

MTH 243: Calculus for Functions of Several Variables

Section 0005 – Fall 2016

- Instructor:** Dr. Vasilije Perovic
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Email Policy: The *only* address that should be used for communication is the one associated with your URI account.
Office: Lippitt Hall, 200B ☎ (401) 874-4463
Office Hours: **Tue: 2:00pm – 3:00 pm;** **Wed: 10:00am – 12:00 pm;** **Thur: 2:00pm – 3:00pm.**
You may also see me at other times by arrangement.
Classroom: Lippitt Hall 204; Tue/Thur: 12:30pm – 1:45pm.
Class Website: This course will use **SAKAI**. SAKAI should be checked regularly for announcements, grades, updates, lecture notes, etc! You might also find the following website helpful
http://math.uri.edu/~perovic/Teaching/Fall12016/Fall_2016_MTH243_Section0005.html
Prerequisite: MTH 142 (Calculus II) or equivalent.
Textbook: McCallum, Hughes-Hallett, et.al., *Multivariable Calculus*, 6th Edition, **with** WileyPLUS.

Bring the textbook to each class, since we will refer to it frequently. It is essential to read the text regularly, and read material before we cover it in class!

Course Description: MTH 243 is a third calculus course, with the focus on functions of two, three, and more variables and the extensions of the ideas of elementary calculus to higher dimensions. It covers coordinates for space vector geometry, partial derivatives, directional derivatives, extrema, Lagrange multipliers*, and multiple integrals.

General Education Areas and Learning Outcomes: MTH 243 is a general education course, The general education areas satisfied by MTH 243 are:

- A1** Scientific, Technology, Engineering, and Mathematical Disciplines (STEM),
- B3** Mathematical, Statistical, and Computational Strategies (MSC).

At the conclusion of this semester you will be able to:

1. *Contour diagrams.* Read and interpret 3d plots and 2d/3d contour diagrams, read and interpret tables of functions of several variables, and plot by hand the graph of simple functions of 2 variables, and simple contour plots of functions in 2 or 3 variables.
2. *Vectors.* Do calculations with vectors that involve the concepts of addition, scalar multiplication, dot product, cross product, magnitude, projection, and use these concepts in geometry and physics applications.
3. *Gradients and directional derivatives.* Calculate partial and directional derivatives, gradients and differentials of function of several variables, use local linearization to approximate functions.
4. *Optimization problems.* Calculate critical points, use the second derivative test to determine local extrema and saddle points (for functions of two variables only), use these concepts to solve (un)constrained optimization problems.
5. *Double and triple integrals.* Calculate double and triple integrals algebraically, change variables in integrals from rectangular coordinates to polar, cylindrical, spherical coordinates and vice versa.
6. *Parametrizaion*.* Use the concept of parametrization to represent curves and surfaces and apply it to solve physics problems involving motion in vector fields. Utilize parametrization in rectangular, spherical, and cylindrical coordinates.
7. *Vector fields*.* Represent and interpret plots of vector fields (including flow lines). Compute the flow of a vector field.
8. *Vector fields and Green's theorem*.* Use vector valued functions to evaluate line integrals in conservative vector fields. Apply Green's theorem for path-dependent vector fields.

9. *Modeling, approximation, technology.* Select calculus methods and use technology to analyze mathematical models and determine their applicability. Use technology to analyze accuracy of approximations, perform numerical and symbolic calculations, and produce graphical representation of functions to investigate their properties.
10. *Written mathematical communication.* Communicate effectively in written form mathematical ideas and conclusions, by stating in a complete, clear, concise, and organized manner steps, calculations, solution strategy, conclusions, and when appropriate, interpreting results in practical or applied terms.

General Advice: In higher level math classes, the *concepts* are as important as the *computations*. To master the concepts, you will have to read and reread the text carefully. Effort is expected outside of class to keep up with the material. A general rule of thumb is to work at least *two to three hours* on the course outside the classroom for each hour of class. You are encouraged to form study groups. Talking about mathematics, and critiquing each other's solutions is a very effective way to learn the subject.

Attendance: Regular, on-time attendance is expected! Attendance will be taken regularly. Should you miss class, your first step should be to get notes from a reliable fellow student.

