



ROCHESTER INSTITUTE OF TECHNOLOGY
COURSE OUTLINE FORM
COLLEGE OF SCIENCE

School of Mathematical Sciences

☒ **New** ☐ **Revised** **COURSE: COS-MATH-173 Calculus C**

1.0 Course designations and approvals:

Required Course Approvals:	Approval Request Date	Approval Grant Date
Academic Unit Curriculum Committee	4-08-10	4-15-10
College Curriculum Committee	11-01-10	11-17-10

Optional Course Designations:	Yes	No	Approval Request Date	Approval Grant Date
General Education	✓			
Writing Intensive		✓		
Honors		✓		

2.0 Course information:

Course Title: Calculus C
Credit Hours: 3
Prerequisite(s): C or better in COS-MATH-172
Co-requisite(s): None
Course proposed by: School of Mathematical Sciences
Effective date: Fall 2013

	Contact Hours	Maximum Students/section
Classroom	3	35
Lab		
Workshop	2	35
Other (specify)		

2.1 Course conversion designation: (Please check which applies to this course)

- ☐ Semester Equivalent (SE) to:
☒ Semester Replacement (SR) to: 1016-283 and parts of 1016-305
☐

2.2 Semester(s) offered:

- ☒ Fall ☒ Spring ☒ Summer
☐ Offered every other year only ☐ Other

2.3 Student requirements:

Students required to take this course: (by program and year, as appropriate)

Second-year Engineering, Chemistry, Physics, Biomedical Computing, Bioinformatics, Imaging Science, Mathematics, Statistics, Computer Science, Engineering Technology, and Economics majors whose progress in previous courses indicate that this is the appropriate course

Students who might elect to take the course:

Business Administration and Information Technology Majors as well as majors in other areas who want to continue a study of calculus

3.0 Goals of the course: (including rationale for the course, when appropriate)

- 3.1 To practice the techniques of algebra, geometry and trigonometry by solving calculus problems.
- 3.2 To learn the basic definitions, concepts, rules, vocabulary, and mathematical notation of calculus.
- 3.3 To provide the necessary manipulative skills required for solving problems in calculus.
- 3.4 To provide knowledge and appreciation of calculus as a tool in solving technical and applied physical problems.
- 3.5 To provide a background in mathematics which can be used for the study of science and engineering.

4.0 Course description: (as it will appear in the RIT Catalog, including pre- and co-requisites, semesters offered)

COS-MATH-173

Calculus C

This is the third course in a three-course sequence (COS-MATH-171, -172, -173) that covers the topics in Project-Based Calculus I and II. This course includes representations of functions by infinite series, convergence and divergence of series, curves defined by parametric equations, and polar coordinates. (C or better in COS-MATH-172) **Class 3, Workshop 2, Credit 3 (F, S)**

5.0 Possible resources: (texts, references, computer packages, etc.)

- 5.1 J. Stewart, *Calculus: Early Transcendentals*, Brooks/Cole, Belmont, CA.

6.0 Topics: (outline) Topics with an asterisk(*) are at the instructor's discretion, as time permits

6.1 Techniques of Integration

- 6.1.1 Review of substitution, integration by parts, and trigonometric integrals
- 6.1.2 Trigonometric substitution
- 6.1.3 Integration of rational functions by partial fractions
- 6.1.4 Improper integrals and comparison theorems

6.2 Parametric Equations and Polar Coordinates

- 6.2.1 Plane curves defined by parametric equations
- 6.2.2 Calculus with parametric curves

- 6.2.3 Polar coordinates and graphing
- 6.2.4 Area and arc length in polar coordinates
- 6.2.5 Conic sections in Cartesian coordinates
- 6.2.6 Conic sections in polar coordinates*

6.3 Infinite Sequences and Series

- 6.3.1 Sequences
- 6.3.2 Infinite series
- 6.3.3 The integral test and estimates of sums
- 6.3.4 The comparison tests
- 6.3.5 Alternating series
- 6.3.6 Absolute convergence
- 6.3.7 The Ratio Test and the Root Test
- 6.3.8 Power series
- 6.3.9 Taylor and Maclaurin series, and intervals of convergence
- 6.3.10 Binomial Series

7.0 Intended learning outcomes and associated assessment methods of those outcomes:

Learning Outcomes	Assessment Methods				
	Homework	Quiz/Exam/Final	Project	Computer Work	Class Presentation
7.1 Define basic concepts and notations of calculus	✓	✓			
7.2 Demonstrate the manipulative skills required to solve problems in calculus	✓	✓			
7.3 Apply calculus to physical problems	✓	✓			
7.4 Represent functions by infinite series and determine convergence and divergence of the series	✓	✓			

8.0 Program goals supported by this course:

- 8.1 To develop an understanding of the mathematical framework that supports engineering, science, and mathematics.
- 8.2 To develop critical and analytical thinking.
- 8.3 To develop an appropriate level of mathematical literacy and competency.
- 8.4 To provide an acquaintance with mathematical notation used to express physical and natural laws.

9.0 General education learning outcomes and/or goals supported by this course:

		Assessment Methods				
		Homework	Quiz/Exam/Final	Project	Computer Work	Class Presentation
General Education Learning Outcomes						
9.1	Communication					
	Express themselves effectively in common college-level written forms using standard American English					
	Revise and improve written and visual content					
	Express themselves effectively in presentations, either in spoken standard American English or sign language (American Sign Language or English-based Signing)					
	Comprehend information accessed through reading and discussion					
9.2	Intellectual Inquiry					
	Review, assess, and draw conclusions about hypotheses and theories					
	Analyze arguments, in relation to their premises, assumptions, contexts, and conclusions					
	Construct logical and reasonable arguments that include anticipation of counterarguments					
	Use relevant evidence gathered through accepted scholarly methods and properly acknowledge sources of information					
9.3	Ethical, Social and Global Awareness					
	Analyze similarities and differences in human experiences and consequent perspectives					
	Examine connections among the world's populations					
	Identify contemporary ethical questions and relevant stakeholder positions					
9.4	Scientific, Mathematical and Technological Literacy					
	Explain basic principles and concepts of one of the natural sciences					
	Apply methods of scientific inquiry and problem solving to contemporary issues					
✓	Comprehend and evaluate mathematical and statistical information	✓	✓			
✓	Perform college-level mathematical operations on quantitative data	✓	✓			
	Describe the potential and the limitations of technology					
	Use appropriate technology to achieve desired outcomes					
9.5	Creativity, Innovation and Artistic Literacy					

		Assessment Methods				
		Homework	Quiz/Exam/Final	Project	Computer Work	Class Presentation
General Education Learning Outcomes						
	Demonstrate creative/innovative approaches to course-based assignments or projects					
	Interpret and evaluate artistic expression considering the cultural context in which it was created					

10.0 Other relevant information: (such as special classroom, studio, or lab needs, special scheduling, media requirements, etc.)

10.1 Smart classroom

10.2 Workshop room equipped with tables and chairs to accommodate groups of 3 or 4 students

10.3 SMS Calculator Policy:

All electronic devices are prohibited on the final exam for this course.