

# Engineering Analysis & Modeling with Excel VBA: Course Notes (Version 8.0)

By Matthew E. Moran



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UPDATED TO INCLUDE EXCEL 2013. These course notes are for engineers, scientists, and others interested in developing custom engineering system models. Principles and practices are established for creating integrated models using Excel and its built-in programming environment, Visual Basic for Applications (VBA). Real-world techniques and tips not found in any course, book, or other resource are revealed. Step-by-step implementation, engineering application examples, and integrated problem exercises solidify the concepts introduced. LEARN HOW TO: Exploit the full power of Excel for building engineering models. Master the built-in VBA programming environment. Implement advanced data I/O, manipulation, analysis, and display. Create full featured graphical interfaces and interactive content. Optimize performance for multiparameter systems and designs. Integrate interdisciplinary and multi-physics capabilities. TESTIMONIALS: "I worked through the course materials of 'Engineering Analysis & Modeling w/Excel/VBA' and would highly recommend it to other engineers.", Maury DuPont, University of Cincinnati "...the exercises were very easy to understand... followed extremely well after the learning slides that came before them. The instructions were detailed enough to understand, but still left enough leeway for individual learning", Monica Guzik, Rose-Hulman Institute of Technology "Good introduction and quick functioning using VBA was enabled by this course", Michael R. Palis, Hybricon Corporation "Gave me a lot to work with. Very helpful and hands on. [My favorite parts?]... It was all good", Dale Folsom, Battelle "Really enjoyed how much info was passed along in such a short and easily understandable method", Will Rehlich, Noren Products "Excellent... Good overview of VBA programming...", John Yocom, General Dynamics "Lots of useful information, and a good combination of lecture and hands-on", Brent Warner, Goddard Space Flight Center "I've been looking for a course like this for years! Matt was very knowledgeable and personable and walked his talk", James McDonald, Crown Solutions "Great detail... informative and responsive to questions. Offered lots of useful info to use beyond the class", Sheleen Spencer, Naval Research Laboratory

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About the Author

Matt Moran is the owner of Isotherm Technologies LLC. He is also a sector manager and senior engineer at NASA. Matt teaches engineering short courses throughout the U.S., and has been adjunct faculty at the graduate school at Walsh University and other colleges. He has 32 years of experience developing products and systems for aerospace, electronics, military, and power generation applications. Matt is a Professional Engineer (Ohio), with a B.S. & graduate work in Mechanical Engineering, and an MBA in Systems Management. He has published 44 papers and a book; and has 3 US patents. Matt has created and used many engineering software tools over more than three decades including: general math, finite difference, FEA, CFD, CAE, DAQ, system simulation, custom codes, etc. He has also been using spreadsheets for selected engineering applications since the early 1980s; and VBA since 1996. He has found Excel VBA to be a versatile platform for engineering calculations when properly implemented, and has taught the associated methods to hundreds of course participants since 2007. He has created Excel VBA engineering system models for the Air Force, Office of Naval Research, Missile Defense Agency, DARPA, NASA, and many industrial organizations.

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