



Course Code MATH-190	Course Title Calculus I	ECTS Credits 8
Department Computer Science	Semester Fall, Spring	Prerequisites MATH-180 or MPT
Type of Course Required	Field Mathematics	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 1 st	Lecturer(s) Dr Marios A. Christou
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

1. Cover limits and continuity in depth
2. Discuss limits and continuity of trigonometric functions in detail.
3. Introduce students to derivatives and provide them with a deep knowledge of differentiation techniques.
4. Discuss the basic calculus theorems such as the Intermediate Value theorem, the Mean Value theorem and Rolle's theorem.
5. Provide students with the necessary knowledge to analyze functions and sketch their graphs.
6. Introduce the students to the integral as a summation and evaluate indefinite and definite integrals.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Compute limits, including one-sided limits, and limits at infinity.
2. Determine the intervals on which a function is continuous
3. Apply derivatives to find equations of tangent lines and rates of change.
4. Use the derivative analyze functions and sketch the graphs of polynomial and rational functions.
5. Implement Rolle's theorem and the mean value theorem.
6. Compute definite and indefinite integrals using their basic properties and techniques such as u-substitution.
7. Calculate the derivatives and integrals of Logarithmic and exponential Functions.

Course Contents:

1. Limits-Limits at infinity. Continuity.
2. Continuity of Trigonometric Functions. Tangent Lines, rates of change.
3. The Derivative Function. Techniques of Differentiation, Product and Quotient

- rules.
- 4. Derivatives of Trigonometric Functions. The Chain Rule. Implicit Differentiation.
- 5. Analysis of Functions.
- 6. Rolle's Theorem; Mean Value Theorem. An Overview of the Area Problem
- 7. The Indefinite and Define Integral.
- 8. Exponential and Logarithmic Functions.
- 9. Derivatives and Integrals of Logarithmic and Exponential Functions.

Learning Activities and Teaching Methods:

Lectures, Handouts and Assignments

Assessment Methods:

2 Mid-Term Exams; Final Exam; Class Participation.

Required Textbook/Reading:

Authors	Title	Publisher	Year	ISBN
Howard Anton, Irl Bivens, Stephen Davis	Calculus: Late Transcendentals , Combined <i>9th Edition</i>	Wiley	2009	0470183497

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
James Stewart	Calculus	Thomson/Brooks/ Cole	2007	9780495011668