Calculus II (MTH254)
Spring 2022

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

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, straight edge. No ink pens.

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.

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

Covid-19 Protocols

Face Mask Policy: As per the direction of the University of Arkansas Board of Trustees, all students are required to wear a proper face covering that completely covers the nose and mouth while on campus and in class. Masks with holes or masks that do not completely cover nose and mouth are not acceptable. Any student that does not have a proper mask will leave class and be referred to the Vice Chancellor for Student Affairs for possible disciplinary action.

Food and Drink: Food and drinks, including water are not allowed in the classroom at any time.

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.

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 nights and weekends when SSS is not available.

Course Requirements / Evaluation (Grading):

Tests are 30% of your final grade. Four tests are scheduled.
Class Attendance & Participation 10%
Homework Assignments & Quizzes 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 – 79 = 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, and ruler.

Criteria for Credit: Homework must be neat and complete. ***Answers alone are not acceptable; all workings must be clearly shown***. Use pencils and /or blue or black ink pens and straight edge papers. Leave a 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. Graphs much be drawn with a pencil unless otherwise instructed.

Attendance / Make-up Policy: No make-up exams will be given. If you miss an exam, the missing grade will be replaced by the final exam score at the end of the course. Deliberately missing an exam is not advised due to the comprehensive nature of the final exam and the possibility of missing a future exam. The student is responsible for instruction missed during class by studying the material in the book, seeking help from the teacher and/or student support services, and by getting class notes from the teacher or another student.

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. Cell phones will be taken up on test days.

Academic Dishonesty: Any suspicion of academic dishonesty will result in no credit for the paper in question.

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 accommodations 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.

UA Rich Mountain Credit Hour Calculator: For every course credit hour in an 8-week course, you should expect to spend at least six 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 24 hours per week dedicated to this course. This includes the time spent in class.

Course Outline: Calculus II Spring 2021

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 10-12

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)
10.1-10.2 Parameterized curves
10.3-10.4 Polar coordinates, area length in polar coordinates.

Chapter 11 Sequence and Series Week 13-15
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 (All Chapters)

Important Dates:

January 10	M	Classes begin.
January 21	F	Last day to drop with a refund
February 14	M	Winter Break (no classes, offices open)
February 28-March 4	M-F	Priority Registration for Summer & Fall
March 7	M	Mid-semester/first 8-week classes final grades due
March 21-25	M-F	Spring holidays begin (no classes, offices open)
April 29	F	Classes end/Last day to drop a class with a W
May 2-5 May 5	M-R R	Final exams Grades due

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