Departmental Syllabus

(A guide for MATH 242 instructors)

Text: Stewart, J., *MATH 241/242/243 — University of Delaware*, Thomson, 2008, ISBN-13: 0-495-47922-5 (custom UD version).

- Instructors are strongly urged to prohibit the use of calculators with CAS on exams. If graphing calculators are permitted, then instructors should design exams so such users do not have an advantage.
- It is expected that the textbook topics which follow will be covered. Furthermore, it is expected that students will have some exposure to and familiarity with the Maple commands listed (or equivalent) in order to prepare them for further coursework, though proficiency in hand calculations is critical.
- Students should be able to synthesize the Maple commands to solve mathematical problems. The website

  `http://www.math.udel.edu/~rakesh/TEACH/M242/main242.html`

  has examples of problems which may help accomplish this. The site also contains suggestions and course related material.

Introductory Maple Commands

Basic syntax: + , - , * , ^ , / , := , restart , etc.
Expression manipulation: eval , evalf , simplify , factor , expand , collect , combine , assume , assuming , etc.
Plotting commands: plot , display
Preparing a Maple report with text, graphs, and Maple commands
Trigonometric, exponential and logarithmic functions

Review

Brief review of exponential, logarithmic and hyperbolic functions

Chapter 4: Applications of Differentiation

4.4 Indeterminate Forms and L'Hospital's Rule
4.8 Newton's Method (*Use Maple procedures to implement it in Lab*)

Related Maple commands: limit, diff, solve, fsolve, proc, pointplot

Chapter 6: Applications of Integration

6.1 Areas between Curves
6.2 Volumes
6.3 Volumes by Cylindrical Shells
6.5 Average Value of a Function

Related Maple commands: int

Chapter 7: Techniques of Integration

7.1 Integration by Parts
7.2 Trigonometric Integrals (*Cover only the simple trigonometric integrals*)
7.3 Trigonometric Substitution (*Cover only simple trigonometric substitutions*)
7.4 Integration of Rational Functions by Partial Fractions (*Cover simple division and distinct linear factors only*)
7.7 Approximate Integration
7.8 Improper Integrals

Related Maple commands: parfrac

Chapter 8: Further Applications of Integration

8.1 Arc Length

Chapter 11: Infinite Sequences and Series

11.1 Sequences
11.2 Series
11.3 The Integral Test and Estimates of Sums
11.4 The Comparison Tests (*Emphasize the limit comparison test*)
11.5 Alternating Series (*Optional*)
11.6 Absolute Convergence and the Ratio and Root Tests (*Do not cover conditional convergence or the root test*)
11.8 Power Series
11.9 Representation of Functions as Power Series
11.10 Taylor and Maclaurin Series (*Ignore convergence at endpoints*)
11.11 Applications of Taylor Series

Related Maple commands: series, taylor, sum, abs

Chapter 10: Parametric Equations and Polar Coordinates

10.1 Curves Defined by Parametric Equations
10.2 Calculus with Parametric Curves (*Only tangent lines should be covered*)
10.3 Polar Coordinates
10.4 Areas and Lengths in Polar Coordinates (*Cover areas only*)
10.5 Conic Sections

Related Maple commands: plot[parametric], impliciplot, polarplot