國立臺灣科技大學
National Taiwan University of Science and Technology
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No. 43, Keelung Road, Section 4, Taipei, Taiwan

National Taiwan University of Science and Technology

2018 Summer Program

MATH 122 Calculus 2

Course Outline

Course Code: MATH 122

Instructor: Anja Bankovic

Home Institution: Boston College

Office Hours: TBA and by appointment

Email: anja289@yahoo.com

Credit: 4

Class Hours: According to the regulations of Minister of Education, R.O.C, 18 class hours could be counted as 1 academic credit in all universities in Taiwan. This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10-hour extra classes.

Course Description:

This is the second course in calculus for engineers, physicists, computer scientists, and mathematicians.

You will learn more advanced integration techniques, convergence of sequences and series, power series, and basics of differential equations.

Calculus studies the limiting behavior of functions. Functions themselves are among the most important discoveries in history, because they describe the dependence of objects and phenomena in nature. Most functions of interest exhibit a rather regular behavior which makes it possible to understand their infinitesimal properties. This enables us to describe the nature and predict its behavior.

The proper understanding of calculus plays a crucial role in careers of mathematicians, physicists, economists, engineers, programmers, and in recent years biologists and other life scientists. This course will teach you how to think and understand the reasons behind formulas. The calculus will give meaning to your future courses and life.

Required Textbooks:

Stewart: Calculus – Early Transcedentals

Grading & Evaluation:

Homework and quizzes: 20%
Midterm: 30%
Final: 50%

Course Schedule:

Week 1:

Session 1: Anti-derivatives and indefinite integrals

Session 2: Definite integrals. Fundamental Theorem of Calculus. Substitution

Sessions 3: Integration by parts. Trigonometric Substitution

Week 2:

Session 1: Integration of rational functions. Strategies for integration, Improper integrals

Session 2: Arc length and the area and volume of the surface of revolution.

Session 3: Approximation to integrals. Midpoint, trapezoid, and Simpson's approximation.

Week 3:

Session 1: Work. Center of mass. Application of integrals in probability, expected value of a random variable.

Session 2: Sequences and series. Comparison and limit comparison test.

Session 3: Integral test.

Week 4:

Session 1: Alternating series test.

Session 2: Ratio and root test.

Session 3: Power series. Radius and interval of convergence. Taylor and MacLaurin series.

Week 5:

Session 1: First order differential equation. Direction fields.

Session 2: Separable equations.

Session 3: Exponential growth and decay.