Math 221: Calculus II

Spring 2009, 4 Credits, MWRF 8:00-8:50 a.m., MC 378
Instructor: Richard J Maresh, Associate Professor of Mathematics
Office: MRC 521, 796-3655; Hours: MW 12-2, R 10-11, 1-2
Final Exam: Wednesday, 6 May 2009, 9:50-11:50 a.m.

Catalog Description:
Applications of the integral and techniques of integration. Trigonometric, logarithmic and exponential functions. Prerequisite: grade of C or higher in 220.

Text: *Calculus: Concepts and Contexts 3rd Edition)*, James Stewart. (Brooks-Cole, 2005)

Core Abilities: Since this course may be taken in partial fulfillment of the general education requirements, this syllabus includes the following set of core ability goals.

(a) **Thinking:** Students engage in the process of inquiry and problem solving.
- Students will understand the problems which led to the development of differential calculus.
- Students will understand the concept of limit, and its application to the derivative.
- Students will investigate the differentiation formulas and techniques for a wide variety of functions.
- Students will practice solving a variety of applications of calculus, such as optimization problems and related rates problems.

(b) **Ethical Decision Making**: Students respond to ethical issues, using informed value systems.
- Students will understand how academic honesty in mathematics requires deductive reasoning.
- Students will understand the need to do their own work, and to honestly challenge themselves to understand the material.

(c) **Communication:** Students speak and write to suit varied purposes, audiences, disciplines, and contexts.
- Students will participate in class discussions on the material at hand.
- Students will improve their ability to write solutions to a variety of problems.

(d) **Cultural Sensitivity:** Students understand their own and other cultural traditions and demonstrate a respect for the diversity of the human experience.
- Students will develop an appreciation of the history of the calculus and its role in a variety of disciplines.
- Students will learn to use mathematical notation accurately and appropriately.

Mathematics Program Student Learning Outcomes: The Viterbo University Mathematics program assesses a set of "Student Learning Outcomes" to see whether our majors are learning to do the things a math major requires. In this course we assess the following outcomes:
SLO-4: Our majors will demonstrate a basic understanding of axiomatic-deductive systems. (Reasoning)
SLO-5: Our majors will demonstrate the ability to apply appropriate mathematical methods to novel or non-routine problems. (Problem Solving)
SLO-6: Our majors will demonstrate the ability to perform computational, graphical and algebraic procedures using a calculator or computer. (Technology)
SLO-8: Our majors will use the language of mathematics accurately and appropriate in written form. (Communication)

Specific Course Goals:

1. From the perspective of mathematical content, this course should allow the student to expand and apply skills and knowledge gained in the first semester of Calculus to the topics of integration and applications of integration.
2. The student will gain knowledge and skills, and the ability to apply these, to a variety of situations which might be encountered in the world of mathematics, science, or engineering.
3. The student will further improve his/her ability to communicate mathematical ideas and solutions to problems.
4. The student will improve her/his problem-solving ability.
5. From a most general perspective, the student should see growth in his/her mathematical maturity. The three-semester sequence of calculus courses form the foundation of any serious study of mathematics or other mathematically-oriented disciplines.

Course Philosophy and Procedures:
I am a firm believer in the notion that you as the student must be actively engaged in the learning process and that this is best accomplished by your DOING mathematics. My job here is not to somehow convince you that I know how to do the mathematics included in the course, but to help guide YOU through the material; I am to be a "guide on the side, NOT a sage on the stage". I may not always say things in the way which best leads to your full comprehension, but I will try to do so and I ask that you try to see your learning as something YOU DO rather than as something I do to you. PLEASE feel free to come see me

to discuss questions or concerns you may have during the course; I will not bite! PLEASE ask questions in class if you have them; the only "dumb question" is the one you fail to ask!

Homework: Let me therefore urge you to make it a regular part of your day to try working the homework problems. There will never be enough time for us to go through every listed problem in class, and it is probably unrealistic to think that you will be able to find the time to work through every listed problem, but you should at least spend some time thinking about virtually every problem, and working the more interesting or challenging to completion. The daily homework assignments will not generally be collected or graded. They are intended to structure your learning so that you regularly challenge yourself to see that you understand the material we are looking at. The important thing is that you at least look at all the assigned problems. You should also feel free to work other problems if you deem it necessary for your comprehension of the content.
You should view homework assignments as a test to see how well you understand the material and you should bring to the next class any questions you might have.

Group Work: In general, I think students can benefit greatly by working together on problems. While there is some danger of the "blind leading the blind" syndrome, or of students deceiving themselves into thinking they understand the material better than they actually do, for the most part grappling with ideas and trying to explain them to another student or learning to listen to others explain an idea is a wonderful way to see that you really do understand the material. In class we will have a group "practice exam" before the individual exams, and I also encourage you to find a "learning group" outside of class. One word of caution, however; I do find that some students work with colleagues or tutors and think they have mastered the material – it is important that you do enough problems on your own that you know how to do the problems. This is what exams are for, to show me that you as an individual understand the material well enough to actually solve problems you haven't seen before.

