

FALL 2009 SYLLABUS FOR MATH 2260

INSTRUCTOR: JONATHAN HANKE

Course Title and Number: Calculus II – Math 2260

Course Description: Math 2260 is an intensive integral calculus course aimed at physical science and engineering majors (you do not have to be a science or engineering major to enroll for the course).

Prerequisites, corequisites, and cross-listings for the course: The course follows the intensive differential calculus course Math 2250, which ends with a unit on integration. The 2260 course assumes a basic knowledge of integration and teaches applications of integration, advanced techniques in integration, sequences and series, and vector geometry. The course prepares students for the multivariable calculus course Math 2500.

Course Objectives: This course will teach applications of definite integrals, techniques of integration, how to work with and understand infinite sequences and series, and vectors in 3-dimensional space.

Topical Outline:

- (1) Applications of Definite Integrals
 - (a) Volumes by Slicing and Rotation about an Axis
 - (b) Volumes by Cylindrical Shells
 - (c) Lengths of Plane Curves, Areas of Surfaces of Revolution
 - (d) Exponential Change and Separable Differential Equations
 - (e) Work
- (2) Techniques of Integration
 - (a) Integration by Parts
 - (b) Trigonometric Integrals
 - (c) Trigonometric Substitution
 - (d) Integration of Rational Functions by Partial Fractions
 - (e) Improper Integrals
- (3) Infinite Sequences and Series
 - (a) Sequences
 - (b) Infinite Series
 - (c) The Integral Test
 - (d) Comparison Tests
 - (e) The Ratio (and Root) Test(s)
 - (f) Alternating Series, Absolute and Conditional Convergence

- (g) Power Series
- (h) Taylor and Maclaurin Series
- (i) Convergence of Taylor Series
- (4) Vectors and the Geometry of Space
 - (a) Three-Dimensional Coordinate Systems and Vectors
 - (b) The Dot Product
 - (c) The Cross Product
 - (d) Lines and Planes in Space

The Honor Code and Academic Honesty Policy: As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at www.uga.edu/honesty. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

Mandatory Disclaimer: The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Principal Course Assignments. The assignments for this course are the homework problems listed by section below from the textbook "University Calculus" by Hass, Weil and Thomas: **Chapter 6: Applications of Definite Integrals**

- §6.1 Volumes by Slicing and Rotation About an Axis
§6.1: #1, 3, 7, 8, 11, 13, 15, 17, 19, 22, 23, 27, 28, 29, 35, 39, 41, 45, 49, 50, 51
- §6.2 Volumes by Cylindrical Shells
§6.2: #1, 3, 5, 7, 11, 15, 21, 23, 25, 28, 34, 39
- §6.3-6.4 Lengths of Plane Curves, Areas of Surfaces of Revolution
§6.3: #1, 3, 9, 11, 17, 27, 29, 33; §6.4: #9, 13, 14, 21, 29
- §6.5 Exponential Change and Separable Differential Equations
§6.5: #1, 3, 9, 11, 19, 21, 24, 29, 30, 35, 37, 41
- §6.6 Work
§6.6: #1, 3, 5, 6, 7, 8, 11, 12, 13, 14, 15, 19, 22, 23
- Additional and Advanced Exercises: #1, 6, 7, 11, 15

Chapter 7: Techniques of Integration

- §7.1 Integration by Parts
§7.1: #1, 4, 5, 7, 9, 11, 22, 29, 33, 35, 37, 43, 44, 48
- §7.2 Trigonometric Integrals
§7.2: #1, 3, 7, 11, 15, 17, 23, 41, 43
- §7.3 Trigonometric Substitutions
§7.3: #1, 3, 5, 7, 13, 16, 19, 21, 29, 39, 41
- §7.4 Integration of Rational Functions by Partial Fractions
§7.4: #1, 3, 9, 11, 15, 19, 21, 29, 30, 35, 37, 43, 49

