課程名稱: 微分方程 I

Elementary Differential Equations I

課號/班別: MA2041-B

上課時間 (Time): Monday 14:00-14:50

Wednesday 10:00-11:50

學分: 3

授課教師: 陳建隆 (Jann-Long Chern)

參考書(References):

Differential Equations with Boundary-Value Problems,

Ninth Edition and Metric Version

授課內容:

Chapter 1. INTRODUCTION TO DIFFERENTIAL EQUATIONS.
Definitions and Terminology. Initial-Value Problems.
Differential Equations as Mathematical Models. Chapter 1 in
Review: Exercises 2,9,13,18,21,26,29,32,32,39,40.

Chapter 2. FIRST-ORDER DIFFERENTIAL EQUATIONS.
Solution Curves Without a Solution. Separable Variables.
Linear Equations. Exact Equations and Integrating Factors.
Solutions by Substitutions. A Numerical Method. Chapter 2 in
Review: Exercises 3,6,14,16,17,18(f,n),20,25,31,35,37,39

Chapter 3 (Selected Topics)
MODELING WITH FIRST-ORDER DIFFERENTIAL
EQUATIONS. Linear Models. Nonlinear Models. Modeling
with Systems of First-Order Differential Equations. Chapter 3
in Review: Exercises 8,9,10,11,12,22.

Chapter 4. HIGHER-ORDER DIFFERENTIAL EQUATIONS.
Preliminary Theory-Linear Equations. Reduction of Order.

Homogeneous Linear Equations with Constant Coefficients. Undetermined Coefficients-Superposition Approach. Undetermined Coefficients-Annihilator Approach. Variation of Parameters. Cauchy-Euler Equation. Solving Systems of Linear Differential Equations by Elimination. Nonlinear Differential Equations.

Chapter 4 in Review: Exercises 5,12,14,24,32,37,42,45,48

Chapter 5. (Selected Topics)

MODELING WITH HIGHER-ORDER DIFFERENTIAL EQUATIONS.

Linear Models: Initial-Value Problems. Linear Models: Boundary-Value Problems. Nonlinear Models.

Chapter 5 in Review: Exercises 8,12,16,24,30,31,32

Chapter 6. SERIES SOLUTIONS OF LINEAR EQUATIONS.

Review of Power Series Solutions About Ordinary Points. Solutions About Singular Points. Special Functions. Chapter 6 in Review: Exercises 4,6,17,18,22,24,26,27

Chapter 7. LAPLACE TRANSFORM.

Definition of the Laplace Transform. Inverse Transform and Transforms of Derivatives. Operational Properties I. Operational Properties II. Dirac Delta Function. Systems of Linear Differential Equations.

Chapter 7 in Review:

Exercises 4,9,11,16,20,24,28,32,39,44,46,50,51

評量配分比重: Quiz + Exercises = 25%

Two Mid-Exam.= 25% * 2 = 50%

Final Exam. = 25%

Total 100%

Office Hours: Wednesday 14-16 or Make point

with Teacher first