Grading: I use a rather traditional Grading Scale: A = 90% (or better), AB = 87%, B = 80%, BC = 77%, C = 70%, CD = 67%, D = 60%. I do try to come up with a mix of points so that exams are not weighted too heavily; about two-thirds of the points during the semester will come from individual, in-class exams - the rest will come from group labs, take-home problems, group practice exams, journals, and portfolios.

Attendance: I do not prefer to quantify your attendance in terms of a grade, but I can assure you that your chances of success will be much improved by regular attendance.

Americans with Disability Act:
If you are a person with a disability and require any auxiliary aids, services or other accommodations for this class, please see me or Jane Eddy in the Learning Center (796-3194) within 10 days to discuss your accommodation needs.

MATH 221 Schedule, Spring, 2009

12 Jan	Introduction, Calc I review	p 336 #1-5, 13, 14, 33, 36, 44; p 340 #3, 7
14 Jan	[5.1] Areas and Distances	p 352 #1, 3, 5, 7, 11
15 Jan	[5.2] The Definite Integral	p 364 #1-11 odd
16 Jan	…more [5.2]	p 365 #15, 17, 21, 23, 27, 29, 31, 33, 35, 37, 39
19 Jan	[5.3] Evaluating Definite Integrals	p 374 #1-27 odd
21 Jan	… more [5.3]	p 374 #31-45 odd
22 Jan	[5.4] The Fundamental Theorem of Calculus	p 383 #1-13 odd, 19, 21
23 Jan	[5.5] The Substitution Rule	p 392 #1-33 odd
26 Jan	Quiz #1	p 392 #35-57 odd
28 Jan	[5.6] Integration by Parts	p 398 #1-31 odd
29 Jan	[5.7] Additional Integration Techniques	p 404 #1-15 odd
30 Jan	… more [5.7]	p 405 #17-31 odd
2 Feb	[5.8] Using Tables and CAS	p 410 #1-21 odd, 25-31 odd
4 Feb	[5.9] Approximate Integration	p 421 #1-15 odd
5 Feb	… more [5.9]	p 421 #17-29 odd
6 Feb	[5.10] Improper Integrals	p 431 #1-25 odd

9 Feb	Review…	p 434 #1-47 odd
11 Feb	Practice Exam #1 (20 points)	
12 Feb	**EXAM #1** (80 points)	
13 Feb	[6.1] More about Areas	p 446 #1-23 odd
16 Feb	[6.2] Volumes – Solids of Rotation	p 457 #1-13 odd
18 Feb	… more [6.2]	p 457 #15-21 odd, 25, 33
19 Feb	[6.3] Arc Length	p 465 #1-15 odd, 21
20 Feb	[6.4] Average Value of a Function	p 469 #1-13 odd, 14
23 Feb	[6.7] Probability	p 492 #1-9 odd
25 Feb	Review…	
26 Feb	Practice Exam #2 (20 points)	
27 Feb	**EXAM #2** (80 points)	
2 – 6 Mar	*-- S P R I N G B R E A K --*	
9 Mar	[7.1] Differential Equations	p 503 #1-9 odd
11 Mar	[7.2] Directions Fields, Euler's Method	p 511 #1-11 odd
12 Mar	… more [7.2]	p 511 #13, 15, 19, 21, 23
13 Mar	[7.3] Separable Differential Equations	p 519 #1-15 odd, 21
16 Mar	[7.4] Exponential Growth and Decay	p 532 #1, 3, 5, 9, 11
18 Mar	… more [7.4]	p 532 #13, 15, 17, 19, 21
19 Mar	[7.5] The Logistic Equation	p 542 #1-9 odd
20 Mar	[7.6] Predator-Prey Systems	p 549 #1-7 odd
23 Mar	Review…	
25 Mar	Practice Exam #3 (20 points)	
26 Mar	**EXAM #3** (80 points)	
27 Mar	[8.1] Sequences	p 565 #1-27 odd, 35, 37
30 Mar	[8.2] Series	p 574 #3-19 odd, 29, 31, 33
1 Apr	… more [8.2]	p 575 #39, 54, 57
2 Apr	[8.3] Integral and Comparison Tests	p 585 #1-21 odd, 27, 29
3 Apr	[8.4] Other Convergence Tests	p 592 #1-17 odd
6 Apr	… more [8.4]	p 593 #19-33 odd
8 Apr	[8.5] Power Series	p 598 #3-17 odd
9-13 Apr	*-- EASTER BREAK –*	
15 Apr	[8.6] Representing Functions as Power Series	p 604 #1-13 odd
16 Apr	… more [8.6]	p 604 #15-29 odd
17 Apr	[8.7] Taylor and Maclaurin Series	p 615 # 1-15 odd
20 Apr	… more [8.7]	p 615 #17-41 odd
22 Apr	[8.8] Binomial Series	p 620 #1-13 odd
23 Apr	[8.9] Applications of Taylor Series	p 628 #3-23 odd
24 Apr	Review…	
27 Apr	Practice Exam #4 (20 points)	
29 Apr	**EXAM #4** (80 points)	
30 Apr	Review …	
1 May	Group Practice Final Exam (25 points)	

FINAL EXAM (125 Points) - Wednesday, 6 May 2009, 9:50-11:50 a.m.