

MAT 145 SYLLABUS - ANALYTIC GEOMETRY AND CALCULUS II

ANDREW SCHWARTZ, PH.D.

Catalog Description: 145-01 Analytic Geometry and Calculus II (Fall 2010)

Differentiation and integration of transcendental functions, series, conic sections, polar coordinates. Prerequisite: MA 140 with a grade of 'C' or higher. (4)

Text: Stewart, James (2008) *Single Variable Calculus: Early Transcendentals* (Sixth Edition), Belmont, CA: Brooks/Cole-Thomson Learning.

Office Location and Hours: Johnson Hall 307 – WR 2:25pm-3:55pm and whenever I'm around (I want you to always feel free to stop by and see if I'm in. If I'm not, see if the Mathematics Learning Center can help with your question. If none of these times or situations work for you, you can make an appointment that is an appropriate time for the both of us.)

Contact Information: office phone: (573) 651-5065 e-mail: aschwartz@semo.edu
my homepage: <http://cstl-csm.semo.edu/aschwartz>

Classroom Location and Hours: JH 223 – MWRF 11:00am-11:50am

Class Webpage: <http://cstl-csm.semo.edu/aschwartz/ma145fa10>

Course Objectives: MA140, this course, and MA240 form the three course Analytic Geometry and Calculus sequence. The purpose of this sequence overall is to give students a working knowledge of the above, particularly the limit, the derivative, the integral, basic sequences, and basic series and their analysis. The theory behind the derivative and definite integral will be discussed and students may be expected to compute (for example) simple derivatives using only the definition. Overall, however, the course emphasizes techniques rather than theory. Trigonometric, polynomial, rational, radical, exponential, and logarithmic functions are covered.

Upon completion of this course in particular, you should be able to (among others):

- Use more advanced techniques of integration such as by parts, by trigonometry, by trigonometric substitution, and by partial fractions.
- Approximate integrals and find improper integrals.
- Find arc lengths and areas of surfaces of revolution.
- Solve basic differential equations.
- Graph and manipulate functions using the polar coordinate system.
- Identify which equations denote which conic sections and vice versa.
- Find partial derivatives.
- Locate critical points of a function of two variables. Identify relative maxima, relative minima, and saddle points for a function of two variables.
- Analyze the basics of certain series and sequences.

Tentative Schedule:

- (1) Intro, Syllabus
- (2) 6.1 Applications of Integration (review): Areas Between Curves # 6, 10, 16, 20, 26
- (3) 6.2 Applications of Integration (review): Volumes # 2, 4, 6, 14, 54
- (4) 6.3 Applications of Integration (review): Volumes by Cylindrical Shells # 4, 6, 10, 12, 14
- (5) 6.4 Applications of Integration (new material): Work # 2, 4, 6, 8, 14 (bank)
- (6) 6.5 Applications of Integration (new material): Average Value of a Function # 4, 6, 8, 10, 12(a)(b) only
- (7) 6.4 and 6.5 - to be determined by class
- (8) 7.1 Techniques of Integration: Integration by Parts # 4, 6, 12, 18, 20
- (9) 7.2 Techniques of Integration: Trigonometric Integrals # 2, 6, 12, 22, 28
- (10) 7.3 Techniques of Integration: Trigonometric Substitution # 4, 6, 8, 16, 24 (bank)

