Course Update
Math 104, Spring 2006

Date: 1/9
Sections: 1.1
Log: Review of course policies. Slopes, intercepts and equations of straight lines. The point-slope and slope-intercept forms. Fitting a line to two given points. Parallel and perpendicular lines.
Assignment: Read section 1.2, and do the syllabus problems from 1.1 and 1.2.
Notes: The first quiz will be on 1/13. It will cover sections 1.2 and 2.1.

Date: 1/11
Sections: 2.1, 2.2
Log: Functions. Domain and range. Evaluation of functions. The vertical line test. Quadratic functions. The quadratic formula. Graphing $f(x) = ax^2 + bx + c$. The sign of $a$, the $y$-intercept, the roots and the vertex.
Assignment: Do the problems listed on the syllabus from 2.1.

Date: 1/13
Sections: 2.2, 2.3
Assignment: Do the problems listed on the syllabus from 2.2.
Notes: Quiz 2 will be given on 1/20. It will be over section 2.3.

Date: 1/18
Sections: 2.3
Assignment: Do the problems listed on the syllabus from 2.3.
Notes: There will be Math 104 review sessions on Tuesdays, 12:30-1:50, in Henzlik 107, and on Thursdays, 2:00-3:20, in Henzlik 201. The first session will be on Tuesday, 1/24.
**Date:** 1/20

**Sections:** 3.1

**Log:** Limits of functions. The definition of \( \lim_{x \to a} f(x) \). One sided limits: \( \lim_{x \to a^+} f(x) \) and \( \lim_{x \to a^-} f(x) \). The non-existence of the limit when \( f(x) \) approaches different values from the right and the left of \( a \), and when \( f(x) \) becomes infinite as \( x \) approaches \( a \) from the right or left. Quiz 2.

**Assignment:** Read about the nonexistence of limits on page 144, and the rules for limits on page 145.

**Notes:** Quiz 3 will be given on Friday, 1/27. It will be over sections 3.1 and 3.2.

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**Date:** 1/23

**Sections:** 3.1, 3.2

**Log:** Rules for computing limits. Evaluating limits of the “0/0” type. Limits as \( x \to \pm \infty \). Definition of continuity.

**Assignment:** Do the problems listed on the syllabus from 3.1.

**Notes:** Exam 1 will be on Friday, 2/3.

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**Date:** 1/25

**Sections:** 3.2, 3.3

**Log:** Continuous functions. Introduction to rates of change. The slope of the secant line. The average rate of change of a function with respect to a variable.

**Assignment:** Do the problems listed on the syllabus from 3.2.

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**Date:** 1/27

**Sections:** 3.3

**Log:** The average and instantaneous rates of change of a function with respect to a variable. Quiz 3.

**Assignment:** Do the first set of syllabus problems from 3.3.

**Notes:** The first exam will be on Friday, 2/3. It will cover sections 1.1, 1.2, 2.1-2.3 and 3.1-3.4.
Date: 1/30
Sections: 3.4
Assignment: Do the second set of syllabus problems from 3.3, and the problems from 3.4.
Notes: The first exam will be on Friday, 2/3. It will cover sections 1.1, 1.2, 2.1-2.3 and 3.1-3.4.
Date: 2/1
Sections: 3.4, 4.1
Review: 1.1 21, 29, 31, 33, 34, 36.
   1.2 9, 11, 21, 23, 28, 33.
   2.1 25, 28, 29, 36, 52, 53, 62.
   2.2 8, 11, 45, 48.
   2.3 16-20, 27, 31, 38, 49.
   3.1 31-51 odd.
   3.2 9, 11, 13, 25-28.
   3.3 2, 4, 9, 13, 29.
   3.4 11, 13, 15, 17, 19, 21, 45.
Date: 2/3
Log: Exam 1.

Date: 2/6
Sections: 4.1, 4.2
Assignment: Do the syllabus problems from sections 4.1 and 4.2.
Notes: Quiz 4, over sections 4.2 and 4.3 will be on Friday, 2/10.
Date: 2/8  
Sections: 4.3  
Log: The chain rule, version 1,  
\[ \frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx}, \]
and version 2,  
\[ D_x \{f[g(x)]\} = f'[g(x)]g'(x). \]
Combining the chain rule with the product and quotient rules.  
Assignment: Do the syllabus problems from section 4.3.

Date: 2/10  
Sections: 2.4  
Log: Exponential functions. Graphs of exponential functions. Exponential equations. The function \( f(x) = e^x \). Quiz 4.  
Assignment: Do problems 14-18, 25 and 27 in section 2.4.  
Review: Section 4-R, problems 1-12.  
Notes: Quiz 5, covering sections 2.4 and 2.5, will be given on Friday, 2/17.

Date: 2/13  
Sections: 2.4  
Assignment: Do problems 33-40 in section 2.4.

Date: 2/15  
Sections: 2.5  
Assignment: Syllabus problems from 2.5.  
Notes: Quiz 5, covering sections 2.4 and 2.5, will be given on Friday, 2/17.
Date: 2/17
Sections: 2.6
Assignment: Syllabus problems from 2.6.
   Notes: Quiz 6, covering sections 4.4 and 4.5, will be given on Friday, 2/24.

Date: 2/20
Sections: 4.4, 4.5
   Log: Derivatives of exponential functions. Derivatives of logarithmic functions.
Assignment: Syllabus problems from 4.4.
   Notes: Quiz 6, covering sections 4.4 and 4.5, will be given on Friday, 2/24.

