Mathematics 267	University Calculus II

Calendar Description: H(3-1T-1.5)
Sequences and series, techniques of integration, double integration, applications; parametric equations.

Prerequisite(s): Mathematics 249 or 265 or 275 or 281 or Applied Mathematics 217.

Antirequisite(s): Credit for more than one of Mathematics 267, 277, 349, or Applied Mathematics 219 will not be allowed.

Syllabus

Topics	Number of Hours
Techniques of integration	6
Applications of integration: volume, arc length, surface area	4
Parametric equations	3
Partial Differentiation and Double Integral	10
Sequences and Series, Taylor series	13
TOTAL HOURS	**36**

See accompanying page for a detailed breakdown of instructional hours.

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Detailed breakdown of instructional hours
Math 267 University Calculus II

	Hours
TECHNIQUES OF INTEGRATION	
Review: Indefinite integral, u-substitution	(0.5)
Integration by parts	(1.5)
Trigonometric integrals	(1)
Trigonometric substitutions	(1)
Integral of rational functions using partial fractions	(2)
APPLICATIONS OF INTEGRATION	
Review: Area, Riemann sum and the definite integral, Area between curves	(1)
Volume of solid – Slicing	(1)
Volume of solid of revolution – Shell method	(1)
Length of arc	(0.5)
Area of surface of revolution	(0.5)
PARAMETRIC EQUATIONS	
Parametric equations	(1)
Calculus of parametric equations	(2)
PARTIAL DIFFERENTIATION AND DOUBLE INTEGRATION	
Functions of several variables and partial derivatives	(2)
Partial differentiation and the Chain rule	(2)
Double integral, iterated integration (Rectangular coordinates)	(3)
Double Integration in polar coordinate system	(3)
SEQUENCES AND SERIES	
Sequences and convergence	(1)
Monotone Convergence Theorem	(1)
Infinite series, convergence, geometric series, n-th term test	(1)
Series of positive terms. Integral test. Harmonic p-series	(1)
Series of positive terms. Comparison test and Limit Comparison Test	(1.5)
Series of positive terms. Ratio test and Root test	(1.5)
Alternating series test	(1)
Absolute convergence and conditional convergence	(1)
Power series, Radius of convergence, interval of convergence	(1)
Manipulating power series, differentiation and integration	(1)
Taylor series and Maclaurin series	(1)
Applications	(1)
	Total = (36)

Course Outcomes

Overview. This course is a continuation of Math 265 (University Calculus I). We shall build upon the knowledge and skills acquired in Math 265 to learn about further topics in Calculus. Specifically, by the end of this course students should be able to

1. use the language and notion of integral calculus, and apply the key concepts to compute integrals of functions of several real variables.

2. explore the relationship between key calculus concepts and their geometric representation, and seek to apply calculus techniques to a wide variety of practical problems.

3. recognize that not only the technology can be used to achieve some desired results; but also it has limitations.

Subject specific knowledge.

4. **Techniques of Integration**. Students will be able to calculate indefinite integrals using techniques covered in the course.

5. **Applications of Integration**. Students will be able to set up and calculate an appropriate definite integral in order to evaluate the volume of a solid, the length of a curve, and the area of a surface of revolution.

6. **Partial Differentiation and Double Integration**. Students will be able to explain the notion of a function of several variables, its graph, cross-sections, and level curves/surfaces. Students will be able to evaluate partial derivatives and double integrals, and will be able to demonstrate the geometric significance of these concepts.

7. **Sequences and Series**. Students will be able to identify sequences and series, determine convergence by applying a suitable test or theorem covered in the course and contrast between absolute and conditional convergence. Students will be able to determine a Taylor series, analyze the error of Taylor polynomial approximations and compute the radius and interval of convergence of a power series.

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