MATH 441/620 — Numerical Analysis

Schedule number [2725/2761]

Spring 1998

Instructor: Matthias K. Gobbert

- Office hours: Tuesdays and Thursdays 04:30–05:20, or by appointment
- Office: MP 416 (Mathematics/Psychology)
- Phone: (410) 455-2404
- E-mail: gobbert@math.umbc.edu
- URL: http://www.math.umbc.edu/~gobbert/

Lectures: Tuesdays and Thursdays 05:30–06:45, MP 008 (Mathematics/Psychology)

Prerequisite: Calculus I and II (MATH 151 and 152), Introduction to Linear Algebra (MATH 221), Introduction to Mathematical Analysis (MATH 301), and knowledge of a high-level programming language and the UNIX operating system (CMSC 103 or 201), or instructor approval.

Textbook:

- Kendall E. Atkinson, An Introduction to Numerical Analysis, 2nd ed., Wiley, 1989 (required),
- G. W. Stewart, Afternotes on Numerical Analysis, SIAM, Philadelphia, 1996 (recommended).

Note that both books are on reserve in the library.

This course will cover chapters 2, 3, 5, and 8, as well as parts of chapters 1 and 6 of Aktinson.

Homework: Homework will consist both of theoretical exercises and of computational assignments. Only through a familiarity with both sides of numerical analysis will a full appreciation of the material be achieved. (Indeed, it is this combination that is the most rewarding aspect of this class and of the field of numerical analysis as such!)

You will be allowed to use any programming or scripting language of your choice as long as it allows sufficient control over the implementation of the algorithms. However, I would personally encourage the use of a source level programming language like C or Fortran, as this class is a great opportunity to learn more about them and since in the long run only those will provide the needed control over all aspects of the computer's behavior.

Homework will generally be due during lecture each week. I discourage leaving homework at my office, if I am not present, as it can get lost. Also note that the department does not have sufficient resources to accept homework, so do not try to turn in homework to the department secretary, please.

Tests: There will be one (1) midterm exam during the semester and one (1) comprehensive final exam; see the syllabus for the dates.

According to university policy, attempts at cheating are considered a serious offense againgst the student honor code and will be looked upon seriously. The right is reserved to check a picture identification during any of the exams.

In addition to these general statements, I would like to clarify that the purpose of the computational assignments is for you yourself to learn something about computers. So, while I explicitly allow the exchange of ideas and information about them, everybody has to write his or her own code. Any code copied or downloaded from any source would need to be clearly labeled and referenced as such both in the accompaying write-up and the source file; talk to me for information and appropriateness of incorporating code from other sources, it should not be needed for this class.

Grading: This course is a combined undergraduate/graduate level course. All homework and exams will be identical, as the background of both students is assumed to be comparable; the distinction will lie in the additional project that each student registered for MATH 620 will be required to complete. Normally, a project will consist of studying additional material on your own and preparing a typed report on it as well as a class presentation; note that a substantial part of the project grade will be based on the presentation.

Weights for the various items will be distributed approximately according to the following schedule:

Course	Homework	Midterm	Project	Final
MATH 441	40%	20%	0%	40%
MATH 620	20%	20%	20%	40%

While the grading scale will be adjusted later to some degree to reflect the level of difficulty of the exams, the following may serve as a guideline based on experience:

Score above	90%	80%	65%	50%	otherwise
Letter grade	A	B	C	D	F

Both the weight distribution and the grading scale are subject to change by announcement in class. In particular, if it is found that additional reinforcement of material is needed, quizzes might be used.

Syllabus: This syllabus is the plan for the whole semester to give you an idea of the material to be covered. It is subject to change as needed.

Week	Tuesday	Thursday
01/26–01/30 1	1.1, 1.2	Introduction to Matlab 5.1 in ECS 104A
02/02–02/06 2	8.1, 8.2, 8.4	Introduction to Matlab 5.1 in ECS 104A
02/09–02/13 3	2.1, 2.2, 2.3 (02/09 = last day to register)	2.5
02/16–02/20 4	2.10, 2.11	catch-up
02/23–02/27 5	3.1, 3.2	3.3, 3.4, 3.5
03/02–03/06 6	3.6, 3.7	catch-up
03/09–03/13 7	4.1, 4.2	4.3
03/16–03/20 8	review	Midterm
03/23–03/27	Spring Break, no class	Spring Break, no class
03/30–04/03 9	5.1, 5.2	5.3, 5.4, 5.5
04/06–04/10 10	5.7 (04/06 = last day to drop)	catch-up
04/13–04/17 11	6.1, 6.2	6.3, 6.4
04/20–04/24 12	6.5, 6.6	6.7, 6.8
04/27–05/01 13	6.9, 6.10	Project presentations (MATH 620)
05/04–05/08 14	catch-up	course review
05/11–05/15 15	course review	Reading day, no class
05/18–05/22 16	Final exam: 06:00–08:00 p.m.	