

Fall 2011 **MATH 105: Applied Calculus**
Section 005 **3 credit hours**

Instructor: Dr. Trent Kull

Office: Bancroft 154

Office Phone: 803.323.4547

Math Department: 803-323-2175

Campus Email: kullt@winthrop.edu

**Instructor's Teaching
Schedule:**

MWF: 11 - 11:50a
Owens 204

Office Hours:

T: 8:30 - 10a
R: 1:30 - 3p

The instructor reserves the right to make modifications to this syllabus. Students will be notified in class & by email.

A complete syllabus and schedule is available at: http://faculty.winthrop.edu/kullt/MATH_105/105syl.pdf.

Winthrop University is dedicated to providing access to education. If you have a disability and require specific accommodations to complete this course, contact the Office of Disability Services (ODS) at 323-3290. Once you have your official notice of accommodations from the Office of Disability Services, please inform me as early as possible in the semester.

Grades

To ensure that you receive a certain letter grade (or better), you must attain a minimum overall percentage. These minima are: A: 90; B: 80; C: 70; D: 60.

Assignments/Assessments

<i>Date</i>	<i>Event</i>	<i>Percentage</i>
<i>Various</i>	<i>Quizzes</i>	<i>15</i>
<i>September 14</i>	<i>Exam 1</i>	<i>17</i>
<i>October 12</i>	<i>Exam 2</i>	<i>17</i>
<i>November 9</i>	<i>Exam 3</i>	<i>17</i>
<i>December 2</i>	<i>Exam 4</i>	<i>17</i>
<i>December 12</i>	<i>Final Exam</i>	<i>17</i>

Text and Materials

- Required Text: *Mathematics For Winthrop University*
- MATH105 students are expected to have a scientific calculator.
- Students are encouraged to use office hours as a way to receive extra help.
- The Mathematics Tutorial Center and large group review information is available at: www.winthrop.edu/mtc.

Policies

1. Review the student code of conduct for university polices on academic misconduct. Academic misconduct will not be tolerated and will result in a failing grade on the assignment and/or in the course. The full handbook is available online at: (<http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf>)
2. All electronic devises (including cell phones) other than a calculator should be on silent and kept in your book bag or purse throughout class time unless otherwise instructed. (Note if you have some educational, health, or physical reason for an electronic device you must work with your professor to inform them of the accommodation.)
3. The University attendance policy is stated in the current catalog (<http://www.winthrop.edu/recandreg/default.aspx?id=7380>).

Homework/Quizzes

Expect homework assignments/quizzes to reinforce the lesson material and prepare you for exams. Expectations will be detailed during class, with some notes added to the course website.

Exams

These may be closed book, no notes, no computer, no cell phone, individual effort events.

Missed quiz/exam policy

I will not give make-up quizzes or exams for those missed. Instead, I'll use the following policy: For all quizzes and course exams, a missed event will result in a recorded zero score until the end of the course. At that time, the average score achieved on all other quizzes will replace a single missed quiz score, and the final exam score (percentage) will replace a single missed exam score. Note that all students must take the final exam for a grade. Moreover, once a student has been handed any exam, the event will be graded.

Important Dates:

SU Deadline:	October 21	Course Withdraw Date:	October 21
Fall Break:	October 17 - 18	Final Exam:	December 12

Course Goals/Student Learning Outcomes and Alignment with the General Education Goals

The course meets the Quantitative Reasoning requirement through the following goal alignment. Further when not used as the QR requirement, this course meets the Logic, Language, and Semiotics requirement through activities and requirements that require students to: (1) use logic and mathematical information to draw reasonable conclusions and (2) use the symbols and language of mathematics to communicate about problems and present solutions.

Course Goals/SLO	General Education Goals
Apply derivatives and integrations to real life problems	2.1 Solve mathematical problems of the type necessary for living in today's and tomorrow's world.
	2.3 Understand that quantitative analysis is important to almost every endeavor of humankind.
	3.2 Analyze and use a variety of information gathering techniques
Use calculus to analyze graphs of functions and to determine extreme values of functions.	2.1 Solve mathematical problems of the type necessary for living in today's and tomorrow's world.
	2.2 Make valid inferences from data.
	2.3 Understand that quantitative analysis is important to almost every endeavor of humankind.
	2.4 Understand the concept and application of quantitative relationships.
	3.1 Identify sound and unsound reasoning.
	3.2 Analyze and use a variety of information gathering techniques
Use derivatives to solve optimization problems and problems involving rates of change.	2.1 Solve mathematical problems of the type necessary for living in today's and tomorrow's world.
	2.2 Make valid inferences from data.
	2.3 Understand that quantitative analysis is important to almost every endeavor of humankind.
	2.4 Understand the concept and application of quantitative relationships.
	3.1 Identify sound and unsound reasoning.
	3.2 Analyze and use a variety of information gathering techniques
Demonstrate an understanding of what calculus is and how it compares with pre-calculus.	2.2 Make valid inferences from data.
Use limits to investigate the concept of derivatives via slopes of tangent lines to graphs.	2.2 Make valid inferences from data.
	2.4 Understand the concept and application of quantitative relationships.
	3.2 Analyze and use a variety of information gathering techniques
Use limits to investigate the concept of integration.	2.2 Make valid inferences from data.
	2.4 Understand the concept and application of quantitative relationships.
	3.2 Analyze and use a variety of information gathering techniques

