

MA680: Seminar in Mathematical Modelling for Science and Finance

Term/semester: Fall 2017

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Course material and auxiliary references: Lectures and projects are primary sources of information for this course. Some of the additional material may be posted to this website (<http://www.m2netlab.wlu.ca/teaching/courses.html>). There are 4 useful books that are for your usage in the library on a 3-hour loan (marked by star in the list that follows). There is a wealth of other materials for this course and you can find a number of texts that may be useful for the course and for your own future work in mathematical modelling for your specific applications. Some of them are listed below:

- Fowkes, N.D. and Mahoney, J.J., An Introduction to Mathematical Modelling, Wiley.
- *Eriksson, K., Estep, D., Hansbo, P., and Johnson, C., Computational Differential Equations, Cambridge University Press.
- Fulford, G.R. and Broadbridge, P., Industrial Mathematics: Case Studies in the Diffusion of Heat and Matter, AustMs: Cambridge University Press.
- Berry, J. and Houston, K., Mathematical Modelling, Edward Arnold.
- Tveito, A. and Winther, R., Introduction to Partial Differential Equations. A Computational Approach, Springer.
- Quarteroni, A., Sacco, R., and Saleri, F., Numerical Mathematics, Springer.
- *Fowler, A.C., Mathematical Models in the Applied Sciences, Cambridge University Press.
- Arnold, D. and Polking, J.C., Ordinary Differential Equations using MATLAB, Prentice Hall.
- Temam, R. and Miranville, A., Mathematical Modeling in Continuum Mechanics, Cambridge University Press.
- Fulford, G., Forrester, P., Jones, A., Modelling with Differential and Difference Equations, Cambridge University Press.
- Bellomo, N. and Preziosi, L., Modelling Mathematical Methods and Scientific Computation, CRC Press.
- Hoffman, J.D., Numerical Methods for Engineers and Scientists, 2nd ed., Marcel Dekker.
- *MacCluer, C.R., Industrial Mathematics: Modeling in Industry, Science, and Government, Prentice Hall.
- *Gershenfeld, N., The Nature of Mathematical Modeling, Cambridge University Press.

There are also some useful software pages. Although any software tool is formally allowed in accomplishing of what is required in your project-based assignments, first several laboratory sessions will be based on MATLAB only. In this context, you may find the following links useful:

- Software from the text by Quarteroni, A. et al <http://www1.mate.polimi.it/~calnum/programs.html>
- Software from the text by Tveito, A. et al <http://www.ifi.uio.no/~pde/>
- Netlib Software Library <http://www.netlib.org/>
- Software from the text by Arnold, D. et al <http://math.rice.edu/~dfield/>
- University of Dundee Software Links (includes an excellent set of Matlab tutorials) <http://www.maths.dundee.ac.uk/software/matlab.shtml>
- Many others.

Although the use of additional literature is not required for this course, it is highly encouraged.