Math 18, Fall 2010
Intermediate Calculus

1 General course information

	SECTION 1	SECTIONS 2 and 3
Instructor	Jonathan Ben-Artzi	Mirjana Vuletić
Office	Sciences Library 1018	Kassar House 310
Office phone	(401) XXX XXXX	(401) 863 7966
Email	yonib@math.brown.edu	vuletic@math.brown.edu
Course hours	MWF 9-10am	MWF 10-11am(Sec 2) 1-2pm(Sec 3)
Room	Barus and Holley 165	Barus and Holley 163(Sec 2) 161(Sec 3)
Office hours	TBD	Wednesdays 2:15-4pm

Course website	MyCourses website
Book	H. Anton, I. Bivens and S. Davis, *Calculus Multivariable, 9 edition*
Teaching assistants	Fuyi Huang, Kevin Zheng, Samuel Carter
Recitations	Tuesdays from noon-1pm in the same rooms as lectures
Grading	30% Midterm
	40% Final
	30% Assignments (and participation)
Midterm	Thursday, October 14, 2010
Final	Friday, December 10, 2010 (2-5 pm, location TBD)
Homework	weekly, due on Thursdays at noon in Math 18 boxes in Kassar House

2 Course policies

Homework policy. It is crucial to give ample time to prepare your homework assignments. Assignments will be long and demanding, so start them early. **Late or unstapled homework will not be accepted.** In special circumstances extensions on homework will be granted, but the extension will need to be recommended by the Dean's Office or Health Center. Collaboration is allowed and encouraged, discussing problems and sharing ideas are OK, but you may not use someone else's written solutions to see how to do a problem. You must write solutions on your own without assistance. Although collaboration on homework is allowed, you should be aware that being able to tackle a problem on your own is very important. The assignments will be clearly posted on MyCourses website. Be sure to always consult the site for the correct, and up-to-date information.

Exam policy. You must plan your travel arrangements around the dates listed above. The only valid excuses for missing an exam are a family-related crisis or a serious health problem. If this is the case, you will need a note from the appropriate Dean or University Health Services official. If you cannot attend an exam because of a Brown athletic contest, you must notify your instructor at least **two weeks in advance**. No collaboration, books, calculators or computers will be allowed on exams. We suggest that you do not use calculators or computers on homework assignments, except to check your work.

Getting help.

- Office hours are a great place to get help with the course material since you can get one-to-one attention. Be open and ask questions, office hours are there for you, by asking questions you will motivate your instructors to find alternative ways to help you understand material and/or see it from a different angle. If drop in hours don't work for you, contact your instructor and he/she will find another time.

- Every Tuesday you will meet with your teaching assistant. Their recitations will be oriented towards problem solving and will be of great help for your homework assignments. Occasionally, they will review some of the material from single variable calculus that we won't have time to cover in class.

- In addition, if you are having trouble with any of the course topics, you are encouraged to go to the Math Resource Center (MRC). There, you will find graduate students and advanced undergraduate students who can help you with notions from the course and with homework.

  MRC hours are 8 - 10 pm, Monday through Thursday, at Kassar 105. Directions and info can be found at: `http://www.math.brown.edu/mrc/`

- For students who need help beyond that, there is a tutoring program run by the Dean's office. They offer group or individual tutoring for some of the introductory and intermediate math, science, economic and language sciences. More information can be found at:
  `http://www.brown.edu/Administration/Dean_of_the_College/tutoring/index.php`

Disability. Students who need accommodations or services due to a disability should contact Disability Support Services first to discuss their needs. We will do our best to make necessary accommodations.

3 List of topics

Overview. Math 18 is an introduction to multivariable calculus. It is a demanding course and it is important that you take assignments and exams seriously. Multivariable calculus will provide you with the most fundamental tools that will help you understand the world around you – from electromagnetism to gravitation to solving engineering problems. It will be crucial for you to have a solid background in single variable calculus: derivatives, definite integrals, antiderivatives, as well as a firm understanding of the exponential, logarithmic and trigonometric functions.

Tentative list of topics.

1. *Differentiation*

   - Brief survey of Euclidean geometry, scalar and vector products.
   - Multivariate functions: graphical representation (surfaces), continuity.
   - Differentiation in two and three dimensions: partial derivatives, directional derivatives.
   - Gradients, tangent lines and planes.
   - Extremal problems.
   - Lagrange multipliers and constraints.
   - Higher order derivatives and Taylor's theorem.

2. *Integration*

   - Brief survey of one dimensional integration.
   - Integration in two dimensions: Cartesian, polar.
   - Fubini's theorem.
   - Integration in three dimensions: Cartesian, cylindrical, spherical.
   - Change of variables: the Jacobian.
   - Geometrical applications: solid volumes, surface area, center of mass.

3. *Vector analysis*

   - Vector valued functions.
   - The divergence and the curl of a vector field.
   - Line integrals in two and three dimensions.
   - Green's theorem (in two dimensions).
   - Surface integrals.
   - Divergence theorem (Gauss' theorem).
   - Stokes' theorem.