MAT 206

Unified Calculus and Analytics

Course Designation

MAT 206. UNIFIED CALCULUS AND ANALYTICS. Applications of the definite integral, differentiation and integration of logarithmic, exponential, and trigonometric functions, techniques of integration, and hyperbolic functions. Prerequisite: MAT 205. 4

Text

James Stewart. Calculus: Concepts and Contexts. Fourth Edition. Belmont, California. Thompson Brooks/Publishing Company, 2010. ISBN 0-495-55742-0.

General Course Objectives

Upon completion of the course, the student will be able to:

1. Demonstrate an understanding of the concept of the antiderivative of a function.
2. Demonstrate an understanding of the concept of an indefinite integral of a function.
3. Approximate the value of a definite integral using Riemann sums.
4. Approximate the value of a definite integral using Simpson's Rule.
5. Use techniques of integration to evaluate antiderivatives and definite integrals.
6. Calculate the area between two curves in a plane.
7. Calculate the volume of a solid of revolution using the disk/washer method.
8. Calculate the volume of a solid of revolution using the shell method.
9. Calculate the arc length of a function.
10. Calculate the average value of a function.
11. Solve problems involving applications of the definite integral to physics.
12. Solve separable differential equations and initial value problems.
13. Approximate solutions to differential equations using slope fields.
14. Solve exponential growth and decay problems.
15. Determine the convergence of an infinite series using appropriate tests.
16. Represent a function as an infinite series.
17. Find the Taylor Series representation of a function.
18. Find the integral of a function using its infinite series expansion.
19. Solve differential equations using infinite series.

Subject Matter or Content to be Studied

1. The antiderivative
2. Techniques of integration which include substitution, integration by parts, partial fractions, use of tables of integrals, approximation techniques, and improper integrals
3. Application of the definite integral involving geometry and physics
4. Topics involving differential equations, which include slope fields, Euler's method, separation of variables, growth and decay, and applications and modeling
5. Approximating functions to include Taylor polynomials, Taylor series, and geometric series

Student Activities and Requirements

1. Class attendance, as determined by the regulations of the university and the department.
2. Homework exercises to be completed by the student and graded at the discretion of the instructor.

3. Participation in class discussion.
4. Scheduled tests and quizzes will be given periodically throughout the semester. Students will be given adequate notice.
5. A comprehensive final examination will be given as scheduled at the end of the semester.
6. Regular and punctual attendance is necessary for successful completion of this course.

Presentation Methods

Lecture with demonstration to include the use of graphing calculators and computer software as well as cooperative learning (75%); class discussion (25%).

Evaluation and Grading

4 tests	Four 100-point tests
daily grade (to include homework, quizzes)	The combined grade of quizzes and homework will be computed for the daily grade, which will count like a major test.
Final examination grade	A 100 point comprehensive final exam.

The final examination grade may be used to replace the lowest test grade. The final exam grade will count a minimum of 1/4 of the course grade. The average of the four test grades and the homework grade will constitute 3/4 of the course grade.

Exam Date: Tuesday, May 4, 2010 at 3 p.m.

Grading Scale

Grades will be assigned according to the following scale:

A (90% - 100%) B (80% - 89%) C (70% - 79%) D (60% - 69%) F (below 60%)

Cheating and plagiarism are not tolerated. If it is established that a violation has occurred, the instructor may determine the penalty, or he may report the offense to the department chair and dean of the school. The usual penalty involves a grade of zero on the test, examination, or paper in question.

Make up Tests, Class Attendance, and Tardiness

Prompt and regular attendance is necessary for success in this course. You are expected to be on time for class and stay the full class period. Three late arrivals or early departures will be counted as an absence. A student absent from class and missing a scheduled test is entitled to a make up test if evidence is presented to the instructor that the absence was due to personal illness or death in the immediate family. Absences authorized by the Vice President for Academic Affairs for official purposes (athletics, performing groups, student government, etc.) also entitle a student to make up test privileges. Any absence from scheduled work must be covered by an excuse from the Vice President for Academic Affairs, Student Health Services, or a doctor before the student is allowed to make up that work. Any exception to this rule must be arranged before the missed work! Each student is directly responsible to the individual faculty member for making up work missed due to excused absences. ALL makes up work must be completed with one week after returning to class. In order to receive credit in this course, a student must attend a minimum of 75% of the class meetings. Students in this class will be allowed no more than 14 absences, excused and unexcused. If a student exceeds the allowable number of absences, a grade of "F"

