Calculus II (MTH254)
Spring 2024

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Office Hours: MW 10:50-12:20, 2:00-4:00
TR 9:30-11:00, 12:20-1:50
F 10:00 – 12:00

Time/Location: TR 2:00 – 4:00, Spencer 245

Prerequisites: Grades of C or better in MTH245 (Calculus I)

Resources: Text: Stewart. *Calculus—Early Transcendentals.* Eighth Edition. Cengage Learning © 2016

Required Materials:

TI- 84 Graphing Calculator, 3-ring notebook, college rule 3-hole paper, graph paper or graph stamp, cardboard folder, mechanical pencils with extra erasers, small pack-colored pencils, pens and straight edge.

Program Outcomes: The knowledge and critical thinking skills acquired in the general education component enable students to analyze problems, to arrive at intelligent conclusions, and to make reasoned choices in their professional and personal lives.

- Use computational mathematics, algebraic operations, and their practical applications to solve problems which they encounter at home and the workplace.
- Possess basic technological skills to identify, locate, and process information.

Rationale: An objective of post-secondary education is to provide a core of knowledge that is shared with most educated people. By studying and developing a deeper understanding of mathematical computations, students can better analyze, problem solve, and prepare critical thinking strategies for real world scenarios. Technological skills with the graphing calculator are necessary for future math courses.

By studying and developing an ability to apply the mathematical principles of the second course in calculus, MTH255 Calculus II, the student will be prepared to continue in the study of the calculus sequence and to compete academically upon transfer to a four-year institution.

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Course Description:

This course is designed primarily to serve students majoring in mathematics, engineering, physics, chemistry, and various other fields of science. The content of this course consists of a study of areas, volumes of solids of revolution, exponential and logarithmic functions, trigonometric and hyperbolic functions and their inverses, integration techniques, conic sections, indeterminate forms, improper integrals and infinite series. (ACTS: MTH2505)

Course Objectives: Upon successful completion of MTH 255 Calculus II and Analytic Geometry, the student should be able to:

1. Demonstrate understanding of areas, volumes of solids of revolution, integration techniques, conic sections, indeterminate forms, improper integrals, infinite series, and their applications.
2. Work with functions (exponential, logarithmic, trigonometric, and hyperbolic and their inverses) represented in a variety of ways—graphically, numerically, analytically, and verbally—and understand the connections among these representations.
3. Use critical thinking to formulate decisions and solve problems based on reasoning and analysis.
4. Communicate mathematics and explain solutions to problems both verbally and in written sentences.
5. Use graphing calculators to help solve problems, experiment, interpret results, and support conclusions.

Expected Student Learning Outcomes:

The student will understand and be able to apply the concepts involved with integration. Topics required are:

- Velocity and Net Change
- Area between curves
- Volumes of Solids of Revolution
- Work
- The student will understand and apply the following integration techniques (Calculus I or Calculus II):
    - Integration by parts
    - Trigonometric and substitutions
    - Integration of rational functions using partial functions
- Improper Integrals
- Applications to Physics, Engineering, Economics, and Biology
- Differential Equations
- Slope Fields and Euler's Method

- Separable Equations
- Sequences and Infinite Series

Course Outline: Calculus II Spring 2023

Chapter 6: Applications of Integration Weeks 1-3

6.1 Areas Between Curves
6.2 Volumes: Slice, Disk, Washer
6.3 Volumes by Cylindrical Shells
6.4 Work
6.5 Average Value of a Function
Review test and Chapter 6 Exam

Chapter 7: Techniques of Integration Weeks 4-7

7.1 Integration by Parts
7.2 Trigonometric Integrals
7.3 Trigonometric Substitution
7.4 Integration by Partial Fractions
7.5 Strategy for Integration
7.6 Integration using Tables and Computers
7.7 Approximate Integration
7.8 Improper Integrals
Review test and Chapter 7 Exam

