use date offsets to manage projects using the scheduling equation.....	124
Lesson 3-11: Use the DATE function to offset days, months and years.....	126
Lesson 3-12: Enter time values and perform basic time calculations	128
Lesson 3-13: Perform time calculations that span midnight.....	130
Lesson 3-14: Understand common time functions and convert date serial numbers to decimal values....	132
Lesson 3-15: Use the TIME function to offset hours, minutes and seconds	134
Lesson 3-16: Use the AND and OR functions to construct complex Boolean criteria.....	136
Lesson 3-17: Understand calculation options (manual and automatic).....	138

Lesson 3-18: Concatenate strings using the concatenation operator (&).....	140
About strings	140
The concatenation operator (&).....	140
Lesson 3-19: Use the TEXT function to format numerical values as strings.....	142
Custom format strings recap	142
Lesson 3-20: Extract text from fixed width strings using the LEFT, RIGHT and MID functions	144
Lesson 3-21: Extract text from delimited strings using the FIND and LEN functions	146
Lesson 3-22: Use a VLOOKUP function for an exact lookup.....	148
Lesson 3-23: Use the SWITCH function.....	150
Lesson 3-24: Use an IFERROR function to suppress error messages	152
Lesson 3-25: Use a VLOOKUP function for an inexact lookup	154
Lesson 3-26: Use a MATCH function for an exact lookup	156
Lesson 3-27: Use the INDEX function	158
Lesson 3-28: Use the IFS function	160
Session 3: Exercise	163
Session 3: Exercise Answers	165

Session Four: Using Names and the Formula Auditing Tools 167

Session Objectives	167
Lesson 4-1: Automatically create single-cell range names	168
Lesson 4-2: Manually create single cell range names and named constants	170
Lesson 4-3: Use range names to make formulas more readable.....	172
Lesson 4-4: Automatically create range names in two dimensions	174
Lesson 4-5: Use intersection range names and the INDIRECT function.....	176
Lesson 4-6: Create dynamic formula-based range names using the OFFSET function	178
Lesson 4-7: Create table-based dynamic range names	180
Lesson 4-8: Create two linked drop-down lists using range names	182
Lesson 4-9: Understand the #NUM!, #DIV/0! and #NAME? error values	184
Lesson 4-10: Understand the #VALUE!, #REF! and #NULL! error values.....	186
Lesson 4-11: Understand background error checking and error checking rules	188
Lesson 4-12: Manually check a worksheet for errors	190
Lesson 4-13: Audit a formula by tracing precedents	192
Lesson 4-14: Audit a formula by tracing dependents	194
Lesson 4-15: Use the Watch Window to monitor cell values.....	196
Lesson 4-16: Use Speak Cells to eliminate data entry errors	198
Session 4: Exercise	201
Session 4: Exercise Answers	203

Session Five: What If Analysis and Security 205

Session Objectives	205
Lesson 5-1: Create a single-input data table.....	206

Lesson 5-2: Create a two-input data table	208
Lesson 5-3: Define scenarios	210
Lesson 5-4: Create a scenario summary report.....	212
Lesson 5-5: Use Goal Seek	214
Lesson 5-6: Use Solver.....	216
What is Solver?	216
Lesson 5-7: Hide and unhide worksheets, columns and rows.....	218
Lesson 5-8: Create custom views.....	220
Lesson 5-9: Prevent unauthorized users from opening or modifying workbooks.....	222
Lesson 5-10: Control the changes users can make to workbooks	224
Lesson 5-11: Restrict the cells users are allowed to change	226
Lesson 5-12: Allow different levels of access to a worksheet with multiple passwords	228
Lesson 5-13: Create a digital certificate	230
Why digital certificates are needed	230
Self-certification and third-party certification	230
Lesson 5-14: Add an invisible digital signature to a workbook.....	232
Lesson 5-15: Add a visible digital signature to a workbook.....	234
Session 5: Exercise.....	237
Session 5: Exercise Answers	239
Session Six: Working with Hyperlinks and Other Applications	241
Session Objectives.....	241
Lesson 6-1: Hyperlink to worksheets and ranges	242
Lesson 6-2: Hyperlink to other workbooks and the Internet.....	244
Lesson 6-3: Hyperlink to an e-mail address and enhance the browsing experience.....	246
Lesson 6-4: Embed an Excel worksheet object into a Word document.....	248
Lesson 6-5: Embed an Excel chart object into a Word document	250
Lesson 6-6: Link an Excel worksheet to a Word document.....	252
Session 6: Exercise.....	255
Session 6: Exercise Answers	257
Session Seven: Forms and Macros	259
Session Objectives.....	259
Lesson 7-1: Add group box and option button controls to a worksheet form	260
Lesson 7-2: Add a combo box control to a worksheet form	262
Lesson 7-3: Set form control cell links.....	264
Lesson 7-4: Connect result cells to a form	266
Lesson 7-5: Add a check box control to a worksheet form	268
Lesson 7-6: Use check box data in result cells.....	270
Lesson 7-7: Add a temperature gauge chart to a form	272
Lesson 7-8: Add a single input data table to a form	274

