University of Delaware
MATH 242

Department of Mathematical Sciences
Analytic Geometry and Calculus B

Departmental Syllabus (Draft)

Text: Stewart, J. Calculus, 4th ed. Pacific Grove: Brooks-Cole, 1999.

Instructors are strongly encouraged 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 in order to prepare them for further course work, though proficiency in hand calculations is critical.

Students should be able to synthesize the Maple commands to solve mathematical problems. The website ????? has examples of problems which may help accomplish this. The site also contains suggestions and course related material.

Introductory Maple commands:
basic syntax (`+, -, *, ^, /, :=, etc.`)
expression manipulation (`eval, simplify, factor, expand, collect, assume`, etc.)
plotting commands (`plot, display`)
preparing a Maple report with text, graphs, and Maple commands
`evalf, restart` and *trigonometric functions.*

Chapter 7: Inverse Functions

7.1 Inverse Functions
7.2* (blue pages) Natural Logarithmic Functions
Instructors may use mid-point rule in Maple lab to approximate various values of $\ln x$.
7.3* (blue pages) Natural Exponential Function
7.4* (blue pages) General Logarithmic and Exponential Functions
7.5 Inverse Trigonometric Functions
7.6 Hyperbolic Functions (Ignore inverse hyperbolic functions.)
7.7 L'Hôpital's Rules

Related Maple commands: `ln, log, exp, limit, diff, int, solve, fsolve`, *hyperbolic and inverse trigonometric functions, working with lists (*`op, allvalues`, *etc.)*

Chapter 8: Techniques of Integration

8.1 Integration by Parts
8.2 Trigonometric Integrals (Cover only $\sin(2x)$ and $\cos(2x)$.)
8.3 Trigonometric Substitutions (Cover only sine and tangent substitutions.)

8.4 Partial Fractions (Cover simple division and distinct linear factors only.)
8.8 Improper Integrals

Related Maple commands: `parfrac`

Chapter 10: Differential Equations

10.1 Modeling with Differential Equations
10.4 Growth and Decay
10.2 Direction Fields and Euler's Method (Optional.)
10.5 Logistic Equation

Related Maple commands: `fieldplot`

Chapter 11: Parametric Equations and Polar Coordinates

11.1 Parametric Equations
11.2 Tangents and Areas (Only tangent lines should be covered.)
11.4 Polar Coordinates
11.5 Areas and Lengths in Polar Coordinates (Cover area only.)
11.6 Conic Sections

Related Maple commands: `plot[parametric], implicitplot, polarplot`

Chapter 12: Infinite Sequences and Series

12.1 Sequences
12.2 Series
12.3 Integral Test and Estimates of Sums
12.4 Comparison Tests (emphasize limit comparison test)
12.5 Alternating Series (optional)
12.6 Absolute Convergence and Ratio Test (Do not cover conditional convergence or the root test.)
12.8 Power Series
12.9 Representation of Functions by Power Series
12.10 Taylor and Maclaurin Series (Ignore endpoints of convergence.)
12.12 Application of Taylor Polynomials

Related Maple command: `series, mtaylor, abs, sum`

Text material: prepared in Spring 2000 by Leung, Bergman, Wenger
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Computer material: prepared in Summer 2001 by Rakesh, Edwards, Wenger
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