will be assigned in the course. Absences accrue from the first day the class meets; not the first day a student attends the class. If you are late registering for the class, any class meeting you missed prior to the first class meeting you attend will be considered an absence. In order to be counted present, a student must arrive on time for class and remain in class the entire time. When a student is tardy for a class, it is the student's responsibility to talk to the faculty member about changing the recorded absence to a tardy. This must be done on the day that the tardy occurred. Failure to do so will result in a recorded absence.

Classroom Policies

1. Do not use tobacco or eat in the classroom.
2. **Please turn off cell phones and pagers upon entering the classroom. Do not check messages or send text messages during class. If you are seen using a cell phone during a test, I will assume you are cheating. You are not allowed to use cell phone calculators.**
3. Do not bring guests, including children, to class.
4. Come to class on time.
5. Be prepared to start class at the scheduled time. Have paper, pencil, book, homework, etc., out and ready.
6. Do not ask to leave class early. Schedule any appointments at times that do not conflict with classroom time.
7. Calculator use is permitted and encouraged on all homework assignments and tests.
8. Be sure to show all work on homework assignments and tests. No partial credit can be given if no work is shown.
9. Homework will be collected and graded at the discretion of the instructor. Homework must be turned in at the time when it is requested. No late homework will be accepted.
10. If a student has a disability that qualifies under the American with Disabilities Act and requires accommodation, he should contact Dr. Richard Houston in the office of Disability Services at 846-4690.

Important Dates

Students who remain in the course more than one week after the first test and who then elect to drop the course will receive a grade of **W** if passing or a grade of **F** if failing the course at the time of the drop. A drop is not effective and complete unless the drop slip has been signed by all designated parties and turned in to the registrar's office. No course may be dropped after **April 30**. If you plan to audit this class, you must notify the instructor by **January 26**. You will not be allowed to change your status from credit to audit after this date.

Instructor: Dr. Lee Virden

Instructor's Office: Walters 270 C **Office Phone:** 846-4511

Instructor's e-mail address: lvirden@deltastate.edu

Instructor's Office Hours:

Monday	Tuesday	Wednesday	Thursday	Friday
1:15 – 2:45	9:15 – 10:45 1:15 – 2:45	10:00 – 11:00 1:15 – 2:45	9:15 – 10:45 1:15 – 2:45	

Additional Statement Concerning MAT 206

Mat 206 is a 4-hour class. This class will meet from 11:00 to 11:50 on Mondays and Fridays and from 10:50 to 11:40 on Tuesdays and Thursdays. This is your **major** course this semester and you should treat it as such. Studying the assignments daily is absolutely necessary for success in this course. You will find that you will need at sometime during this semester almost all of the mathematics that you have been exposed to in the past, especially algebra. The **only** way you will be able to be successful in this course is to work the problems and attend every class meeting. You may find it helpful to collaborate with other students in working through the homework problems in this text. I would certainly encourage you to do so. It is always helpful to have more than one perspective when you approach the solution of a problem. I would like to mention a few of the basic principles, which guided the development of this textbook. The first principle is called "The Rule of Three". This principle emphasizes the presentation of every topic from a **geometric, numerical,** and **algebraic** viewpoint. Throughout this course you will be asked to **think** about the geometrical and numerical meaning of calculus concepts. In the homework problems dealing with applications, you will be asked to explain verbally what your answers mean in practical terms. The final major emphasis in this textbook involves the use of technology. In this course we will take advantage of computers and graphing calculators to help us learn to think mathematically. You will need a graphing calculator for this class. I am most familiar with the **TI-85 or TI-86**. It is the calculator that I plan to use for the purpose of classroom demonstrations and for solving problems in the text that require a graphing utility. If you already have a graphing calculator other than the **TI-85 or TI-86**, you certainly may use it. However, you will be responsible for learning how to operate your calculator. I can provide help with the **TI-85** or **TI-86** only. Please **don't** hesitate to consult the instructor in **Walters 270C** during the designated office hours if you need individual help.