UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
MATH-196	Calculus II	6
Prerequisites	**Department**	**Semester**
MATH-195	Computer Science	Fall/Spring
Type of Course	**Field**	**Language of Instruction**
Required	Mathematics	English
Level of Course	**Lecturer**	**Year of Study**
1st Cycle	Professor Nectarios Papanicolaou	1st
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-face	N/A	None

Course Objectives:

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' Hospital'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 Content:

1. L' Hospital's Rule, Indeterminate forms.
2. Derivatives and Integrals involving Inverse Trigonometric Functions.
3. Integration:
    a. Review of basic Integration Formulae
    b. Integration by parts
    c. Trigonometric Integrals and Reduction Formulas
    d. Trigonometric Substitution
    e. Partial Fractions
    f. Improper Integrals
4. Sequences
    a. Convergence
    b. Monotone sequences
5. Infinite series
    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
    a. Area between two curves
    b. Volumes by Slicing
7. Volumes using Cylindrical Shells

Learning Activities and Teaching Methods:

Lectures, Online Material, Assignments, In-class Exercises.

Assessment Methods:

Final Examination, Midterm Examinations, Class Participation, Assignments/Quizzes.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Calculus: Late Transcendentals	Howard Anton, Irl Bivens, Stephen Davis	Wiley (10th Ed.)	2012	Print copy: 9781118092484 E-book: 9781118379318

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Calculus	James Stewart	Brooks/Cole (6th Ed.)	2009	9780495383628