Course Information	
Course title	Applied Mathematics (I)
Semester	114-2
Designated for	COLLEGE OF ENGINEERING GRADUATE INSTITUTE OF APPLIED MECHANICS
Instructor	KUANG CHONG WU
Curriculum Number	AM7006
Curriculum Identity Number	543EM1020
Class	
Credits	3.0
Full/Half Yr.	Half
Required/ Elective	Required
Time	Tuesday 2(9:10~10:00) Thursday 3,4(10:20~12:10)
Remarks	The upper limit of the number of students: 98.
Course introduction video	
Table of Core Capabilities and Curriculum Planning	Table of Core Capabilities and Curriculum Planning
Course Syllabus	
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Course Description	There are three chapters in this course. Chapter one covers the Cartesian Tensors, which are extensively used in the courses of Elasticity, Plasticity, Fluid mechanics, and other science subjects. Chapter two includes three parts. The first part introduces the existence and uniqueness theory for a system of 1st order ordinary differential equations (ODE). The second part covers the solution of a system of linear 1st order ODE, which is particular useful for the course of Dynamics. The third part is designed to solve linear 2nd order ODE with unknown source functions. We introduce the concepts of Dirac delta function, generalized functions, adjoint operators, Green's functions and the integral representation of the solution of 2nd order ODE. Chapter 3 also includes three parts. The 1st part introduces the classification of the 2nd order partial differential equations (PDE). The 2nd part introduces the Green's function and the integral representation of solution of 2nd order linear PDE. Free space Green's functions are solved first for infinite domain and then method of images is

	introduced for solving some PDE with simple finite domains. The 3rd part introduces the eigenvalue problem of self-adjoint boundary value problems of 2nd order PDE, and the full or partial eigenfunction expansion for solving the linear 2nd order BVP or IBVP. Also included in this part are the Maximum-Minimum principle and unique theorems for Laplace/Poisson equation.
Course Objective	This course is aimed to let the graduate students acquire the analytic skills needed in mechanics and applied science.
Course Requirement	The students who take this course for credits should have taken at least one year of engineering mathematics courses in most engineering departments or equivalent courses which contain vector and matrix analysis and differential equations.
Student Workload (Expected weekly study hours before and/or after class)	
Office Hours	
Designated reading	
References	1) H. Jeffreys, "Cartesian tensors," 7th ed., Cambridge Univ. Press, 1968. (2) Y. C. Fung, "A first course in continuum mechanics," Prentice-Hall, 1969. (3) G. Birkho and G. C. Rota, "Ordinary Differential Equations," 4th ed. John Wiley & Sons, 1989. (5) F. Brauer J. A. Nohel, "Ordinary Differential Equations," Benjamin Inc., 1967. (6) I. Stakgold, "Green's Functions and Boundary Value Problems," John Wiley & Sons., 1979. (7) M. W. Hirsch and S. Smale, "Differential Equations, Dynamical Systems, and Linear Algebra," Academic Press, 1974. (8) W. E. Williams,“Partial differential equations,” Oxford University Press, 1980.
Grading	1. NTU has not set an upper limit on the percentage of A+ grades. 2. NTU uses a letter grade system for assessment. The grade percentage ranges and the single-subject grade conversion table in the NATIONAL TAIWAN UNIVERSITY Regulations Governing Academic Grading are for reference only. Instructors may adjust the percentage ranges according to the grade definitions. For more information, see the Assessment for Learning Section.

Progress

Week	Date	Topic
No data		