Date: 2/22
Sections: 4.5, 5.1
   Log: Derivatives of $\ln f(x)$ and $\ln |f(x)|$. Increasing and decreasing functions. Critical numbers and points. Finding the intervals on which a function is either increasing or decreasing.
Assignment: Syllabus problems from 4.5, and the first set of syllabus problems from 5.1.
   Notes: Quiz 6, covering sections 4.4 and 4.5, will be given on Friday, 2/24. Exam 2, covering sections 2.4-2.6, 4.1-4.5 and 5.1 will be given on Wednesday, 3/1.

Date: 2/24
Sections: 5.1
Assignment: Syllabus problems from 5.1, second set.

Date: 2/27
   Log: Review for exam 2.

Date: 3/1
   Log: Exam 2.
Date: 3/3  
Sections: 5.2  
Log: Relative extrema and critical points. The first derivative test for classifying relative extrema.  
Assignment: Syllabus problems from 5.2, first set.  
Notes: Quiz 7, covering sections 5.2 and 5.3 will be on Friday, 3/10.

Date: 3/6  
Sections: 5.2, 5.3  
Log: Applications: Maximizing revenue and profit. Second derivatives.  
Assignment: Syllabus problems from 5.2, second set.

Date: 3/8  
Sections: 5.3  
Assignment: Syllabus problems from 5.3.

Date: 3/10  
Sections: 5.4  
Log: Curve sketching.  
Assignment: Syllabus problems from 5.4.

Date: 3/22  
Sections: 6.1, 6.2  
Log: Absolute extrema. Finding absolute extrema of functions over closed intervals. Absolute extrema over $(-\infty, \infty)$. Applications of optimization.  
Assignment: Syllabus problems from 6.1  
Notes: Quiz 8, covering 6.1, will be on Monday, 3/27. Exam 3 will be on Friday, 3/31. It will cover sections 5.2-5.4, and 6.1-6.3.
Date: 3/24
Sections: 6.2
Log: Applications of optimization.
Assignment: Syllabus problems from 6.2
Notes: Quiz 8, covering 6.1, will be on Monday, 3/27. Exam 3 will be on Friday, 3/31. It will cover sections 5.2-5.4, and 6.1-6.3.

Date: 3/27
Sections: 6.3
Assignment: Syllabus problems from 6.3, second set.
Notes: Exam 3 will be on Friday, 3/31. It will cover sections 5.2-5.4, and 6.1-6.3.

Date: 3/29
Sections: 6.3
Log: Elasticity of demand. Review.
Notes: Exam 3 will be on Friday, 3/31. You do not need to know anything from section 6.6 for the exam.

Date: 3/31
Log: Exam 3.

Date: 4/3
Sections: 6.6
Log: Linear approximation, versions I and II.
Assignment: Syllabus problems from 6.6.
Notes: Quiz 9, covering 6.6, will be given on Friday, 4/7.

Date: 4/5
Sections: 7.1
Assignment: Syllabus problems from 7.1, first set.
Notes: Quiz 9, covering 6.6, will be given on Friday, 4/7.
Date: 4/7
Sections: 7.1


Assignment: Syllabus problems from 7.1, second set.

Notes: Quiz 10, covering 7.2 and 7.3, will be given on Friday, 4/14.

Date: 4/10
Sections: 7.2

Log: Indefinite integrals by substitution.

Assignment: Syllabus problems from 7.2.

Date: 4/12
Sections: 7.3

Log: Approximation of area under a curve. The left-hand and right-hand Riemann sums, the midpoint sum and the trapezoid rule.

Assignment: Syllabus problems from 7.3.

Date: 4/14
Sections: 7.4

Log: The fundamental theorem of calculus. Quiz 10.

Assignment: Syllabus problems from 7.4, first set.

Notes: Exam 4 will be on Friday, 4/21. It will cover sections 7.1-7.4.

Date: 4/17
Sections: 7.4

Log: The fundamental theorem of calculus. Rules for computing definite integrals. The area enclosed by a curve above or below the axis. Definite integrals with substitutions.

Assignment: Syllabus problems from 7.4, second set, up to and including problem 51.

Notes: Exam 4 will be on Friday, 4/21. It will cover sections 7.1-7.4.
Date: 4/19
Sections: 7.4
Log: Applications of the fundamental theorem of calculus: Areas, consumption, profit etc. Review for exam.
Assignment: Section 7.4, problems 53, 68 and 69.
Notes: Exam 4 will be on Friday, 4/21. It will cover sections 7.1-7.4.

Date: 4/21
Sections: 7.4
Log: Exam 4.

Date: 4/24
Sections: 7.5
Log: The area between two curves. Consumers’ and producers’ surplus.
Assignment: Syllabus problems from 7.5.
Notes: The final exam will be on Wednesday, May 3, 6:00-8:00 PM, in Avery 115. Bring your UNL ID.

Date: 4/26
Sections: 8.2
Log: The average value of a function over an interval. Review of material from chapter 7.
Assignment: Syllabus problems from 8.2.
Notes: The final exam will be on Wednesday, May 3, 6:00-8:00 PM, in Avery 115. Bring your UNL ID.

Date: 4/28
Log: Review.
Assignment: Syllabus problems on pages 131 and 265.
Notes: The final exam will be on Wednesday, May 3, 6:00-8:00 PM, in Avery 115. Bring your UNL ID.