

SYLLABUS FOR MATH 1230

FALL 2009

Text: Hass, Weir, and Thomas, University Calculus Elements with Early Transcendentals

General:

It is departmental policy that graphing calculators are required of all students in Math 1230. However, the department has agreed that the symbolic calculation of basic derivatives, limits, and integrals is part of the language of mathematics, and students should be proficient in this language. In order to test the material on symbolic calculation, you may wish, for example, to break an exam (such as the final exam) into two parts, with the first part not allowing calculators. Generally, however, calculators should be permitted in most testing situations.

Warning: the students have access to Student Solutions Manual containing worked-out solutions to all odd-numbered problems. Please take this into account when assigning odd-numbered problems for credit.

Calculus II Skill Exam:

Currently, the department requires a Basic Skills test in all sections of Math 1230 and Math1710. The Basic Skills Test is focusing on basic skills of differentiation and integration and will be given during the first week of classes. In addition, the students will have two more opportunities to make up the skills test. Failing all three attempts will result in a half letter grade reduction of the course grade. Additional information about the skills exam and some sample problems can be found on websites

<http://www.wmich.edu/math/calculus%20Basic%20Skills/Calculus%20Basic%20Skills.htm>

Course Prerequisites: A passing grade (C or better) in Math 1220 or Math 1700.

Objectives:

1. Understanding the concept of limit and how it relates average and instantaneous quantities.
2. Understanding the concept of derivative, interpreting it geometrically, physically and using it in optimization and linear approximation.
3. Understanding integration and its relationship with differentiation and applying integration in geometrical and physical problems.

4. Learning the proper use of mathematical notation.
5. Developing sufficient computational skills in differential and integral operations for subsequent calculus courses and for applications in other areas.
6. Developing abilities to tackle multi-step problems and to explain the process.
7. Understanding the possibilities of modern computer algebra systems in assisting the analysis of problems in calculus and the visualization of their solutions.
8. Developing skills in mathematical reasoning.
9. Developing a broad perspective of how various different topics in this course fit together.

Schedule: The schedule below allows for covering 26 sections (plus appendix G) in 12 weeks, leaving about 1.5 weeks for expanding, additional material and testing.

<u>Section</u>	<u>Topics</u>	<u># Days</u>
Chapter 4: Integration		
	Review definition of the integral, Fundamental	2
	Theorem of Calculus, area, and integration by substitution	
Chapter 5: Techniques of Integration		
5.1	Integration by Parts	2
5.2	Trigonometric Integrals	2
5.3	Trigonometric Substitutions	2
5.4	Integration of Rational Functions by Partial Fractions	2
5.6	Numerical Integration	2
3.7	Indeterminate Forms and L'Hopital's Rule	2

5.7	Improper Integrals	2
-----	--------------------	---

Chapter 6: Applications of Definite Integrals

6.1	Volumes by Slicing and Rotation About an Axis	2
6.2	Volumes by Cylindrical Shells	2
6.3	Lengths of Plane Curves	1.5
6.5	Work (omit Fluid Forces)	1.5
6.6	Moments and Centers of Mass	0
14.1	Slope Fields (omit Picard's Theorem)	1
6.4	Exponential Change and Separable Differential Equations	2
14.2	Applications only (omit integration factors)	2

(RL Circuits and Mixing Problems--Mixing problems can be solved using separable differential equations if the inflow and outflow rates are the same)

14.3	Applications (omit orthogonal trajectories)	1
14.4	Euler's Method	1
14.5	Graphical Solutions to Autonomous Equations (logistic growth)	1.5

Chapter 7: Infinite Sequences and Series

7.1	Sequences	2
7.2	Infinite Series	2
7.3	The Integral Test	2
7.4	Comparison Tests	1.5
7.5	The Ratio [and Root if time permits] Tests	1
7.6	Alternating Series, Absolute and Conditional Convergence	1.5

7.7	Power Series	2
7.8	Taylor and Maclaurin Series	1.5
7.9	Convergence of Taylor Series	3
7.10	The Binomial Series (if time permits)	0

Time permitting

Chapter 8: Polar Coordinates and Conics

8.1	Polar Coordinates	1
8.2	Graphing in Polar Coordinates	1
8.3	Areas and Lengths in Polar Coordinates	2