

MA161E – Calculus II

Syllabus

Rivier College - Spring 2004 Tu 6:30 – 9:00 pm in Mem 205

Instructor

Bill Bonnice

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Office hours: Please let me know whenever you need help. Many ideas in this class will be new to you and you will need to study them beyond the classroom in order to understand them fully. You are invited to stop by my office whenever I am there or make an appointment for a different time. I will also respond to e-mail questions. My scheduled office hours are:

Tu, Thur 11:15 – 12:30, Tu 4:30 – 5:30 and by appointment (Feel free to call me at home or at my office.).

Note: Also I will usually remain immediately after class if any would like to talk with me then.

Textbook: *Single Variable Calculus: Concepts and Contexts* by James Stewart, 2nd edition, Brooks/Cole, 2001.

Brief course description: A continuation of Math 160, which includes the definite integral and its applications, techniques of integration.

Required Course Materials: A graphing calculator with a table function is essential for doing calculus. The overhead projector calculator which I may use sometimes in class will be a TI-83. TI-82's and TI-83's are easy to use and are programmable. TI-85's and TI-86's are acceptable but slightly more complex. They do have better statistical capabilities (not needed for Calculus) than the 82/83 versions. If you own a brand other than TI, you are welcome to use it, but I will not be familiar with the commands. Particularly, in this case, make sure you have a manual for the calculator so that I can read it in order to try to help you.

Other Course Materials: Two copies of the solutions to all problems are on reserve in the library and one copy will also be made available for in room use in the math conference room (upstairs Regis); odd answers are in the back of your text, and the CD-Rom that accompanies your text gives some hints to solving problems. The disc *Journey Through Calculus* also has excellent illustrations of integration.

Course Objectives:

- To help students understand and appreciate the major concepts of integral calculus
- To engage students in mathematical reasoning
- To develop students' abilities to approach calculus topics from graphical, numerical, and symbolic points of view
- To help students learn to read mathematics and to become independent learners of mathematics
- To develop students' abilities to create mathematical models and use these models to solve problems
- To engage students in the solution of problems, especially open-ended problems, that apply the concept of integral
- To develop students' ability to write about mathematical ideas and problem solutions
- To help students learn the basic algebraic techniques of integration
- Learn mathematical concepts and techniques from a textbook, from homework, and from classroom activities.
- Work on learning activities in collaboration with other students in the class.
- Be able to communicate your work effectively.

You are expected to participate in class. You should read the book and be prepared to ask questions about the reading and the problem assignments, and take part in class discussions and problem solving.

Peer Study Groups:

Class activities will complement, not substitute, for the reading, problem solving, and discussion that you engage in outside of class. Studies over a long period at Harvard (See *Making the Most of College* by Richard Light, Harvard U. Press, 2001) have shown that one of the two main things that make for the most success in college is the formation of peer study groups which meet weekly. This is difficult for evening students but, if possible, you should try to have one or two “study pals” that you work with regularly.

E-mail Group: With your permission, I will put your name on a class e-mail distribution list. You should use that list to send inquiries and questions out to the rest of the class. I give extra credit to students who send questions and also double extra credit to those who attempt to answer those questions.

Homework:

Plan to spend 6-8 hours per week in study and doing assignments for this course outside of class. You are encouraged to study together, but be sure you do as much explaining as your partners do. You will know that you have learned a concept when you are able to reproduce reasoning and solutions developed during a conversation. Regular study as well as regular attendance in class is very important to your success in the course.

Reading

Reading technical material is an very valuable skill that you will need in this course and in other courses that you take. One of the goals of this class is that you become comfortable reading mathematical material. Toward this aim, I expect that, before each class, you read the textbook sections that we will be covering in class. Reading mathematics can be difficult. As you read through your textbook, follow these:

Guidelines for Reading a Math Textbook

Reading a mathematics textbook is a skill that you can learn. As the semester progresses, you should be able to read more effectively. Here are some suggestions:

- **Spend Time:** Spend time for each reading assignment. It is not unusual to spend up to an hour for each reading assignment.
- **Read and Re-read:** A mathematics text is not easy to read. You might not understand it your first time through. Read in preparation for class. Re-read after class. Re-re-read when doing homework assignments. Things should become clearer each time you look at material in the text.
- **Learn the Language:** Make sure that you understand the terminology, the keywords, the definitions. When you encounter a word that you don't understand or whose definition you have forgotten, look it up in the index. Reread the section where the word is defined and used.
- **Don't Just Read - Do!:** Read with paper and pencil in hand. Read the statement of an example in the book. Then cover up the book's solution and try to do it yourself. After your attempt, look at the book's solution. When you think you understand the book's solution, try again to do the problem.
- **Follow the Instructions:** Sometimes the book will ask you to check calculations or graph an expression. Do it! Let the text step you through the material.
- **Reflect:** Reflect on what you have read. While you are reading try to determine the main concept in the section or the chapter. How does the new material fit in with what you've already learned? Where do you think it is going? (based on material from Tommy Ratliff at Wheaton College, MA)

