



National Taiwan University of Science and Technology

2018 Summer Program

MATH 300 Multivariable Calculus

Course Outline

Course Code: MATH 300

Instructor: TBA

Home Institution: TBA

Office Hours: TBA

Email: TBA

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, 10 lecturer office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10-hour extra classes.

Course Description:

This is a lower division course in multivariable calculus with elements of analytic geometry. The course covers differential and integral calculus of functions of several variables. It provides a solid background for students who wish to continue their studies in natural sciences such as mathematics, physics, engineering, finance, economics, and computer science.

The course will start with the study of analytic geometry of vectors, lines, planes, curves, and



surfaces. The next major topic is differential calculus and optimization problems, and the final topic includes multiple integrals and surface integrals.

Required Texts:

James Stewart, *Calculus: Early Transcendentals*, 7th ed., Cengage Learning, Belmont, 2010. ISBN: 0538497904.

Grading & Evaluation:

Homework and quizzes: 30%

Midterm: 30%

Final: 40%

100%

Course Schedule:

Week 1:

Session 1: Introduction. Vectors in 2D and 3D.

Session 2: Parametric and symmetric equations of lines and planes

Sessions 3: Curves. Velocity, acceleration, and curvature.

Week 2:

Session 1: Surfaces. Parametrizations of surfaces.



Session 2: Conics and quadratic surfaces.

Session 3: Partial derivatives. Directional derivatives. Gradient.

Week 3:

Session 1: Differentials. Taylor formula in multiple dimensions.

Session 2: Maximum and minimum. Hessian matrix.

Session 3: Lagrange multipliers.

Week 4:

Session 1: Multiple integrals.

Session 2: Change of variables. Jacobian.

Session 3: Line integrals. Fundamental theorem for line integrals. Green's theorem.

Week 5:

Session 1: Surface integrals. Curl and divergence.

Session 2: Divergence theorem and Stokes' theorem.

Session 3: Review