- Miscellaneous integration problems
Practice Exercises, p. 499: #69-98 (except 91), as needed
- §7.7 Improper Integrals
§7.7: #1, 3, 5, 7, 11, 15, 35, 37, 41, 47, 51, 53, 55, 63, 67, 68, 69, 70, 74
- Additional and Advanced Exercises: #8, 10, 11, 12, 25, 27, 29, 30, 31, 32

Chapter 8: Infinite Sequences and Series

- §8.1 Sequences
§8.1: #7, 11, 13, 17, 19, 23, 25, 27, 33, 41, 43, 45, 49, 59, 66, [86], 93
- §8.2 Infinite Series
§8.2: #1, 3, 5, 7, 11, 15, 23, 25, 27, 29, 35, 37, 39, 41, 42, 43, 45, 47
- §8.3 The Integral Test
§8.3: #1, 2, 3, 4, 5, 6, 9, 10, 19, 20, 23, 27, 33, [41]
- §8.4 Comparison Tests
§8.4: #1, 3, 4, 5, 8, 9, 10, 17, 19, 20, 25
- §8.5 The Ratio (and Root) Tests
§8.5: #2, 3, 5, 9, 15, 19, 21
- §8.6* Alternating Series, Absolute and Conditional Convergence
§8.6: #1, 2, 3, 5, 11, 13, 15, 19, 27
- §8.7 Power Series
§8.7: #1, 2, 3, 5, 9, 11, 13, 33, 35, 36, 37, 39, 40, 41
- §8.8 Taylor and Maclaurin Series
§8.8: #1, 3, 5, 7, 9, 11, 13, 21
- §8.9 Convergence of Taylor Series
§8.9: #1, 4, 7, 8, 9, 13, 19, 22, 23, 25, 29, 31, 32, 33, 35
- Additional and Advanced Exercises: #5, 15, 27, 28, 29, 30, 31

Chapter 10: Vectors and the Geometry of Space

- §10.1-10.2 Three-Dimensional Coordinate Systems, Vectors
§10.1: #1, 5, 9, 19, 23, 27, 37, 41, 45, 49; §10.2: #5, 12, 13, 19, 23, 25, 33, 37, 41, 43, 45, 47, 49, 51, [52]
- §10.3 The Dot Product
§10.3: #1, 3, 13, 16, 17, 18 or 19, 21, 24, 29, 33
- §10.4 The Cross Product
§10.4: #1, 6, 13, 15, 17, 21, 25, 27, 33, 41
- §10.5 Lines and Planes in Space
§10.5: #1, 3, 9, 21, 23, 25, 27, 31, 35, 39, 47, 53, 73, [74]
- Additional and Advanced Exercises: #5, 8, 10, 11, 16, 20, 21, 22, 23

Specific Course Requirements: In addition to the written weekly homework assignments listed above, this course requires you to demonstrate your knowledge of calculus (without the benefit of a calculator) on several in-class written tests and a cumulative written final examination. There may also be occasional in-class quizzes.

Grading Policy: Your numerical course grade percentage will be determined by the following weighting scheme:

- 60% – 3 or 4 in-class exams at 20% or 15% each
- 30% – cumulative final exam
- 10% – weekly homework and quizzes

Attendance Policy: Attendance in class is not required, though there will be no make-up exams for in-class tests or quizzes without an appropriate excuse for the absence (either officially recognized by UGA or approved by the instructor). However attendance in class should improve your knowledge of the material and better prepare you for the homework and tests used to compute your final grade.

Required Course Material: This course is based on the required textbook “University Calculus” by Hass, Weir and Thomas.

Policy for Make-up of Examinations: Make-up examinations will generally not be given, but may be given under exceptional circumstances with approval from the instructor. They require either a written medical excuse note from a doctor stating why you were medically unable to attend the exam at that time, or some other UGA-approved excuse justifying the need for a makeup-exam.

Additional Instructor Information.

- Instructor: Jonathan Hanke
- Instructor Office: Boyd Graduate Center, Room 447.
- Office Hours: Tuesday & Thursday 3:15pm-4:15pm and Wed 2:15-3pm (after class) in the Boyd Graduate Center, Room 447.
- Office Phone: (706) 542-2644
- E-mail: jonhanke@math.uga.edu