

Course Syllabus
Multivariable Calculus (Calc III)
MATH 200

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SECTION 1

Course Introduction

Credit Hours: This course is recommended for 4 US semester credits. The class consists of 50 classroom hours with an additional 8-10 hours spent outside the classroom, including excursions, visits to professional organizations, and activities.

Prerequisite Courses: Calculus I and Calculus II

Course Introduction:

Germany has played a central role in the development of mathematics, physics, and engineering. Among the most influential figures is Gottfried Wilhelm Leibniz, who is widely credited as a co-inventor of calculus. Born in Leipzig in 1646, Leibniz introduced many of the concepts and notations still used today, including the notation for integration and differentiation. His work laid the foundation for modern calculus and continues to shape the mathematical tools we study in this course.

In this course you will cover material related principally to Multivariable Calculus, also known as Calculus III. Multivariable calculus is the fundamental to Science and Engineering. This course will extend the concepts learned in Calculus I and II. The content of this course will thus focus on curves and surfaces in Euclidean 3-space, length and curvature, area and volume; surfaces, partial derivatives, total differential, tangent planes to surfaces; gradient; vector-valued functions; line integral; Stokes' theorem, Green's Theorem, and the Divergence Theorem.

In addition to the cognitive and knowledge skills listed above, students in this course will consider the contributions of the Germans in science, mathematics, technology, and engineering through experiential learning components.

Course Learning Outcomes

At the end of this course students will be able to:

1. Classify curves and surfaces in Euclidean three-dimensional space, understand vectors and their operations convert coordinates between rectangular and nonrectangular.
2. Compute partial derivatives, tangent planes, directional derivatives, and gradients.
3. Compute double and triple integrals and how to apply them to surface area, mass, moment, and probability density functions.
4. Understand concepts such as vector fields, line and surface integrals, divergence and curl and their application to physics.
5. Understand Germany's contribution to the fields of mathematics, sciences, technology and engineering,

Assessment

Achievement that is outstanding relative to the level necessary to meet course requirements.

B Achievement that is significantly above the level necessary to meet course requirements.

C Achievement that meets the course requirements in every respect.

D Achievement that is worthy of credit even though it fails to meet fully the course requirements.

P Achievement that is satisfactory, which is equivalent to a C- or better (achievement required for a P is at the discretion of the instructor but may be no lower than equivalent to a C-.)

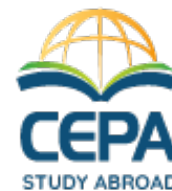
NP Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (see also I).

I (Incomplete) - Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. Requires a written agreement between instructor and student.

Grading Scale (Based on points)

95 – 100	⇒ A	77 – 79	⇒ C+	59 – Lower	⇒ E
90 – 94	⇒ A-	74 – 76	⇒ C		
87 – 89	⇒ B+	70 – 73	⇒ C-		
84 – 86	⇒ B	67 – 69	⇒ D+		
80 – 83	⇒ B-	60 – 66	⇒ D		

Distribution of Course Points



Attendance and participation 10%

Active participation in class discussions. Engagement in group activities and simulations. Contribution to discussions during experiential visits.

Chapter Quizzes 60%

Students will have a quiz after the end of each chapter.

Final Exam 30%

Students will have a final-term exam on the second half of the course.

Academic Policies

All program participants recognize and accept that the **CEPA ESC Academic Policies** apply to this course as well as to any other course offered through the European Study Center. These policies, which govern academic standards, expectations, and requirements for all CEPA ESC program participants, are published on the **CEPA ESC website** and are also accessible at any time through the **Policies tab** in the CEPA mobile app. You are required to read and understand these policies as they form part of the binding academic framework for this program.

Please ensure you **review the full CEPA ESC Program Policies** document as soon as possible and inquire with CEPA support staff or your faculty if you have questions, requests or concerns.

Course-Specific Applications and Clarifications

While all CEPA ESC Academic Policies apply uniformly across ESC programs, the instructor may provide additional course-specific details or clarifications regarding how certain policies are implemented in this course (for example, participation expectations, assignment formats, or submission procedures). Any such course-specific guidance is intended to supplement—not replace or contradict—the official CEPA ESC Academic Policies. In cases of discrepancy, the CEPA ESC Academic Policies take precedence.

SECTION 2

General

Homework assignments are recommended, not required, as they will not be turned in for grades. However, they are intended to help you understand the class material, and to stay on track in the course. Questions on the assignments will be addressed at the beginning of each class session, as well as during each week's Reading Day (week review and practice).

Class Meets:

Weekly throughout the term, usually in five, 1 hour 45 minute sessions
Detailed course schedule with hours and locations of classes is TBC.

