

**MATH 251: Multivariable Calculus, Summer 2016**  
Section 01

**Lecture Times/Location:** MTuTh 9:00-11:05, MP 104

**Discussions:** MTh 11:15-12:15, MP 104

**Professor:** Dr. Brian Dean

Office: Sherman 148E

Office Hours: Mon. 12:15-1:15, Tues. 11:15-12:15, or by appointment.

Email: [bdean@umbc.edu](mailto:bdean@umbc.edu). If you email me to set up a time to see me in my office, please indicate what you want to talk to me about, so that I can prepare for your questions, or possibly answer them via email. I will try to respond to all emails as promptly as possible, but will generally not be reachable on nights and weekends.

**TA:** Juyoung Jeong ([juyoung1@umbc.edu](mailto:juyoung1@umbc.edu))

**Textbook:** *Multivariable Calculus*, by James Stewart; Brooks/Cole, Eighth edition. Please bring your textbook (or laptop if you have an ebook) with you to class.

**Content:** In MATH 251, we see how single-variable calculus generalizes to higher dimensions. As we will see, some concepts generalize quite naturally and easily, while others become more complicated in higher dimensions. We will study vectors and curves in two- and three-dimensional space, as well as differentiation and integration of multivariable functions.

**Exams and Grading:** The usual 90-80-70-60 % grading system will be used in this course. Students are advised to form study groups. Students should take advantage of extra help available during office hours, tutoring available through the Learning Resources Center, and Student Disability Services.

Your grade for the course will be based on your performance on exams and quizzes:

Homework – Your top 10 scores, worth 10 points each = 100 points (12.5 %)

Quizzes – Your top 8 scores, worth 25 points each = 200 points (25 %)

Midterms – Three exams, worth 100 points each = 300 points (37.5 %)

Final Exam – 200 points (25 %)

TOTAL POINTS – 800 points

**WebAssign Online Homework:** You will need a personal WebAssign code. This code comes bundled with a new text or can be purchased separately online at the publishers' website or in the bookstore. If the enhanced code is purchased, an e-book is already included online and students can decide if they want the hard copy as well as the text online. You can access WebAssign through Blackboard by going to the Blackboard site for this course, clicking on "Other Bb Tools" on the lefthand side of the screen, and then clicking on WebAssign. There will be no homework extensions for any reason.

**Quizzes:** There will be a total of ten quizzes throughout the summer session, during your discussion sections. No notes or calculators will be allowed on the quizzes. There will be no makeup quizzes for any reason.

**Midterms:** There will be three 75-minute midterm exams (Tues. July 19, Mon. Aug. 1, and Thurs. Aug. 11, all in class). No notes or calculators will be allowed on the midterms. Make-up exams will be given at my discretion and provided I have been notified the morning of the test and that there is sufficient reason for missing class.

**Final Exam:** No notes or calculators will be allowed on the final exam. The final will be cumulative, on Thurs. Aug. 18 from 9:00-11:05 in MP 104.

**Attendance:** There is no formal attendance policy for this course, but people with poor attendance usually don't do very well. When you come to class, you are expected to pay attention and participate. There is no excuse for being habitually late to class. It disturbs the instructor as well as the other students, and it will not be tolerated. The use of smartphones during class is strongly discouraged; at the very least, do not be disruptive, and do not let them distract yourselves from paying attention.

**Academic Integrity:** By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.  
[http://www.umbc.edu/undergrad\\_ed/ai/](http://www.umbc.edu/undergrad_ed/ai/)

### **CLASS SCHEDULE (subject to change):**

**Mon. 7/11:** LECTURE: 12.1: Three-Dimensional Coordinate Systems  
12.2: Vectors

DISCUSSION: Practice problems on 12.1-12.2

**Tues. 7/12:** LECTURE: 12.2 (cont.)  
12.3: Dot Product  
12.4: Cross Product

**Thurs. 7/14:** LECTURE: 12.4 (cont.)

12.5: Equations of Lines and Planes  
12.6: Cylinders and Quadric Surfaces

DISCUSSION: **Quiz 1: 12.1-12.2**  
Practice Problems on 12.3-12.4

**Mon. 7/18:** LECTURE: 13.1: Vector Functions and Space Curves  
13.2: Derivatives and Integrals of Vector Functions  
13.3: Arc Length  
13.4: Motion in Space

DISCUSSION: **Quiz 2: 12.3-12.4**  
**Quiz 3: 12.5-12.6**

**Tues. 7/19:** LECTURE: **Exam 1: 12.1-12.6, 13.1-13.3 (9:00-10:15)**  
13.4 (cont.)  
14.1: Functions of Several Variables

**Thurs. 7/21:** LECTURE: 14.1 (cont.)  
14.2: Limits and Continuity  
14.3: Partial Derivatives  
14.4: Tangent Planes and Linear Approximations

DISCUSSION: **Quiz 4: 13.4, 14.1 (with 14.1 limited to material from 7/19 lecture)**  
Practice problems on 14.2-14.4

**Mon. 7/25:** LECTURE: 14.4 (cont.)  
14.5: Chain Rule  
14.6: Directional Derivatives and the Gradient  
14.7: Maximum and Minimum Values

DISCUSSION: **Quiz 5: 14.2-14.4 (with 14.4 limited to material from 7/21 lecture)**  
Practice problems on 14.5-14.6

**Tues. 7/26:** LECTURE: 14.7 (cont.)  
14.8: Lagrange Multipliers  
15.1: Double Integrals Over Rectangles

**Thurs. 7/28:** LECTURE: 15.1 (cont.)  
15.2: Double Integrals Over General Regions

DISCUSSION: **Quiz 6: 14.5-14.6**  
**Quiz 7: 14.7-14.8**

**Mon. 8/1:** LECTURE: **Exam 2: 13.4, 14.1-14.8, 15.1-15.2 (9:00-10:15)**  
15.3: Double Integrals in Polar Coordinates

DISCUSSION: Practice problems on 15.3

**Tues. 8/2:** LECTURE: 15.6: Triple Integrals  
15.7: Triple Integrals in Cylindrical Coordinates  
15.8: Triple Integrals in Spherical Coordinates

**Thurs. 8/4:** LECTURE: 15.7/15.8 (cont.)  
15.9: Change of Variables in Multiple Integrals

DISCUSSION: **Quiz 8: 15.3, 15.6**  
Practice problems on 15.7-15.9

**Mon. 8/8:** LECTURE: 16.1: Vector Fields  
16.2: Line Integrals  
16.3: Fundamental Theorem for Line Integrals

DISCUSSION: **Quiz 9: 15.7-15.9**  
Practice problems on 16.1-16.2

**Tues. 8/9:** LECTURE: 16.3 (cont.)  
16.4: Green's Theorem  
16.5: Curl and Divergence

**Thurs. 8/11:** LECTURE: **Exam 3: 15.3, 15.6-15.9, 16.1-16.3 (9:00-10:15)**  
16.5 (cont.)  
16.6: Parametric Surfaces and Their Areas

DISCUSSION: Practice problems on 16.4-16.5

**Mon. 8/15:** LECTURE: 16.6 (cont.)  
16.7: Surface Integrals

DISCUSSION: **Quiz 10: 16.4-16.5**  
Practice problems on 16.6-16.7

**Tues. 8/16:** LECTURE: 16.7 (cont.)  
16.8: Stokes' Theorem  
16.9: Divergence Theorem  
16.10: Summary

**Final Exam: Thurs. 8/18, 9:00-11:05, MP 104**