Problem Assignments

The assignments and their due dates accompany this syllabus. Staple loose pages together. If homework is handwritten, it must be neat, and easy to read. One of the objectives for this course is to be able to communicate

your work to others. Handing in homework that is neat and easy to read is a form of communication. Follow the following suggestions:

Math Homework Guidelines

An important skill that you should learn in college is how to communicate. In math classes, you should learn to communicate mathematics.

As a starting point, I want you to communicate your homework solutions clearly and effectively. Here are some suggestions:

- **Identify yourself:** Remember to put your name on top of your paper
- **Identify the assignment:** Write the page, the section number, and the homework assignment number, clearly at the top of the paper.
- **Now what was that problem?** Rewrite the gist of the question or problem as well as the solution. I will not always have a book with me when I look at your homework. So, it isn't very helpful to know only that I am looking at problem #32. I need to know what was asked in problem #32.
- **Neatness is Nice:** Homework must be *neat*, and easy to read. You are not *communicating* mathematics if your writing is illegible.
- **Where's that problem?** Don't make someone hunt around your pages to find your solutions. Clearly identify the beginning and end of each problem.
- **Explain:** Do not be afraid to use words in your homework assignments. In fact, words are highly encouraged. Complete sentences are highly regarded. Justify and explain your arguments. *A list of answers or a string of expressions without any explanation is not acceptable.*
- **Write with your peers in mind:** Write your solutions so that any other student in the class could read and understand your solution. Always keep in mind that your intended audience is other students, not your professor ! One of your goals in this class is to be able to *explain* your work to others. Do not be afraid to use words in your homework assignments. In fact, words are highly encouraged. Even though only some questions will explicitly ask for an explanation, I encourage you to give explanations for **all** problem solutions.

You should study together, but you should write up your homework solutions on your own, without looking at the work of others. Only then will you be sure that you have understood the material and are able to communicate the material to others.

I will try to return homework by the next class period. I will look to see that you have completed the homework, and I will spot check some selected problems more carefully.

Homework Advice

The homework assignments given are a reasonable sample of the kinds of problems you should be able to do. You should work the assigned problems as soon as possible after each class. I suggest that you do problems in addition to those assigned. You should *not* leave homework until 1 a.m. the night before it is due!

Turning in Homework

Homework assignments should be put into the clear plastic "homework case". I encourage you to ask questions *before* the due date. Questions that you have on the homework should be written on a separate piece of paper so that you will remember what you want to ask.

Quizzes and Tests: There will be 4 quizzes, a take-home mid-term, and a comprehensive final. The dates and required material for the quizzes are listed on the accompanying schedule of assigned problems.

I may make arrangements with you to make up a quiz in case of an emergency (being unprepared is not considered an emergency). Any arrangements should be made with me *prior* to the test. In case of a last minute emergency, contact me by phone or e-mail at your first opportunity. *Arrangements for a make-up must be made before the next class.*

Help

I really like this course and I like to talk about it. I expect that you will have questions on the text material and on homework and I do want to help you learn the material. So please feel free to ask me questions. You can e-mail questions to me. I have office hours when you can just drop in. You can set up a meeting with me at other times. Please come by with your questions.

In addition, let me know if you find the course material too easy, or too difficult, if the pace of the course is too slow or too fast, or if the course is not what you expected. I will try to help you work out a solution to make the course much more profitable and enjoyable to you.

Computation

Of Grades

The weights in determining the final grade are as follows:

Homework assignments 20%

Take-home Mid-term 15%

Miscellaneous(Group Participation; Class Discussion; Write-ups, Other Activities) 3%

Four Quizzes (2/10,2/24,3/30,4/20) 40%

Cumulative Final examination 20%

Self-evaluation at the end of the semester 2%

NOTE: The final exam will be cumulative and will be 6:00 – 9:00 PM on Tues., May 4.

