

Calculus III, Mathematics 223 (CRN 10415)
Rhodes College
Fall Semester 2004

Course Description In Calculus III, we deal with vectors and geometry in two-, three-, and higher-dimensional spaces, generalizations of the derivative and integral to scalar- and vector-valued functions of several variables, and applications of these concepts. The material to be covered includes vectors, lines, planes, surfaces in three dimensional space, real-valued functions of several variables, partial and total derivatives, optimization, multiple integrals, vector-valued functions and calculus of vector fields, and – as time permits – generalizations of the fundamental theorem of calculus.

Who should take this course Any student with a solid background in single-variable calculus (for instance 121-122 at Rhodes or a score of at least 4 on the BC Advanced Placement Calculus Exam) may take Calculus III. This is a required course for mathematics and physics majors, and computer science majors choose between it and linear algebra to fulfill a portion of their major requirements. This course is also strongly recommended for majors in Economics and Business Administration who anticipate graduate work in those areas, and it is recommended for Chemistry majors.

Meetings A hour, 8:00 – 8:50, MWF, 225 Ohlendorf Hall

Materials and Resources

Required text: T. Barr, *Vector Calculus*, 2nd Edition, Prentice Hall 2001

Recommended text: any introductory calculus book

Web page: <http://www.rhodes.edu/mathcs/faculty/barr/math223>

File server:

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Instructor

Tom Barr

Office location: 316 Ohlendorf

Office hours: 1:00–2:00 MTWRF (tentative) and by appointment

Office phone: 843-3722

E-mail: tombarr@rhodes.edu

Homework Most of what you learn in this course will be the result of working exercises from the text and handouts. These are designed to reinforce key concepts, so keeping up with and doing the assignments is essential to success. After each class meeting and before the next, you should work on all of the pertinent problems, writing out your solutions neatly and completely so that they can serve as an aid to review for quizzes and tests. The amount of time needed to do homework may vary considerably from assignment to assignment and from student to student. It is not unreasonable, however, to spend two or three hours on many of these assignments, so it is incumbent upon you to allocate time in your schedule several days a week for the purpose of writing

mathematics assignments (**ten** hours per week is a rough guideline). You are encouraged to talk to your classmates about homework, but beware of becoming too reliant on others to help you in doing the assignments. If you have difficulties with the material, do not waste time in getting assistance: drop in or schedule a meeting at office hours, or just send me an e-mail message with your question.

Graded Homework I will assign selected exercises for grading and collect these on a weekly basis. This should be written up in accordance with the following guidelines:

- Identify the section and number for each exercise.
- On each exercise, **state the question**.
- Show your work and provide coherent narrative where an explanation is warranted.
- Use mathematical notation correctly.
- Write neatly: avoid using a pen and the inevitable scratched-out errors; instead use a pencil and a large eraser.
- Do not write on the back of pages.
- Multiple pages must be **stapled**.
- Late, messy, or illegible homework will not be accepted.

In-class Quizzes I may give in-class quizzes. These will be graded and count as one weekly assignment.

Attendance Regular class attendance is necessary (but not always sufficient) for success in this course. Form the habit of being in class at each meeting and also of preparing for those meetings by doing homework and reviewing notes you have taken. If I get the sense that you have abandoned the course from observing an excessive number of absences, I may request that you be removed from the class roll.

Writing Assignments Throughout the semester, there will be two computer laboratory assignments. The objective in each of these is for you to apply ideas you have encountered in class. For each of these, you will prepare a written report, which will be due one week after the assignment has been made.

Tests The three tests are tentatively scheduled for

Wednesday, 22 September
Friday, 22 October
Friday, 19 November

They will be taken in class without the aid of books or notes. With prior notice and a good reason, you may take a test at an alternate time (but generally not more than a day late). Do not simply fail to show up for a test; you risk a score of zero on that test. The same is true of the final exam (See especially paragraph 6 under Examinations on pages 67 - 68 in the 2002-2003 Rhodes College Catalog).

Final Exam The final exam is cumulative and is scheduled 1:00--3:30 p.m., Friday, 10 December.

Academic integrity Honesty with one's self and with others is of utmost importance in life; in particular I expect that what you do in this course will be governed by solid integrity. In practical terms, this means that you should be realistic about how much time you spend on homework, how well you understand the material, and what constitutes a reasonable amount of discussion with others about assignments. By writing your name on work which is submitted to be graded you assert that you have not received aid in completing the work from any other individual, verbally or in writing. If there is clear evidence that you have submitted work that is not your own, then I am obliged to bring the matter to the Honor Council. On the other hand, if you are aware of cheating or other dishonesty in connection with this course, you have a responsibility to bring the matter to my attention and to the attention of the Honor Council.