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- (11) 7.4 Techniques of Integration: Integration of Rational Functions by Partial Fractions # 8, 10, 12, 20, 24 (bank)
- (12) 7.5 Techniques of Integration: Strategy for Integration # 2, 6, 10, 18, 24 (bank)
- (13) 7.1-7.5 - to be determined by class
- (14) 7.1-7.5 - to be determined by class
- (15) REVIEW over Chapters 6 & first half of 7
- (16) TEST over Chapters 6 & first half of 7
- (17) 7.6 Techniques of Integration: Integration Using Tables and Computer Algebra Systems # 6, 8, 10, 12, 14
- (18) 7.7 Techniques of Integration: Approximate Integration # 6, 8, 12
- (19) 7.8 Techniques of Integration: Improper Integrals # 6, 8, 14, 16, 38
- (20) 7.6-7.8 - to be determined by class
- (21) 7.6-7.8 - to be determined by class
- (22) 8.1 Further Applications of Integration: Arc Length # 8, 10, 12, 14, 18
- (23) 8.2 Further Applications of Integration: Area of a Surface of Revolution # 6, 8, 10, 14, 16 (bank)
- (24) 8.3 Further Applications of Integration: Applications to Physics and Engineering # 2, 4, 8, 10, 12, 24, 28, 32, 34, 46 (bank)
- (25) 8.1-8.3 - to be determined by class
- (26) REVIEW over Chapters 7 & 8
- (27) TEST over Chapters 7 & 8
- (28) 9.1 Differential Equations: Modeling with Differential Equations # 2, 4, 6, 8, 10
- (29) 9.2 Differential Equations: Direction Fields and Euler's Method # 2, 4, 6, 8, 10, 24
- (30) 9.3 Differential Equations: Separable Equations # 2, 4, 10, 14, 16
- (31) 9.1-9.3 - to be determined by class
- (32) 10.1 Parametric Equations and Polar Coordinates: Curves Defined by Parametric Equations # 2, 4, 6, 8, 16
- (33) 10.2 Parametric Equations and Polar Coordinates: Calculus with Parametric Curves # 2, 4, 14, 20, 32, 42, 60
- (34) 10.3 Parametric Equations and Polar Coordinates: Polar Coordinates # 4, 6, 8, 18, 22, 20, 44, 58 (bank)
- (35) 10.4 Parametric Equations and Polar Coordinates: Areas and Lengths in Polar Coordinates # 2, 6, 12, 24, 46
- (36) 10.5 Parametric Equations and Polar Coordinates: Conic Sections # 2, 14, 20, 30, 42
- (37) 10.6 Parametric Equations and Polar Coordinates: Conic Sections in Polar Coordinates # 2, 4, 6, 10, 12, 14, 16
- (38) 10.1-10.6 - to be determined by class
- (39) 10.1-10.6 - to be determined by class
- (40) REVIEW over Chapters 9 & 10
- (41) TEST over Chapter 9 & 10
- (42) 11.1 Infinite Sequences and Series: Sequences # 4, 8, 12, 20, 22
- (43) 11.2 Infinite Sequences and Series: Series # 2, 4, 14, 20, 24, 32, 36, 42, 50
- (44) 11.3 Infinite Sequences and Series: The Integral Test and Estimates of Sums # 6, 8, 14, 20, 34
- (45) 11.4 Infinite Sequences and Series: The Comparison Test # 4, 8, 10, 12, 26, 36
- (46) 11.5 Infinite Sequences and Series: Alternating Series # 2, 4, 14, 18, 26, 30
- (47) 11.6 Infinite Sequences and Series: Absolute Convergence and the Ratio and Root Tests # 2, 4, 6, 8, 12, 18, 26
- (48) 11.6 Infinite Sequences and Series: Absolute Convergence and the Ratio and Root Tests # 2, 4, 6, 8, 12, 18, 26
- (49) 11.7 Infinite Sequences and Series: Strategy for Testing Series # 2, 4, 8, 24, 32
- (50) 11.7 Infinite Sequences and Series: Strategy for Testing Series # 2, 4, 8, 24, 32
- (51) 11.8 Infinite Sequences and Series: Power Series # 4, 8, 12, 14, 16
- (52) 11.8 Infinite Sequences and Series: Power Series # 4, 8, 12, 14, 16

- (53) 11.9 Infinite Sequences and Series: Representations of Functions as Power Series # 4, 6, 8, 12, 24, 28
- (54) 11.9 Infinite Sequences and Series: Representations of Functions as Power Series # 4, 6, 8, 12, 24, 28
- (55) 11.10 Infinite Sequences and Series: Taylor and Maclaurin Series # 6, 8, 10, 20, 26, 62, 64 (bank)
- (56) 11.10 Infinite Sequences and Series: Taylor and Maclaurin Series # 6, 8, 10, 20, 26, 62, 64
- (57) REVIEW over Chapter 11
- (58) TEST over Chapter 11

