Massasoit Community College

Instructor:
Office:
Email:
Phone:
Office Hours:

Course: Calculus III
Course Number: MATH223-XX
Semester:
Classroom:
Day and Time:

Course Description: This is a third course in the calculus sequence intended for undergraduate mathematics, science, technology, or engineering majors. Topics include conic sections, parametric equations, polar coordinates, vectors and applications, functions of several variables, partial derivatives and applications, double and triple integrals in rectangular and other coordinate systems and applications, vector fields, line integrals and applications, parametric surfaces, surface integrals and applications, Green's Theorem, the Divergence Theorem, and Stokes's Theorem.

Prerequisite: C- or higher in MATH 222 Calculus II; waiver by placement testing results; or departmental approval.

Required Text and Materials:

1. Calculus: Early Transcendental Functions (custom textbook with EnhancedWebAssign access card), Larson/Edwards, 7th edition, Cengage, ISBN: 9781337888950.

   Your textbook should come packaged with a WebAssign access card. Homework assignments must be completed online in WebAssign. If you do not purchase your textbook through the bookstore, please make sure that it comes with a WebAssign access code.

2. A TI-83/84 graphing calculator is required for this course. All assessments will assume that you have a graphing calculator. A TI-83/84 can be rented through the library for a small fee. You may not use any other technologies, such as cell phones, iPods, tablets, laptops, etc. on in-class assessments. You also may not borrow/share calculators, or borrow mine. Also, any calculator with a computer algebra system, such as a TI-89, TI-89 Titanium, TI-92, TINSpire, or others may NOT be used on in-class assessments!

Teaching Procedures: This course will be taught in a lecture/discussion format with ample opportunity for student questions. Generally, class will begin with a question and answer session on the most recent homework assignment. New material will then be presented in a lecture format and homework be assigned to reinforce the topics covered in class.

Course Topics:

Chapter 10: Conics, Parametric Equations, and Polar Coordinates

Chapter 11: Vectors and the Geometry of Space

Chapter 12: Vector-Valued Functions

Chapter 13: Functions of Several Variables

Chapter 14: Multiple Integration

Chapter 15: Vector Analysis

Instructional Objectives:

COURSE OUTCOMES	**SAMPLE OUTCOMES ACTIVITIES**	**SAMPLE ASSESSMENT TOOLS**
Upon successful completion of this course students should:	To achieve these outcomes students may engage in the following activities:	Student learning may be assessed by:
1. Demonstrate an understanding of conic sections, plane curves, and parametric equations to solve application problems; (QL)	□ Identify and find equations of ellipses, parabolas, and hyperbolas □ Sketch curves represented by parametric equations □ Write the rectangular equation of a curve by eliminating the parameter □ Represent curves using parametric equations □ Solve slope, tangent line, arc length, and area problems for parametric curves	□ Homework □ In-class problem sets □ Quizzes □ Exams

2. Demonstrate an understanding of vectors; (QL)	☐ Write vectors, perform basic vector operations, and represent vectors graphically ☐ Calculate dot products and cross products, and solve application problems ☐ Sketch plane and space curves, perform basic calculus operations, and solve motion, tangent/normal vector, arc length, and curvature problems involving vector-valued functions	☐ Homework ☐ In-class problem sets ☐ Quizzes ☐ Exams
3. Demonstrate an understanding of functions of multiple variables; (QL)	☐ Plot points in three-dimensional space ☐ Find equations of lines and planes in space ☐ Write equations of surfaces in space and sketch their graphs ☐ Calculate limits and establish continuity of multivariate functions	☐ Homework ☐ In-class problem sets ☐ Quizzes ☐ Exams
4. Demonstrate an understanding of partial derivatives and their applications; (QL)	☐ Find partial derivatives of multivariate functions ☐ Construct and use chain rules for functions of multivariate functions ☐ Calculate directional derivatives, gradients, tangent planes, and normal lines ☐ Find relative and absolute extrema for functions of two variables	☐ Homework ☐ In-class problem sets ☐ Quizzes ☐ Exams
5. Demonstrate an understanding of non-rectangular coordinate systems (QL)	☐ Perform conversions from rectangular coordinates to polar coordinates in two dimensions and to cylindrical and spherical coordinates in three dimensions ☐ Sketch polar graphs, calculate areas of polar regions, and calculate arc lengths of polar curves ☐ Plot points in cylindrical and spherical coordinates	☐ Homework ☐ In-class problem sets ☐ Quizzes ☐ Exams