Lesson 7-9: Improve form appearance and usability.....	276
Lesson 7-10: Understand macros and VBA.....	278
Macros record keystrokes and mouse-clicks.....	278
Lesson 7-11: Record a macro with absolute references.....	280
Lesson 7-12: Understand macro security.....	282
Why is security needed?	282
The Excel Workbook and Excel Macro Enabled Workbook formats.....	282
Four ways to trust a macro enabled workbook	282
Lesson 7-13: Implement macro security	284
Lesson 7-14: Understand trusted documents.....	286
Lesson 7-15: Record a macro with relative references.....	288
Lesson 7-16: Use shapes to run macros.....	290
Lesson 7-17: Run a macro from a button control.....	292
Lesson 7-18: Show and hide ribbon tabs	294
Lesson 7-19: Add custom groups to standard ribbon tabs.....	296
Lesson 7-20: Create a custom ribbon tab	298
Session 7: Exercise	301
Session 7: Exercise Answers	303

Session Eight: Pivot Tables

305

Session Objectives	305
Lesson 8-1: Create a one-dimensional pivot table report from a table	306
Lesson 8-2: Create a grouped pivot table report	308
Lesson 8-3: Understand pivot table rows and columns	310
Lesson 8-4: Understand the pivot table data cache.....	312
Lesson 8-5: Apply a simple filter and sort to a pivot table.....	314
Lesson 8-6: Use report filter fields	316
Lesson 8-7: Filter a pivot table visually using slicers.....	318
Lesson 8-8: Add a timeline control to a pivot table.....	320
Lesson 8-9: Use slicers to create a custom timeline	322
Lesson 8-10: Use report filter fields to automatically create multiple pages	324
Lesson 8-11: Format a pivot table using PivotTable styles.....	326
Lesson 8-12: Create a custom pivot table style	328
Lesson 8-13: Understand pivot table report layouts	330
Lesson 8-14: Add/remove subtotals and apply cell styles to pivot table fields.....	332
Lesson 8-15: Display multiple summations within a single pivot table.....	334
Lesson 8-16: Add a calculated field to a pivot table.....	336
Lesson 8-17: Add a calculated item to a pivot table.....	338
Lesson 8-18: Group by text	340
Lesson 8-19: Group by date	342

Lesson 8-20: Group by numeric value ranges.....	344
Lesson 8-21: Show row data by percentage of total rather than value.....	346
Lesson 8-22: Use pivot table values in simple formulas.....	348
Lesson 8-23: Use the GETPIVOTDATA function.....	350
Lesson 8-24: Create a pivot chart from a pivot table	352
Lesson 8-25: Embed multiple pivot tables onto a worksheet	354
Lesson 8-26: Use slicers to filter multiple pivot tables.....	356
Session 8: Exercise.....	359
Session 8: Exercise Answers	361

Session Nine: 3D Maps 363

Session Objectives	363
Lesson 9-1: Understand how 3D maps use the data model.....	364
Lesson 9-2: Create a simple 3D Map	366
Lesson 9-3: Confirm the accuracy of geocoding.....	368
Lesson 9-4: Map using different location fields.....	370
Lesson 9-5: Apply filters to a 3D Map	372
Lesson 9-6: Set layer options and customize data cards	374
Lesson 9-7: Add a height field to a layer	376
Lesson 9-8: Apply different visualization types.....	378
Lesson 9-9: Visualize multiple categories	380
Lesson 9-10: Create a visualization with multiple layers.....	382
Lesson 9-11: Add annotations.....	384
Lesson 9-12: Create a video from temporal data.....	386
Lesson 9-13: Set scene options	388
Lesson 9-14: Create a tour with multiple scenes	390
Session 9: Exercise.....	393
Session 9: Exercise Answers	395

Session Ten: Create Get & Transform queries 397

Session Objectives	397
Lesson 10-1: Understand Get & Transform and ETL.....	398
Lesson 10-2: Create a simple extract and load web query	400
Lesson 10-3: Understand queries and connections	402
Lesson 10-4: Move, remove, rename, filter and sort columns	404
Lesson 10-5: Split delimited data.....	406
Lesson 10-6: Understand data types	408
Lesson 10-7: Create and use a linked data type.....	410
Lesson 10-8: Add a linked data type field using a data card.....	412
Lesson 10-9: Resolve geocoding errors in the geography linked data type	414
Lesson 10-10: Understand Get & Transform data types	416