Chapter 8: Further Applications of Integration Weeks 8 – 9

8.1 Arc Length
8.2 Area of a Surface of Revolution
8.3 Applications of Physics and Engineering
8.4 Applications of Economics and Biology
8.5 Probability
Review test and Chapter 8 Exam

Chapter 9: Differential Equations Weeks 11-12

9.1 Modeling with Differential Equations
9.2 Direction Fields and Euler's Method
9.3 Separable Equations

9.4 Models for Population Growth
9.5 Linear Equations
Review test and Chapter 9 Exam

Chapter 10: Parametric Equations and Polar Coordinates (Independent Study & Presentation)- Week 13
10.1-10.2 Parameterized curves
10.3-10.4 Polar coordinates, area length in polar coordinates.

Chapter 11 Sequence and Series Week 14-15
11.1 Sequences
11.2-11.3 Series & Integral Test
11.4 Comparison Test
11.5-11.6 Alternating Series, absolute convergence, ratio and root tests.
11.7 Strategy for Testing Series
11.8-11.9 Power Series
11.10 Taylor and Maclaurin Series
Final Exam Review- week 16

Important Dates:

January 16	T	Classes begin.
January 18	F	Last day to drop with a refund
February 19	M	Winter Break (no classes, offices open)
February 26-March 1	M-F	Priority Registration for Summer & Fall
March 11	M	Mid-semester/first 8-week classes final grades due
March 18-22	M-F	Spring holidays begin (no classes, offices open)
May 2	R	Graduation
May 3	F	Classes end/Last day to drop a class with a W
May 6-9 May 9	M-R R	Final exams Grades due by 4:30pm

Course Conduct: The class will be taught using a combination of lecture, group interaction, question and answer approach, and independent study. New topics will be demonstrated using the board, overhead document projector, and TI 84+ Smartview computer program for support of graphing calculator use. Students are strongly encouraged to discuss concepts and examples as opportunities are presented during instructor presentation. It is the student's responsibility to inform the instructor when a concept is confusing or otherwise unclear.

UA Rich Mountain Credit Hour Calculator: For every course credit hour, you should expect to spend at least three clock hours per week of concentrated attention on course-related work, including but not limited to time attending class, as well as out-of-class time spent completing homework, seeking help from instructor or tutors, preparing for upcoming quizzes/tests/exam, reviewing material, problem solving, and organizing your notebook. For a four-hour course, a typical student should expect to spend at least twelve hours per week dedicated to this course. This includes the time spent in class.

Course Requirements / Evaluation (Grading):

Tests are 30% of your final grade. Four tests are scheduled.
Class Attendance & Participation 10%
Homework Assignments (Biweekly) 25%
Research & Presentations 15%
Final Exam 20%

The final exam is comprehensive and will include problems from the chapters we have covered in class.

90 – 100 = A **80 – 89 = B** **70 – 70 = C** **60 – 69 = D** **0 – 59 = F**

Supplies Needed for daily work: TI-83/84 Calculator supplied by UA Rich Mountain as needed, 3-ring notebook, college rule 3-hole paper, graph paper, cardboard folder, mechanical pencils with extra erasers, pens, yellow highlighter, small pack-colored pencils, small ruler or straight edge.

Criteria for Credit: Homework must be neat and complete. All steps or an explanation of how to arrive at the correct answer must be given. ***Answers alone are not acceptable***. Write the lesson topic at the top of the first page. Leave at least one blank line between problems. All graphs are to be accurately sketched on graph paper with all parts properly labeled and all work for the problem shown on the same page as the graph. For immediate feedback, you may check your answers for most assigned problems in the back of the book. *You will not receive credit for any problems not meeting the criteria for credit described above.*

Title IX and Discrimination Policy: UA Rich Mountain adheres to a policy that enables all individuals regardless of race, color, gender, national origin, age, religion, sexual orientation,

veteran's status, or disability, to work and study in an environment unfettered by discriminatory behavior or acts. Harassment of an individual or group will not be condoned, and any person (student, faculty, of staff member) who violates this policy will be subject to disciplinary action.

