ME 610 Advanced Engineering Mathematics

1. Ordinary differential equations
   - First-order differential equations
   - Second-order linear differential equations
   - Higher order linear differential equations
   - Series solutions of differential equations (special functions)
   - Laplace transforms
2. Linear algebra and vector calculus
   - Linear algebra: Matrices, Vectors, Determinants
   - Vector differential calculus (Grad, Div, and Curl)
   - Vector integral calculus (Integral theorems)
3. Fourier analysis and partial differential equations
   - Fourier series, orthogonal functions, integrals, and transforms
   - Partial differential equations (D'Alembert, Separation of variables, Heat equation, and Laplace's equation)
4. Complex analysis
   - Complex number and complex analytical functions
   - Complex integration
   - Complex analysis applied to potential theory (Heat problems, Fluid flow, and Harmonic functions)

Week	Topic	Lecturer
1 (16/06)	Introduction	Thira
2 (23/06)	Overview of advanced mathematics	Padungsak
3 (30/06)	First/Second order ODE	Thira
4 (07/07)	Higher order IDE and series solutions	Thira
5 (14/07)	Laplace transform	Thira
6 (21/07)	Linear algebra: matrices, vectors, determinants	Thira
7 (28/07)	Linear algebra and applications	Thira
8 (04/08)	Vector calculus	Thira
9 (25/08)	Fourier series, orthogonal functions, integral transform method	Chainarong
10 (01/09)	PDE (solid applications)	Thira
11 (08/09)	PDE (fluid applications)	Padungsak
12 (15/09)	Complex number and complex analytical Functions	Watit
13 (22/09)	Complex integration, complex analysis (Heat problem, Fluid flow etc.)	Watit
14 (29/09)	Finite difference method	Wiroj

Remarks: Midterm examination (11/08) and Final examination (06/10)

References:
1. Advanced Engineering Mathematics, E. Kreyszig, John Wiley & Sons, 1993.
2. Advanced Engineering Mathematics, D. G. Zill and M. R. Cullen, PWS publishing company, 1992.