Suggested Problems: Regularly assigned, but not collected. Do problems promptly so that you establish a baseline for your understanding of the material. By default, *all solutions must include reasoning expressed in complete sentences*. Note that there will be some overlap between these problems and the ones assigned through WileyPLUS. Suggested problems, together with the material presented during lectures, will be the main sources for problems on quizzes and exams.

Calculators: A graphing calculator is recommended and you may use it for homework and *some* quizzes and exams. Note that a majority of problems will **not** require using calculators and you should not rely on it too much. On most of the in-class quizzes and exams you will **not** be allowed to use calculators.

Video Lectures/Notes: In case our class is canceled due to inclement weather or any other reason, I might post a link on SAKAI to a video lecture (resp., handout) that you will be responsible for watching (resp., reading).

Grading, Exams, and Quizzes: The course grade will be based on **quizzes**, **WileyPLUS online homework**, two **in-class exams**, and a **final exam**, weighted as follows:

Quizzes	20%	
WileyPlus Homework	10%	
Exams (2)	40%	(20% each)
Final Exam	30%	(Thursday, December 15, 11:30am – 2:30pm)

Quizzes will be either in-class, typically every other Thursday, or will be take-home. The lowest quiz score will be dropped, and so **no make-up quizzes** will be given for any reason. In-class quizzes will be announced at least two class periods in advance.

A *tentative* schedule for the **in-class exams** is:

Exam 1: October 13 (Thursday)

Exam 2: November 17 (Thursday)

Makeup exams will be permitted *only* in those cases when a student documents a genuine medical or personal emergency. In such a case you must notify instructor of your emergency within 24 hours of the day of the exam.

Letter grades for the course will be determined by considering your overall weighted percentage according to the following scale:

A: 93.00% and above		A-: 90.00% – 92.99%
B+: 87.00% - 89.99%	B: 83.00% – 86.99%	B-: 80.00% – 82.99%
C+: 77.00% – 79.99%	C: 73.00% – 76.99%	C-: 70.00% – 72.99%
D+: 67.00% – 69.99%	D: 60.00% – 66.99%	
F: 59.99% and below		

Incomplete Grade: University of Rhode Island regulations concerning incomplete grades will be strictly followed (see University Manual sections [8.53.20](#) – [8.53.21](#) for details).

WileyPLUS Online Homework System: We will be using WileyPLUS online homework system in this course. To sign up for the WileyPLUS system, you will need a WileyPLUS registration code. *If you buy a copy of our textbook at the URI Bookstore, a registration code for WileyPLUS will be included with the book at no additional cost.*

If you buy a copy of our textbook somewhere else and it does not include WileyPLUS code, you will need to purchase a WileyPLUS code separately from the WileyPLUS site. A code purchased separately gives you access to an electronic version of the textbook, so it is an option to consider. The WileyPLUS website contains instructions, tutorials, technical support etc.

Once you have a code, you can register for our section of MTH 243 by going to the following URL specific to our section:

<http://edugen.wileyplus.com/edugen/class/cls539142/>

Important Dates: Please pay close attention to the following dates:

Sept. 28 – Last day to DROP courses with NO TRANSCRIPT DESIGNATION.

Oct. 19 – Last day for students to DROP course with “W” designation.

Nov. 24-27 – Thanksgiving break (classes do not meet).

Dec. 8 – Last day of instruction *for this class*.

Dec. 15 – Final exam *for this class*.

Accommodations: Any student with a documented disability (e.g., physical, learning, vision, hearing, etc.) who needs to arrange reasonable accommodations should contact me as soon as possible. At the beginning of the semester students should contact Disability Services for Students Office at 330 Memorial Union, (401) 874-2098, <http://www.uri.edu/disability/dss/>.

Academic Integrity: You are responsible for making yourself aware of and understanding the policies and procedures in the University Manual that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. Further information can be found in the UNIVERSITY MANUAL sections on Plagiarism and Cheating at

<http://web.uri.edu/manual/chapter-8/chapter-8-2/>

If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test. Violations of the academic honesty policies can result in failing grades for the assignment and the course. Additional penalties can be imposed by the University.