92.122 Management Calculus
Spring 2012

<u>Text</u>: Bittinger and Ellenbogen, **Calculus and Its Applications**, 10th edition, Pearson Education Inc. 2012; and the accompanying software MyMathLab.

<u>Note</u>: The text and MyMathLab are packaged together at a reduced price. Online versions of the student solution manual and text are available with MyMathlab. The hard copy student solution manual will be available separately at the bookstore.

<u>Goals and objectives</u>: This applied calculus course is a reform calculus approach for non science students. Emphasis will be given to a graphical understanding of calculus concepts, especially with regard to applications. A solid foundation in Pre-Calculus Mathematics is assumed.

The strategies will consist of business and economics related applications to the mathematical concepts as they are developed through graphical, numeric and analytic procedures. The primary objectives are:

- Differential calculus:- Slopes of lines will be viewed graphically and limiting cases examined to understand the meaning of a derivative. Relative maximum and minimum will be identified and applications developed for revenue, cost and profit functions. For optimization problems, graphical and numeric techniques will be used to help identify solutions. Elasticity of demand applications will also be examined. In all cases, students will be responsible for analytic methods of solution.
- Exponential and log functions:- Natural logarithm and growth/decay functions will be graphed, trends discussed and applications developed.
- The development of integration techniques as an antidifferentiation process along with applications of integration to economics.

Technology will be used as necessary to model data with least squares regression procedures and an emphasis will be placed on problem solving.

<u>Grading policy</u>: MyMathLab online homework will be assigned, due weekly and will account for 39% of the grade. Hard copy of the MyMathLab assignments with detailed mathematical explanations must be handed in. Based on vacations and other extenuating circumstances, due dates will be adjusted. Approximately one-third of the MyMath Lab homework will be associated with each of three exams. Each exam will be worth 12% of the grade. The comprehensive final examination will be worth the remaining 25% of the grade. MyMathLab homework and exams will offer students an added opportunity for success by being based on 105 points. The MAST Module 2004-2005 material at http://faculty.uml.edu/mstick/92.122/material.htm will be used as a resource for projects. Two projects will be assigned (students can work in pairs) during the course of the semester. The projects will be scored on a 0-5 scale with a maximum of 10 points added to the overall average. Participation in class will be recognized as an asset in final grade evaluation. Graphing calculators can be used on all exams.

A guideline for course grade assignment will be:

FINAL AVERAGE	94-100	90-93	86-89	81-85	77-80	74-76	70-73	66-69	63-65	54-62	0-53
	A	A-	B+	B	B-	C+	C	C-	D+	D	F

Arrangements are possible for adjusted weights to be assigned in order to enhance individual overall performances.

Attendance policy: There will be three 50 minute meetings per week. Students are expected to attend all classes and are responsible for all material covered. Each of the three exams will be given during class time. A missed examination will result in a **zero** grade unless prior arrangements or acceptable written documentation is provided. Details of the attendance policy follow:
1. Attendance is required;
2. Students are allowed ONE unexcused absence;
3. Additional absences are excused only if the request is accompanied by a Doctor's note or a note from the Dean of Students on appropriate letterhead. This encompasses all situations and unforeseen hardships (accidents, illness, death of a relative, etc.);
4. TWO points will be deducted from the student's final course average per unexcused absence (minus the one allowed);
5. Attendance will be taken to monitor attendance.

Technology: The TI-84 Plus Silver Edition will be used throughout the course as a visual aid for learning. While technology will be used, students are responsible for mastery of analytic procedures presented. It is expected that all students will have a TI graphing calculator.

In addition to the MyMathLab text based homework assignments, other exercises as listed will be reviewed. Review material including sample exams will be made available.

The following should serve as a guide for exam coverage. It represents sections that are included.

Week	Sections to be covered
1	MML #1 assigned, R4, R5
2	MML #2 assigned, R6, 1.3
3	MML #3 assigned, 1.4, 1.5
4	MML #4 assigned, 1.6, 1.7
5	Review, exam 1 on February 24
5-6	MML #5 assigned, 2.1, 2.2, 2.3
7	MML #6 assigned, 2.4, 2.5, 2.6
8	MML #7 assigned, 2.7, 3.1
9	Review, exam 2 on March 30
9-10	MML #8 assigned, 3.2, 3.3, 3.4
11	MML #9 assigned, 3.6, 4.1
12	MML #10 assigned, 4.3, 5.1
13	Review, exam 3 on April 30
14	Review for final exam

Syllabus
92.122 Management Calculus

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<u>Section</u>	<u>Topic</u>	<u>Exercises</u>
R.4	Slopes and linear equations	MML #1, 31,33, p.89/9
R.5	Nonlinear Functions and Models	MML #1, 29,47,65
R.6	TI least squares – Math Modeling	MML #2, 10,22
1.3	Average rates of Change	MML #2, 5
1.4	Limits of Difference Quotients	MML #3¸ 1
1.5	Power Rule	MML #3, 1,5,25,31,63,67
1.6	Product and Quotient Rules	MML #4, 103,105, p.130/38
1.7	Chain Rule	MML #4, 19,29,57,75
2.1	Relative max/min	MML #5, 1,15,19,89
2.2	Concavity	MML #5, 9
2.3	Asymptotes	MML #5, 3,64
2.4	Absolute Max/Min	MML #6, 16,17
2.5	Max/Min – Bus. and Econ. Applications	MML #6, 30
2.6	Marginals and Differentials	MML #6, 11,27,63
2.7	Implicit Differentiation	MML #7, 1,31,45
3.1	Exponential Functions and Derivatives	MML #7, 21,75,77,107
3.2	Log Functions, Properties and Derivatives	MML #8, 62,64,65,66
3.3	Growth Model	MML #8, 13,22,30,41
3.4	Decay and Present value Applications	MML #8, 19,37
3.6	Elasticity of Demand	MML #9, 5, p.385/21
4.1	Antidifferentiation	MML #9, p.468/22
4.3	Definite Integrals	MML #10, 7,35,60,62; also as definite integrals do p.407/1 and 6
5.1	Consumer and Producer Surplus	MML #10, 1

Graphing Calculator Implementation

Linear Regression
ex: Model the Dow Jones (D.J.) weekly data with a linear regression model $y = ax + b$.
a) STAT, EDIT to create data

$L_1(time)$	$L_2(D.J.)$	$L_1(time)$	$L_2(D.J.)$
1	12375	6	12450
2	12325	7	12425
3	12350	8	12525
4	12350	9	12650
5	12400	10	12725

b) 2nd QUIT, 2nd CATALOG, DiagnosticOn, enter (twice)
c) STAT, CALC, LinReg(ax+b)
d) LinReg(ax+b) L_1, L_2, y_1 enter
e) 2nd STAT PLOT, option 1 , on
f) ZOOM, option 9
g) turn off plot 1 at y=screen or at STAT PLOT