Grading Scale:

- A 90-100
- B 80-89.9
- C 70-79.9
- D 60-69.9
- F 0-59.9

Grading Scheme:

- Homework and Participation 4%
- Tests 1, 2, 3, and 4 19% apiece
- Final 20%

Tutoring: Tutoring sessions are also available to you in the Mathematics Learning Center (this is free). The hours are 8:00am-5:00pm M-R, 8:00am-2:00pm F, and 6:00pm-9:00pm Sunday. The MLC is in Johnson Hall room #104. Furthermore, Jamie Birkman (the Administrative Assistant in the Mathematics Department) has a list of personal (paid) tutors that are available.

Disability Support Services: “Any student who believes that they may need an academic accommodation based on the impact of a disability should contact me to arrange an appointment to discuss their individual needs. We instructors rely on Disability Support Services to verify the need for academic accommodations and developing accommodation strategies. Students that have not already registered with Disability Support Services as a student with a disability will be encouraged to do so.”

Classroom and Final Exam Policy: The use of a scientific or graphing calculator is encouraged for use on the class and final examinations for this course; however, computers with graphic, word-processing, symbolic manipulation or programming capabilities will not be allowed for these exams (unless specifically allowed by Disability Support Services). If you cannot afford to purchase a calculator, these may be rented from Textbook Rental Services for a nominal fee. The use of books, notes, or other resources materials will not be permitted on the final examination. All cell phones prohibited during the final exam (THIS POLICY APPLIES TO THE EVERYDAY CLASSROOM AS WELL). You may NOT use the calculator on your cell phone for quizzes, tests, and the final exam. Furthermore, you are expected to be prepared for every quiz, test, or exam in this class. There will be no sharing of calculators, pencils, or erasers during any quiz, test, or the final exam. The final is at 10:00am on Wednesday, December 15 in JH219 (the same room this class is in).

Absences on Exam Days: If the absence is known ahead of time and you find that you will be unable to take an exam at the regularly scheduled time, you need to let me know as soon as possible in advance of the regularly scheduled time for said exam (no exceptions) so that a make-up time can be arranged before the rest of the class is scheduled to take the exam. If it is an emergency absence (you are hospitalized or arrested, etc.), you must take it the first or second day you are physically able to be in my office or at Testing Services. Homework, quizzes, and class participation cannot be made up regardless of whether the absence is known ahead of time or it is of the emergency variety. Homework is always due the next class day after assigned unless otherwise noted. Homework can be turned in early however. Moreover, it is due by the time the class is over and not a minute later.

General Student Behavior: “Every student at Southeast is obligated at all times to assume responsibility for his/her actions, to respect constituted authority, to be truthful, and to respect the rights of others, as well as to respect private and public property. In their academic activities, students are expected to maintain high standards of honesty and integrity and abide by the University’s Policy on Academic Honesty. Alleged violations of the Code of Student Conduct are adjudicated in accordance with the established procedures of the judicial system.” Dishonorable actions, such as cheating will result in an immediate zero for the correlating classroom activity. Additional unethical actions will result in a referral to the Department Chair, Dean of the College of Science and Math, and/or the University Judicial Affairs Committee.

Class Disruptions: These are absolutely not tolerated. Your classmates (their parents, legal guardians, or their scholarship sources) pay entirely too much money on tuition to have their classroom experience

subjugated by rude individuals. I understand that emergencies can and do arise, however blatant refusal to cooperate, unnecessary (as deemed by myself) cell phone usage (including texting), using Ipods or mp3 players, talking in class (about non-subject related matter), frequently leaving the room (during the middle of class or walking out early) are all prohibited. If you transgress this once, it will be a verbal warning. Second offenses are cause for removal from that day's class. Offenses past that will start to directly affect the student's grade (1 whole percentage point off of the final grade for each and every offense including the third offense and every offense thereafter).

DEPARTMENT OF MATHEMATICS, SOUTHEAST MISSOURI STATE UNIVERSITY