

El Paso Community College

Syllabus

Part II

Official Course Description

SUBJECT AREA	<u>Mathematics</u>
COURSE RUBRIC AND NUMBER	<u>MATH 2413</u>
COURSE TITLE	<u>Calculus I (C) (MNS)</u>
COURSE CREDIT HOURS	<u>4 4 :</u> Credits Lec Lab

I. Catalog Description

Limits and continuity; the Fundamental Theorem of Calculus; definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental functions, with an application to calculation of areas. **Prerequisite: MATH 2412 with a "C" or better or by placement exam. (4:0).**

II. Course Objectives

Upon completion of this course the student will comprehend some of the great ideas of mathematics, and will be able to demonstrate this understanding:

A. Unit I Limits, Continuity and The Derivative

1. Understand the intuitive concept of limit.
2. Find limits numerically and graphically.
3. Find the points where a function is continuous.
4. Use the epsilon – delta definition of a limit.
5. Find infinite limits and use them to find equations of asymptotes.
6. Establish the relationship between tangent lines and rates of change.
7. Understand how the concept of limits leads to the concept of the derivative.
8. Find derivatives using the power rule, the product rule and the quotient rule.
9. Find higher order derivatives.
10. Use the chain rule.
11. Find derivatives using the implicit method.
12. Solve related rate problems.

B. Unit II Derivative Applications

1. Find relative and absolute extrema on an interval.
2. Apply Rolle's Theorem and The Mean Value Theorem.
3. Find where functions are increasing and decreasing.
4. Find where functions are concave up and down.
5. Apply the 1st and 2nd derivative tests.
6. Analyze and sketch the graph of a rational function.
7. Solve optimization problems.

8. Interpret the meaning of a differential.
- C. Unit III Integration
1. Evaluate definite and indefinite integrals.
 2. Use sigma notation to find sums.
 3. Find approximations for areas using rectangles and exact areas using integration.
 4. Apply the fundamental Theorem of Integral Calculus.
 5. Apply the method of substitution to integration problems.
- D. Unit IV Logarithmic, exponential and other transcendental functions
1. Find derivatives of natural logarithm functions.
 2. Find derivatives of exponential functions.
 3. Integrate logarithmic and exponential functions.
 4. Understand the concept of inverse functions.
 5. Find derivatives of inverse trigonometric functions.
 6. Integrate inverse trigonometric functions.

EPCC Core Learning Outcomes

Upon successful completion of this course, students will:

1. Demonstrate effective written, oral, and/or visual **communication skills**.
2. Apply **critical thinking skills** by engaging in creative thinking, innovation, inquiry, analysis, evaluation, and synthesis of information.
3. Demonstrate **empirical and quantitative skills** by formulating an inquiry and then identifying and following an investigative process using empirical and/or qualitative/quantitative reasoning to satisfy the inquiry.

III. THECB Learning Outcomes (ACGM)

Upon successful completion of this course, students will:

1. Develop solutions for tangent and area problems using the concepts of limits, derivatives, and integrals.
2. Draw graphs of algebraic and transcendental functions considering limits, continuity, and differentiability at a point.
3. Determine whether a function is continuous and/or differentiable at a point using limits.
4. Use differentiation rules to differentiate algebraic and transcendental functions.
5. Identify appropriate calculus concepts and techniques to provide mathematical models of real-world situations and determine solutions to applied problems.
6. Evaluate definite integrals using the Fundamental Theorem of Calculus.
7. Articulate the relationship between derivatives and integrals using the Fundamental Theorem of Calculus.

IV. Evaluation

- A. There will be at least three in class exams (100 points each) and one required in class comprehensive final exam to evaluate student learning for the course.
- B. Quizzes may be given at the discretion of the instructor.
- C. Homework assignments should be expected to accompany each class session.

D. Grading will be based on the following scale:

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Note: “I” and “W” grades will be assigned whenever the appropriate assignments and deadlines have been met. To receive an I, the students must have completed at least 80% of the course with at least a 75 average. The proper forms must also be signed by both the student, and the instructor before being submitted to the registrar.

V. **Disability Statement (American with/Disabilities Act [ADA])**

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. **6 Drop Rule**

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.

VII. **Title IX and Sex Discrimination**

Title 9 (20 U.S.C. 1681 & 34 C.F.R. Part 106) states the following "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance." The Violence Against Women Act (VAWA) prohibits stalking, date violence, sexual violence, and domestic violence for all students, employees and visitors (male and female). If you have any concerns related to discrimination, harassment, or assault (of any type) you can contact the Assistant to the Vice President for Student and Enrollment Services at 915-831-2655. Employees can call the Manager of Employee Relations at 915-831-6458. Reports of sexual assault/violence may also be reported to EPCC Police at 915-831-2200.