

*Engineering Computation with MATLAB Review*  
David Smith

**REVIEWER INFORMATION**

Department: Electrical Engineering School: University of the District of Columbia/Montgomery College

**COURSE INFORMATION**

Course Title: **Scientific and Engineering Computation (ENES240)**

Grade Level: 200

Annual Enrolment: about 100 students ( course is offered in Fall, Spring and sometimes Summer)

Text In Use: **Applied Numerical Methods with MATLAB for Engineers and Scientists, 3rd edition, by Steven C. Chapra, Published by McGraw Hill**

***Engineering Computation with MATLAB Review***  
**David Smith**

1. What factors made you chose your current book?

**The current textbook by Chapra does two things. In the first Part of the book, MATLAB as a programming language is introduced. The rest of the textbook teaches students how to do numnerical methods using MATLAB. The book contains many MATLAB codes and examples. Overall the book is well written and informative.**

2. How does this book compete with your current text?

**The book by Smith has a different scope. It focuses more on teaching the students computing. It is assumed that the students do not have ( or have little) background in computing. Some of the topics covered in detail in Smith's book do not appear in Chapra's book. For example, there is no Chapters on Processing Sound ( Chapter 14) or Processing graphs (Chapter 17) in the Chapra book. However, it must be noted that Chapra's book goes into much more detail on some of the numerical methods that are dicussed. For example, Chapra's book gives a comprehensive analysis on curve fitting and interpolation that the book by Smith.**

3. Please examine the table of contents of *Engineering Computation with MATLAB* and answer the following:

- a. How does the Table of Contents match with your current course syllabus? Please elaborate.

**The Table of contents only covers 50% of the material that is covered in ENES240 at Montgomery college. For example, there is no discussion in Smith;s book on finding roots, and the numerical methods behind it. The are also very limited discussion on the numerical methods used in finding the solutoins to multiple equations.**

- b. Would you change the order of chapters? If so, how?

**I would. I like to teach the students early on that MATLAB looks at everything as a matrix. Vectors and Arrays that are discussed on Chapter 3 are special cases on Matrices discussed in Chapter 12. I would move Chapter 12 to Chapter 4, after arrays and vectors are introduced.**

- c. Do you, or have you, used this text for more than one course? Please explain.

**No, but if I were to teach an elementary course on MATLAB this would be a book that I would consider. It is not suitable for more than one course though. The course could be an introduction to MATLAB or very basic numerical method using MATLAB**

2. Please comment on the quality of the book's pedagogy. Are there pedagogical elements in other books you have used that you feel should be incorporated into this text? What are they?

**While the pedagogy of the book is effective in general, however, the book lacks sufficient number of examples. Some chapters are too short and lack enough examples. If for each discussion an example is provided it would make the book much stronger, even if the topic is easy. For example when it comes to slicing arrays in Chapter 3, there is no example. Many times student would just look at the example to learn a technique. The book could be improved if more examples are provided.**

3. How well does the author present the material in terms of readability, clarity, etc?

**I do not like the descriptions that follow each listing. Instead of describing each line of code in a listing, perhaps, it is better to insert these descriptions as comments in the listings themselves. This would improve the readability. For example, if someone is reading Listing 6.1 and its description, one has to go back and forth between pages 133 and 134, making it hard to follow.**

4. Which topics in your course present you with the greatest teaching challenge? How does this text handle these topics?

**The challenge is to learn the syntax in MATLAB well, specially how to work with arrays, element-by-element operation on arrays and vectors. This is the source of 90% of the mistakes I see in assignments and exams.**

5. Are there other topics that you would suggest deleting or shortening?

**I do not see how students in a 200 level course would benefit from a Chapter on processing graphs. Instead one could expand Chapter 15 with more details on Numerical Methods, specially nonlinear regression.**

6. Are there topics that you would suggest expanding?

**I would expand Chapter 15. Also a section on how to find roots of the function, whether it is a polynomial or not would be helpful. I would also suggest that Chapter 10, which is on the principles of problem solving, be expanded and include more examples and problems at the end of the chapters. More examples throughout the text would also enhance this textbook.**

7. How do you find the quality of the examples? Are there too many or too few?

**I think more examples would increase the quality of the textbook. One does not learn while and for loops with one or two examples. More examples would enhance the quality of the book.**

8. Do you find that the problems are sufficient? Do they relate well to the material?

**Problems are not sufficient, for example, Chapter 10 only provides 2 problems. The problems do relate to the material though.**

9. How do you find the quality of the illustrations and photos? Are there too many or too few?

**In the copy that I have, none of the illustrations are in color. I think that reduces the appeal of the book a lot. For example in the Chapters that plotting is taught, it would be nice to see the plots in color.**

10. When considering the adoption of a new edition, what kinds of revisions are most important to you? For example, new problems, new examples, up-to-date references, etc.

**New problems and new examples, and also the inclusion of new online homeworks that are gradable.. Also if the textbook does not teach basics (which this textbook does, and so this comment does not apply to Smith's book ), the inclusion of more up-to-date material.**

**Minor Note: In the case of this book, since it is MATLAB based, it is important that the MATLAB commands discussed in the book reflect the changes in the software. For example, in previous versions of MATLAB, the "quad" command was used for integration where as the new command for integration is "integral".**

11. What supplements do you use in teaching your course? Which would you like to see provided with this text and why? Specifically, are there any particular digital supplements that you would like to see included?

**I use the power point slides provided by the authos. This textbook provides enough tools for the instructor to adopt the text. The addition of sample exams and more end-of-chapter problems would increase its chance of being adopted.**

12. Do you utilize online homework in your course? In your opinion, do you think online grading of programming homework would be a useful tool to accompany this text?

**I do not utilize online homeworks in my course. However, for this textbook, which aims to teach someone basics of programming with MATLAB, online homeworks would be a very useful tool.**

13. In your opinion what are the best features of this text?

**The best feature is that it covers a wide range of topics. But I think it needs more depth and more examples, specially in some of the Chapters ( for example Chapter 10).**

**Please provide any additional comments you may have below.**