Harassment that is considered discriminatory includes actions or conduct (verbal, graphic, gestural, or written) directed against any person or group with the intent to demean or create a hostile or threatening environment. It is not the intent of this policy to infringe upon or limit educational, scholarly, or artistic expression. Any person who believes he or she has been discriminated against should contact the Title IX Coordinator to obtain assistance and information concerning the filing of a complaint.

Attendance Policy: For attendance purposes, a student who is displaying symptoms of illness must email: contact.tracing@uarichmountain.edu to determine next steps for an excused absence related to COVID or flu. Contacting an instructor **DOES NOT** start this process or guarantee an excused absence.

Make-up Policy: Make up work should be completed promptly after the absence. Make-up exams are given only in instances of the most unavoidable, serious circumstances. Prior notice of absence from an exam is required. Upon return after an absence the student is expected to be prepared for the days' class activities

Assignment Due Dates: Students are expected to submit the assignments and other graded tasks on or before the assigned due dates. You will be penalized for the late work depending on the number of days and full point and importance of the works assigned.

Computer and On-Campus Resources: Computer labs with printers are available in several places on campus including the Johnson Learning Commons. UA Rich Mountain offers students assistance with quality tutors available in the Student Support Services (SSS) and Learning Enrichment and Counseling Center (LEAC) in the Johnson Learning Commons. You may access www.tutor.com/uarichmountain at nights and weekends when SSS is not available.

Cell Phones: The use of cell phones in the classroom is prohibited. Turn cell phone off or set on vibrate and store it out of sight during class time.

Academic Dishonesty: Any act of academic dishonesty will result in no credit for the paper in question and further disciplinary action by the university. This includes the use of Artificial Intelligence (AI) to generate your work.

Disability Policy: It is the policy of UA Rich Mountain to accommodate students with disabilities, pursuant to state and federal law. Any student with a disability who needs accommodation should contact the Vice Chancellor for Student Affairs Office, 394-7622, ext. 1460.

Arkansas Clean Air Act: In compliance with the Arkansas Clean Air Act, UA Rich Mountain is a smoke and tobacco free facility. Students and guests are to refrain from the use of all tobacco products while on campus.

Student Misconduct: Students committing misconduct are subject to disciplinary sanction(s) and/or restrictions. Misconduct or prohibited behavior includes, but is not limited to endangerment, harassment, disruption, sexual misconduct, illegal drugs and/or alcohol, fire or safety issues, gambling, property violations, computer violations or other violations as listed in the UA Rich Mountain catalog.

UA Rich Mountain Mission: UA Rich Mountain provides transformative education to all learners.

Campus Security: UA Rich Mountain strives to provide a safe learning environment; therefore, students who know of any security risk are to contact a college official. For more information follow this link and look under the title Health and Safety: http://www.uarichmountain.edu/at-a-glance/disclosures

Credit Hour Requirement Calculator

Course Information				
Department, Course Number	Mathematics			
Course Title	Calculus II			
Credit Hours	4			
Mode of Delivery	Traditional			
Weeks in Part of Term	8			
Level of Reading Material				
Reading Level of Students	Above Average Student (1)			1
Average Pages per Hour	13			

Enter either week or term, not both

Contact Hours		**Hours/Week**	**Hours/Term**	**Total Hours**
Lecture/Recitation			60	60
Syllabus Items	**Pages Asg'd**	**Hours/Week**	**Hours/Term**	
Weekly Homework Assignments		4		70
Prepare for Chapter Tests			12	12

Study Assigned examples	80	6.2
Prepare for Final		4
		0
		0
		0
		0
		0
		0
Total Hours		152.2
Required Hours		150
Difference		Ok + 2.2