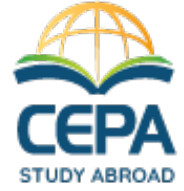
Class Schedule and Sequence of Instruction

Class Session	Date	Course Content	Assignment
Week 1	Class 1	Introduction, Calculus Review	Cumulative Review Problems Chapters 1 - 7
	Class 2	Vectors in two-dimensions, Scalar and Vector Products	Ch. 9.1 – 1, 5, 11, 15, 21, 27, 33, 47, 49 Ch. 9.2 – 3, 5, 11, 19, 25, 41, 47
	Class 3	Vectors in three-dimensions, Scalar and Vector Products, Lines in two-dimensions	Ch. 9.3 – 3, 7, 15, 19, 25, 31, 37, 43 Ch. 9.4 – 1, 5, 9, 15, 19, 23, 25, 29, 35
	Class 4	Lines and Planes in three-dimensions	Ch. 9.5 – 3, 7, 11, 15, 19, 23, 27, 31, 41, 53 Ch. 9.6 – 5, 11, 17, 25, 35, 39, 41, 49
	Class 5	Week review and practice	Study for Week 1 Quiz
Week 2	Class 6	Review of Chapter 9, Chapter 9 Quiz	
	Class 7	Vector Functions, Vector Function Differentiation	Ch. 10.1 – 3, 9, 15, 19, 23, 31, 39, 45, 53
	Class 8	Vector Function Integration, Vector Function Applications	Ch 10.2 – 1, 5, 7, 11, 17, 23, 31, 37, 45 Ch 10.3 – 1, 9, 11, 15, 19, 27, 33, 39
	Class 9	Unit Tangent and Normal Vectors, Curvature	Ch. 10.4 – 1, 5, 9, 17, 23, 31, 35, 43 Ch. 10.5 – 1, 5, 9, 17, 19, 25, 33
	Class 10	Week review and practice	Study for Week 2 Quiz
Week 3	Class 11	Review of Chapter 10, Chapter 10 Quiz	
	Class 12	Functions of Several Variables, Limits and Continuity, Partial Derivatives,	Ch. 11.1 – 1, 9, 17, 23, 31, 35, 43 Ch. 11.2 – 3, 7, 17, 23, 35, 45 Ch 11.3 – 3, 5, 9, 11, 21, 27, 33, 41
	Class 13	Tangent planes, Chain Rule, Directional Derivative	Ch. 11.4 – 5, 11, 21, 27, 35 Ch 11.5 – 5, 7, 9, 15, 21, 25 Ch 11.6 – 3, 7, 17, 23, 35, 45
	Class 14	The Gradient, Extrema of functions of two variables, Lagrange Multipliers	Ch. 11.7 – 5, 7, 11, 17, 21, 25, 31, 37, 41

			Ch 11.8 – 1, 5, 17 25, 31
	Class 15	Week review and practice	Study for Week 3 Quiz
Week 4	Class 16	Review of Chapter 11, Chapter 11 Quiz	
	Class 17	Double Integrals, Surface Area	Ch 12.1 – 1, 5, 13, 23, 29, 39 Ch 12.2 – 1, 3, 7, 11, 15, 25 Ch 12.3 – 3, 5, 15, 21, 35 Ch 12.4 – 1, 7, 15, 17
	Class 18	Triple Integrals, Mass and Moments, Probability Density Functions	Ch. 12.5 – 5, 9, 13, 17, 31, 39 Ch 12.6 – 7, 13, 23, 35
	Class 19	Spherical and Cylindrical Coordinates, Change of Variables	Ch. 12.7 – 3, 5, 9, 13, 17, 31 Ch 12.8 – 3, 9, 19, 21, 35
	Class 20	Week review and practice	Study for Week 4 Quiz
Week 5	Class 21	Review of Chapter 12, Chapter 12 Quiz	
	Class 22	Vector Fields, Divergence, Curl	Ch. 13.1 – 3, 9, 17, 21, 31
	Class 23	Line Integrals, Independence of Path	Ch. 13.2 – 3, 11, 15, 21, 29, 37 Ch 13.3 – 5, 7, 9, 13, 19, 21, 37, 49
	Class 24	Green's Theorem, Stoke's Theorem, Divergence Theorem	Ch. 13.4 – 1, 5, 9, 15, 31 Ch 13.5 – 1, 7, 13, 19, 31 Ch 13.6 – 3, 7, 15, 25
	Class 25	Week review and practice	Review Ch. 9 - 10
Week 6	Class 26	Review of Ch. 9 and 10	Review Ch. 11-12
	Class 27	Review of Ch. 11 and 12	Review Ch. 13
	Class 28	Review of Ch 13	Review Ch. 9 - 13
	Class 29	Reading Day	Review Ch. 9 - 13
	Class 30	Final Exam Ch 9 - 13	

Instructional Materials

(These may be available through your on campus electronic library. Relevant chapters will be provided for students who do not have access to the electronic version.) Choose one of the following:



1. Karl J. Smith, Monty J. Strauss, and Magdalena D. Toda. Calculus. 7th edition. Kendall Hunt. 2017.
2. Karl J. Smith, Monty J. Strauss, and Magdalena D. Toda. Calculus Special Edition Chapters 9 – 13. Kendall Hunt. 2017.