6. Demonstrate an understanding of multiple integrals; (QL)	☐ Set up and evaluate double and triple integrals in rectangular coordinates ☐ Reverse the order of integration of a double integral ☐ Set up and evaluate double integrals in polar coordinates ☐ Set up and evaluate triple integrals in cylindrical and spherical coordinates ☐ Calculate volumes and solve other applications using double and triple integrals ☐ Use change of variables and the Jacobian to evaluate double integrals	☐ Homework ☐ In-class problem sets ☐ Quizzes ☐ Exams
7. Demonstrate an understanding of vector fields and line integrals; (QL)	☐ Sketch vector fields ☐ Write and evaluate line integrals and solve application problems ☐ Identify conservative vector fields, calculate potential functions, and use the Fundamental Theorem of Line Integrals ☐ Use Green's Theorem to evaluate line integrals	☐ Homework ☐ In-class problem sets ☐ Quizzes ☐ Exams
8. Demonstrate an understanding of parametric surface and surface integrals; (QL)	☐ Find a set of parametric equations to represent a surface and sketch the surface ☐ Write and calculate surface integrals and solve application problems ☐ Use the Divergence Theorem to evaluate surface integrals ☐ Use Stokes's Theorem to understand the connection between surface integrals and line integrals	☐ Homework ☐ In-class problem sets ☐ Quizzes ☐ Exams

MATH223 — Daily Topical Coverage

Class Meeting	Topic/Activity
1	• Conic Sections (Sect 10.1) – self study • Plane Curves and Parametric Equations (Sect 10.2)
2	• Parametric Equations and Calculus (Sect. 10.3)
3	• Problem Set 1
4	• Polar Coordinates and Polar Graphs, Part I (Sect. 10.4)
5	• Polar Coordinates and Polar Graphs, Part II (Sect. 10.4) • Area and Arc Length in Polar Coordinates (Sect. 10.5)
6	• Problem Set 2
7	• Exam 1
8	• Vectors in the Plane (Sect. 11.1)
9	• Space Coordinates and Vectors in Space (Sect. 11.2)
10	• The Dot Product of Two Vectors (Sect 11.3) • The Cross Product of Two Vectors in Space (Sect. 11.4)
11	• Problem Set 3
12	• Lines and Planes in Space (Sect. 11.5) • Surfaces in Space (Sect 11.6, generally brief)
13	• Vector-Valued Functions (Sect. 12.1) • Differentiation and Integration of Vector-Valued Functions (Sect. 12.2) • Velocity and Acceleration (Sect. 12.3) (Merge 12.2 concepts into 12.3)
14	• Tangent Vectors and Normal Vectors (Sect. 12.4) • Arc Length and Curvature (Sect. 12.5)
15	• Problem Set 4
16	• Exam 2
17	• Introduction to Functions of Several Variables (Sect. 13.1) • Limits and Continuity (Sect 13.2, fairly brief)
18	• Partial Derivatives (Sect. 13.3) • Chain Rules for Functions of Several Variables, Part I (Sect. 13.5)
19	• Problem Set 5