For purposes of departmental and touchstone program assessment of student learning in this course, sections of the final exam will be tabulated for all students and cover the goals listed above. Individual tests and course grades may also be used as an indication of progress toward the above goals.

Tentative Course Schedule

Date		Section	Topic	Key Ideas	
W	8/24	11.1	Limits	<ul style="list-style-type: none"> Limits: understanding & computing 2-sided limits, existence, nonexistence, properties, computational methods, functions that differ at a point One-sided and limits involving infinity: understanding & computing limits at infinity (horizontal asymptotes), infinite limits, limits involving piecewise functions Rates of change: computation, average / instantaneous rates of change, velocity Tangent lines and derivatives: understanding connection between slopes and rates, secant lines, tangent lines, derivative definition, using limits to compute, existence, technology Techniques for finding derivatives: notation, constant / power / scalar multiple / sum / difference rules Derivatives of products and quotients: computing 	
F	8/26	11.1	Limits		
M	8/29*	11.2	One-sided and limits involving infinity		
W	8/31	11.3	Rates of change		
F	9/2	11.4	Tangent lines & derivatives		
M	9/5*	11.4	Tangent lines & derivatives		
W	9/7	11.5	Techniques for finding derivatives		
F	9/9	11.6	Derivatives of products and quotients		
M	9/12	11.6	Derivatives of products and quotients		
W	9/14		Test 1		
F	9/16	11.7	The chain rule		<ul style="list-style-type: none"> The chain rule: computation of composite functions, notation, decomposition, generalized power rule Exponential and logarithmic derivatives: computation, algebraic properties, domain restrictions Continuity and differentiability: relationship, continuity at a point / on an interval Derivatives and graphs: analyze the shape, increasing / decreasing intervals, critical numbers, first derivative test, local extrema The second derivative: analyze, notation, higher derivatives, concavity, second derivative test, points of inflection Optimization: application, extreme value thrm, absolute extrema
M	9/19*	11.7	The chain rule		
W	9/21	11.8	Exponential & logarithmic derivatives		
F	9/23	11.9	Continuity and differentiability		
M	9/26*	11.9	Continuity and differentiability		
W	9/28	12.1	Derivatives and graphs		
F	9/30	12.1	Derivatives and graphs		
M	10/3*	12.2	The second derivative		
W	10/5	12.2	The second derivative		
F	10/7	12.3	Optimization applications		
M	10/10	12.3	Optimization applications		
W	10/12		Test 2		
F	10/14	13.1	Antiderivatives	<ul style="list-style-type: none"> Antiderivatives: inverse relation, notation, power rule, general properties Integration by substitution: computation, differentials Area and the definite integral: geometric interpretation, total change, notation, infinite sums, technology The fundamental theorem of calculus: computational convenience, notation, properties, area Applications of integrals: application, area btwn curves Differential equations: initial value problems, general / particular solutions, initial conditions, separable equations 	
W	10/19*	13.2	Integration by substitution		
F	10/21	13.2	Integration by substitution		
M	10/24*	13.3	Area and the definite integral		
W	10/26	13.3	Area and the definite integral		
F	10/28	13.4	Fundamental theorem of calculus		
M	10/31*	13.4	Fundamental theorem of calculus		
W	11/2	13.5	Applications of integrals		
F	11/4	13.7	Differential equations		
M	11/7	13.7	Differential equations		
W	11/9		Test 3		
F	11/11	14.1	Functions of several variables		<ul style="list-style-type: none"> Functions of several variables: familiarity, graphing, planes, surfaces, traces, level curves Partial derivatives: understanding, computation, limit definitions, notation, rates of change, second order partials. Multivariable extrema: determination, local extrema Lagrange multipliers: familiarity, multipliers, solving systems of equations, technology
M	11/14*	14.2	Partial derivatives		
W	11/16	14.2	Partial derivatives		
F	11/18	14.3	Multivariable extrema		
M	11/21*	14.3	Multivariable extrema		
M	11/28	14.4	Lagrange multipliers		
W	11/30	14.4	Lagrange multipliers		
F	12/2		Test 4		
M	12/5		Review		
M	12/12		Final Exam	8 - 10:30a	

*Homework quiz