Grading The grading scheme is nominally the standard university point scale: 90 - 100, A; 80 - 89, B; 70 - 79, C; 60 - 69, D; below 60, F. Your final point average will be computed according to the following weighting:

3 Tests @ 18% each	54%
1 Final Exam	25%
Homework/Quizzes	12%
Writing Assigs./Labs	9%

Tentative Assignments, Math 223, Calculus III

Rhodes College, Fall 2004

Text: *Vector Calculus 2/E*, T. Barr

***Starred exercises are to be handed in for grading**

Section	Page	Exercises
1.1	8	1ab, 2*, 4ab*d, 5, 7, 8, 10, 13, 14*, 17, 19, 20*, 24, 25*, 31
1.2	15	1, 2, 5, 6*, 7, 9, 10*, 13, 14ab*, 15ab, 18, 20, 21, 22*, 23
1.3	24	1, 3, 5, 7, 8*, 9, 10, 11, 13, 16acd, 17b*cd*, 18acd*
1.4	32	1, 2, 3, 4, 5, 6ab, 7abcd*, 8, abde, 9ac, 12, 13*
1.5	44	1, 2, 3ab*cd*, 4*, 5, 8ab, 9a, 10a, 12*, 13, 16
	<i>Supplemental</i>	1*, 2, 3*
1.6	54	1ac, 2ab*, 3, 4ab, 5, 7, 10*, 11, 13, 14, 16, 24*
	<i>Supplemental</i>	1, 2, 3*
1.7	65	1abc, 2, 3, 8*, 10, 16, 17, 18*, 20, 23, 24*, 28, 33, 34*, 37
	<i>Supplemental</i>	1, 2, 3*
1.8	75	1, 2, 3, 5, 6, 7, 8*, 9, 10*, 11, 13, 15, 16*, 23, 24*, 26, 27, 28*
1.9	84	1, 3, 4, 5, 7, 8*, 10, 11, 12, 13, 14*, 15, 18*, 22, 23, 25*, 30, 31, 32*
1.10	97	2, 3, 5, 6, 7, 9, 10*, 12*, 15, 19*, 21*, 23, 27, 28, 31, 33, 35*, 39
	<i>Supplemental</i>	2.3ab*, 4ab*, 5*
2.1	109	1abc, 3, 4*, 6, 8, 12, 13*, 22, 24*
2.2	122	1, 2, 3, 4, 5, 8, 9, 12a*b*cd*, 13abcd*, 14a, 15ac, 16ac, 17, 19, 28*, 32*, 35, 40, 41
2.3	131	2, 3, 4, 6*, 7, 8*, 10, 13, 14ac, 16ab*d*, 17, 21*, 23a
2.4	141	2, 3, 4*, 9, 10abcd*ef*, 11, 12ac, 14, 15, 21*
2.5	148	1, 3, 5, 6, 7, 9, 11, 12, 14, 15, 17, 20*, 21*
3.1	151	1, 3, 4, 7, 9, 10*, 12, 13, 15, 17, 20*, 22, 24
	<i>Supplemental</i>	1, 2, 3*
3.2	169	1, 3, 5, 6*, 7, 11, 12, 13, 14*, 16, 18, 19, 22, 24, 25, 28, 29
3.4	184	1, 4, 5, 7, 8*, 9, 11, 14, 15, 18*, 19, 21, 24*, 26, 27, 29, 34b*, 42, 45*
	<i>Supplemental</i>	1abc*d*, 2ab*, 3*
3.5	197	2, 3, 5, 8, 9, 10, 11, 13, 17, 18*, 21, 23, 24, 27, 30*, 40, 41, 44*
3.6	208	1, 3, 5, 6*, 11, 13, 14*, 15, 19, 20, 23, 24, 27, 28*, 31, 32*, 33, 37, 38*, 41*, 43, 45
4.1	220	1, 3, 4, 7, 8*, 11, 12, 13, 15, 19, 20*, 24*, 25, 28*, 30, 32, 33, 36, 39, 40*, 46, 47, 51
4.2	229	1, 3, 5, 9, 17, 21, 28
4.3	238	1, 2, 3, 5, 9, 10*, 11, 12, 17*, 20, 21, 24*
4.4	249	2, 3, 5, 7, 8, 13, 17, 19, 20*, 23, 26*, 28, 33, 34, 39, 41, 43, 45
5.1	279	3, 8*, 9, 10, 11, 12*, 15, 20, 21ab*c
5.2	291	1bcd, 2, 3, 7*, 9, 10, 12, 13, 14*, 18, 20*, 25, 27, 28
5.3	308	2, 6, 7, 9, 12, 13*, 15, 17, 20, 21, 24, 26, 27*, 32, 35, 37, 40*, 43, 45, 49, 50*, 51
5.4	323	1, 4, 6*, 9, 11, 14*, 16, 21, 23, 25, 29, 31
6.1	387	1, 3, 5, 7, 8, 11, 15, 16*, 19, 21, 24, 25, 31, 32*

Student Information
Math 223, Fall 2004

My name is . . .

I like to be called . . .

My current status is

- First-year Sophomore Junior Senior
- Major: _____
- E-mail address _____

I am taking this course because . . .

My most recent math course was . . .

My experience with computers/software includes . . .

An interesting fact about me is . . .