Class Meeting	Topic/Activity
20	• Chain Rules for Functions of Several Variables, Part II (Sect. 13.5) • Directional Derivatives and Gradients, Part I (Sect. 13.6)
21	• Directional Derivatives and Gradients, Part II (Sect. 13.6) • Tangent Planes and Normal Vectors (Sect. 13.7) • Extrema of Functions of Two Variables (Sect. 13.8, brief)
22	• Problem Set 6
23	• Exam 3
24	• Iterated Integrals and Area in the Plane (Sect. 14.1)
25	• Double Integrals and Volume (Sect. 14.2)
26	• Change of Variables: Polar Coordinates (Sect. 14.3)
27	• Problem Set 7
28	• Triple Integrals and Applications (Sect. 14.6)
29	• Cylindrical and Spherical Coordinates (Sect. 11.7) • Triple Integrals in Other Coordinates, Part I (Sect. 14.7)
30	• Triple Integrals in Other Coordinates, Part II (Sect. 14.7) • Change of Variables: Jacobians (Sect 14.8)
31	• Problem Set 8
32	• Exam 4
33	• Vector Fields (Sect. 15.1)
34	• Line Integrals (Sect. 15.2)
35	• Conservative Vector Fields and Independence of Path (Sect. 15.3)
36	• Problem Set 9
37	• Green’s Theorem (Sect. 15.4) • Parametric Surfaces (Sect. 15.5)
38	• Surface Integrals (Sect. 15.6)
39	• Divergence Theorem (Sect. 15.7) • Stokes’s Theorem (Sect. 15.8)
40	• Problem Set 10
41	• Exam 5

Class Meeting	Topic/Activity
42	• Final Exam Review

Basis for Student Grading: Grades for this course will be assigned as follows:

Grade	Average
A	93%-100%
A-	90%-92%
B+	87%-89%
B	83%-86%
B-	80%-82%
C+	77%-79%

Grade	Average
C	73%-76%
C-	70%-72%
D+	67%-69%
D	63%-66%
D-	60%-62%
F	0-59%

The grade you earn is the grade you will receive in this course. Grades are not negotiable. You will not be allowed to make up work, substitute alternative assignments, or submit extra assignments in order to improve your grade during the semester or after the semester ends.

Grades of incomplete are given only in situations when extenuating circumstances prevent a student from taking the final exam or fulfilling a specific requirement in the course. The grade of "I" cannot be used to give students additional time to complete course assignments in order to raise their grade.

Basis for Evaluating Student Performance: The grade for this course will be weighted based on the following categories:

- *Homework (10%)*: Homework will be assigned in WebAssign at the end of each section. It is due by the next class period.
- *Exams (60%)*: There will be four in-class exams given throughout the semester, approximately every 3 weeks. Exams must be taken during the regular class time and no make-up exams will be given. The lowest exam grade will be dropped. Your exam average will account for 60% of your final grade.
- *Final Exam (30%)*: The course will culminate in a cumulative final exam. It will be worth 30% of your final grade.

There is no extra credit available for this course.

Tentative Test Schedule/Assignment(s) Schedule:

Assignment:	Tentative Date:
Test 1	
Test 2	
Test 3	
Test 4	
Final Exam	

Attendance: Attendance for this course is mandatory. After the third absence, students will lose two points per absence thereafter from their final average. I will take attendance at the beginning of every class, and students not present at that time will be marked absent for the class, even if they show up late. If you must miss a regular class, you are still responsible for the material that was presented in class. The average student needs to attend all class meetings in order to be successful in this course.

Access and Disability Resources (ADR): Access and Disability Resources (ADR) provides accommodations to students who qualify for services based on a documented disability. Students interested in accessing classroom or testing accommodations need to register with ADR, and need to have an Accommodation Letter for the current semester. Students can contact ADR at 508-588-9100 X 1807 or by e-mail at adr@massasoit.mass.edu for further information.

Office of Diversity and Inclusion: Massasoit Community College is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, stalking, or retaliation, we encourage you to report it to Yolanda Dennis, Chief Diversity Officer and Title IX Coordinator, Office of Diversity and Inclusion, at 508-588-9100, x1309 or ODI@massasoit.edu or the Associate Dean of Students & Deputy Title IX Coordinator, Joseph DiMaria, 508-588-9100, x1417, Brockton Campus, Student Center, Room 208A, jdimaria@massasoit.mass.edu. While you may talk to a faculty member, understand that as a "responsible employee" of the College, the faculty member must report what you share to the College's Title IX Coordinator and/or Deputy Title IX Coordinator. On and off campus resources and interim measures are available to assist you. Information about both of these policies can be found at www.massasoit.edu/title-ix and www.massasoit.edu/eeo. We are here to support you.

Academic Integrity: Academic dishonesty will not be tolerated. Please see the following URL for more information on the college's policies on academic integrity:

http://www.massasoit.edu/academics/policies/academic-honesty/index