Grades are intended to reflect the degree to which the mathematical content has been mastered, not the performance of one student in relation to others. I want my students to help one another learn. I don't want them competing with one another for grades. Instead, the goal is to lift everyone's level of understanding so that everyone can get a high grade. To foster cooperation, I never "scale" grades. I use the Rivier College standard grade boundaries to assign grades:

	87-89 B+	77-79 C+	67-69 D+
93-100 A	83-86 B	73-76 C	63-66 D
90-92 A-	80-82 B-	70-72 C-	00-62 F

These grade boundaries will not be changed. I would be very happy if everyone earned an A.

GRADING OF THE HOMEWORK:

I will not have time to grade each problem individually. Instead I will be checking that you have done the homework. I will rely on you to check your own work. If you are not sure of your solution, write down *specifically* what you are not sure about and ask about it in class. I will get an overall impression of each assignment that you turn in and award it a check plus(110%), a check(100%), a check minus(80%), or a check minus minus(60%). **You can get full credit for any problem that you can't do, by asking a specific question whose answer will help you solve the problem.** There will be no credit given for late homework. It is important to keep up with your work.

NOTE: You are responsible for understanding and complying with the contents of this syllabus. If you have any questions about this syllabus please raise them at any time during the semester.

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<u>TOPIC</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>EXER- CISES</u>	<u>ASMT. #</u>	<u>DATE DUE</u>
Review of Calculus I:					
The Chain Rule	3.5	233	4,5,7,11,19,33,35,60	#1	1/20
Related Rates	4.1	469	4,7,11,15,18,21		
Optimization Problems	4.6	312	5,9,11,13,15,21,32		
Antiderivatives	4.9	334	7,13,19,23,25,28,29,35,40		
Sigma Notation	Appendix F	A40	1,5,11,15,16,19,21,41ab	#2	1/27
Areas and Distances	5.1	355	1,2,11,12,13,15,18		
The Definite Integral	5.2	367	1,5,11,19,23,29,33,39,41		
Evaluating Definite Integrals	5.3	377	1,3,4,6,12,18,28,39,49,53,57	#3	2/3
The Fundamental Theorem of Calculus	5.4	386	1,2,3,5,9,11,18,19,24		
The Substitution Rule	5.5	395	3,5,16,18,28,35,43, 51,61	#4	2/10
(Quiz #1 thru § 5.4)					
Integration by Parts	5.6	401	2,3,9,14,21,25,41,43		
Additional Techniques of Integration	5.7	408	2,3,6,10,14,16,20,21,27	#5	2/17
Approximate Integration	5.9	425	1,7,13,16,24,25(use Midpt. Rule),33		
Improper Integrals	5.10	436	1,13,19,23,29,35,40,43,47,53	#6	2/24
More about Areas (Quiz #2 thru § 5.9)	6.1	452	1,3,8,14,21,22,24		
Volumes	6.2	463	2,7,11,19,23,25,28,43	#7	3/2
Arc Length	6.3	471	1,5,7,19,23		
BREAK Mar. 8 to Mar. 12 - Have a good vacation!					
(Take-home thru § 6.3 due)					
Applications to Economics	4.7	322	1,3,4,5,9,15,16	#8	3/16
Applications to Economics and Biology	6.6	491	3,5,6,7,8,10,13,15,16		
Probability	6.7	498	1,3,4,7,9,10	#9	3/23
Modeling with Differential Equations	7.1	511	2,5,6,8,9,11,14		
Direction Fields and Euler's Method	7.2	519	1,5,7,11,18,19,28	#10	3/30
(Quiz #3 thru § 7.1)					
Separable Differential Equations	7.3	527	1,8,11,13,18,25,28,35,41		
Exponential Growth and Decay	7.4	538	3,4,5,9,11,13,17,20	#11	4/6
The Logistic Equation	7.5	548	1,3,5,6,11		
Predator-Prey Systems	7.6	555	1,3,4,5,6,8,9	#12	4/13
Sequences	8.1	571	1,2,5,11,21,25,26,31,39,43,45		
Series (Quiz #4 thru § 8.1)	8.2	580	1,3,4,9,15,17,25,28,31,33,40	#13	4/20
Integral Test, Comparison Test, Est. Sums	8.3	591	1,3,4,5,7,9,13,17,21,26,30,31		
Other Convergence Tests	8.4	598	1,3,7,10,15,21,23,25,31	#14	4/27
Power Series	8.5	604	1,2,3,5,10,18,20,22,25		

NOTE: The final exam will be cumulative and will be on Tuesday, May 4, from 6:00 – 9:00