



Course Code MATH-191	Course Title Calculus II	ECTS Credits 8
Department Computer Science	Semester Fall, Spring	Prerequisites MATH-190
Type of Course Required	Field Mathematics	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 1 st or 2 nd	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:

- Cover indeterminate forms of limits and L'Hospital's rule.
- Introduce students to inverse trigonometric functions
- Provide students with a deep knowledge of integration techniques
- Introduce students to sequences and discuss monotonicity tests
- Cover all aspects of infinite series and convergence tests.
- Discuss Maclaurin and Taylor series
- Discuss power series and absolute convergence in detail
- Make students aware of the application of the definite integral in evaluating areas and volumes.

Learning Outcomes:

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

1. Evaluate limits using L'Hopital's Rule.
2. Calculate the derivatives and integrals of inverse trigonometric functions.
3. Apply various integration methods to compute definite and indefinite integrals
4. Evaluate improper integrals.
5. Use appropriate techniques and theorems to investigate the convergence and monotonicity of a sequence.
6. Apply convergence tests to determine whether a series converges or diverges.
7. Compute and use Maclaurin and Taylor Approximations.
8. Find the radius and interval of convergence of a power series
9. Calculate areas and volumes using integration.

Course Contents:

1. L'Hopital's Rule, Indeterminate forms.
2. Derivatives and Integrals involving Inverse Trigonometric Functions.
3. Integration:
 - a. Review of basic Integration Formulae

<ul style="list-style-type: none"> b. Integration by parts c. Trigonometric Integrals and Reduction Formulas d. Trigonometric Substitution e. Partial Fractions f. Improper Integrals
4. Sequences <ul style="list-style-type: none"> a. Convergence b. Monotone sequences
5. Infinite series <ul style="list-style-type: none"> a. Partial Sums b. Geometric and Telescoping Series c. Convergence Tests d. Alternating Series e. Absolute Convergence f. Maclaurin and Taylor Series g. Power Series
6. Applications of the Definite Integral <ul style="list-style-type: none"> a. Area between two curves b. Volumes by Slicing c. Volumes using Cylindrical Shells

Learning Activities and Teaching Methods:

Lectures, Homework and Programming Assignments
--

Assessment Methods:

Two Mid-Term Exams, Final Exam, Quizzes, 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