Lesson 10-11: Specify data types.....	418
Lesson 10-12: Understand steps and PQFL.....	420
Lesson 10-13: Remove empty, error and top and bottom rows.....	422
Lesson 10-14: Understand and work with null values	424
Lesson 10-15: Transform date and time columns.....	426
Lesson 10-16: Transform number columns	428
Lesson 10-17: Add a custom calculated column.....	430
Lesson 10-18: Create an aggregated data query	432
Lesson 10-19: Unpivot aggregated data.....	434
Lesson 10-20: Work with multiple queries.....	436
Lesson 10-21: Create an append query	438
Lesson 10-22: Understand Column From Examples.....	440
Lesson 10-23: Use Column From Examples with selected source columns.....	442
Lesson 10-24: Use Column From Examples to extract characters from strings.....	444
Lesson 10-25: Appreciate the potential of Column From Examples.....	446
Combine text and extract initials	446
Concatenate Text	446
Remove title from names	446
Add commas (a useful name format for alphabetical sorting)	446
Concatenate text and insert extra text	447
Change capitalization	447
Extract the day, month or year from a date	447
Extract the domain name and addressee from an e-mail addresses	447
Extract and Format telephone numbers	447
Lesson 10-26: Understand primary and foreign keys.....	448
Lesson 10-27: Link primary and foreign keys using VLOOKUP	450
Lesson 10-28: Efficiently import data using a view.....	452
Lesson 10-29: Understand linked table and pivot table refresh	454
Lesson 10-30: Load a query directly into the PivotTable cache.....	456
Lesson 10-31: Understand normal and de-normalized data.....	458
Lesson 10-32: Create a simple two-table merged query	460
Lesson 10-33: Create a five-table merged query	462
Session 10: Exercise	465
Session 10: Exercise Answers	467
Introduction to the Data Modeling and Power Pivot sessions	469
Session Eleven: Power Pivot, Data Modeling, OLAP and Business Intelligence	471
Session Objectives	471
Lesson 11-1: Understand data model memory requirements.....	472
Lesson 11-2: Install the Power Pivot add-in	474

Lesson 11-3: Add tables to a data model	476
Lesson 11-4: Understand the Power Pivot window.....	478
Lesson 11-5: Add a relationship to a data model using Power Pivot.....	480
Lesson 11-6: Use an OLAP pivot table to analyze data residing in a data model	482
Lesson 11-7: Understand OLAP pivot tables.....	484
Lesson 11-8: Understand modern data analysis.....	486
Lesson 11-9: Understand many-to-many relationships	488
Lesson 11-10: Create a data model directly from a relational database	490
Lesson 11-11: Understand OLTP database design.....	492
Lesson 11-12: Understand OLAP database design	494
Lesson 11-13: Create a snowflake data model from a relational database	496
Lesson 11-14: Convert a snowflake data model into a star data model	498
Lesson 11-15: Hide, remove and rename data model columns.....	500
Lesson 11-16: Add a calendar table to a data model.....	502
Lesson 11-17: Format values in a data model	504
Lesson 11-18: Understand MDX queries and OLAP pivot table limitations.....	506
Lesson 11-19: Use the CUBEVALUE function to query a data model	508
Lesson 11-20: Convert CUBEVALUE functions to include MDX expressions.....	510
Lesson 11-21: Create an asymmetric OLAP pivot table using Named Sets	512
Session 11: Exercise.....	515
Session 11: Exercise Answers	517

Session Twelve: An introduction to DAX 519

Session Objectives.....	519
Lesson 12-1: Understand the Power Pivot window.....	520
Lesson 12-2: Add a DAX calculated column.....	522
Lesson 12-3: Create a DAX calculated measure	524
Lesson 12-4: Understand Implicit and Explicit measures.....	526
Lesson 12-5: Understand row and filter context	528
Lesson 12-6: Create a calculated measure using the measure dialog.....	530
Lesson 12-7: Use a DAX DISTINCTCOUNT function.....	532
Lesson 12-8: Create a Key Performance Indicator.....	534
Lesson 12-9: Use a DAX CALCULATE function.....	536
Lesson 12-10: Use a DAX measure to calculate year-on-year growth.....	538
Lesson 12-11: Use a DAX ALL function	540
Session 12: Exercise.....	543
Session 12: Exercise Answers	545

Appendix A: Power Pivot Rules 547

1: Get & Transform.....	548
2: Data Modeling	550

3: Table, Column and Measure naming.....	551
4: Creating DAX calculated measures.....	553

Appendix B: Skills Covered in the Essential Skills Course	555
--	------------

Essential skills course outline.....	556
--------------------------------------	-----

Index	561
--------------	------------