ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

COMMON COURSE OUTLINE

Course discipline/number/title: MATH 1128: Calculus II

A. CATALOG DESCRIPTION
1. Credits: 5
2. Hours/Week: 5
3. Prerequisites (Course discipline/number): MATH 1127
4. Other requirements: None
5. MnTC Goals (if any): Goal 4/Mathematics/Logical Reasoning

B. COURSE DESCRIPTION: This course is a second semester calculus course including topics of: inverse functions (exponential, logarithmic, trigonometric, etc.), techniques of integration, applications including arc length, surface area, force, and centers of mass, parametric forms including polar forms, sequences and series including Taylor series. College level reading skills as demonstrated by completion of READ 0900 or equivalent placement score.

C. DATE LAST REVISED (Month, year): February, 2021

D. OUTLINE OF MAJOR CONTENT AREAS:
1. Transcendental functions including exponential and logarithmic
2. Calculus of inverse functions and their derivatives
3. Calculus of inverse trigonometric functions including derivative and integration forms
4. Calculus of hyperbolic functions and their inverses including derivative and integration by parts, trigonometric
5. Techniques of integration including:
   a) Substitution
   b) Integration by parts
   c) Trigonometric forms with substitution
   d) Rational form in trigonometry
   e) Partial fractions
   f) Rational form in trigonometry
   g) Generalized function substitutions
6. Applications of integration including arc length, surface area of rotation, hydrostatic force, and centroids of mass, expected values, and variances.
7. Graphing in parametric forms with an emphasis on polar forms in two variables
8. Infinite sequences and series, convergence and divergence, including Taylor series.
9. Separable and Linear First Order Ordinary Differential Equations
10. Numerical Approximation Methods

E. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Differentiate and integrate various functions and their inverses including trigonometric, exponential, logarithmic and hyperbolic.
2. Recognize and integrate functions using techniques including: u-substitution, integration by parts, trigonometric forms, trigonometric substitution, rational form in trigonometry, partial fractions with linear, quadratic and repeated factors, and other miscellaneous function substitutions.
3. Apply L'Hopitals rule to evaluate indeterminate forms of limits.
4. Evaluate convergence and divergence of improper integrals.
5. Solve differential equations including variables separable and first order linear differential equations with applications including position-velocity-acceleration, mixing, growth and decay, logistic growth.
6. Recognize sequence and series patterns and apply tests for convergence and divergence.
7. Derive and use Taylor and McLaurin series for differentiable functions.
8. Know parametric forms and polar forms of graphing as compared to Cartesian with respect to symmetries, area, tangent lines and surface area.
9. Calculate numerical estimates of calculus operations using tools such as Newton's Method, Midpoint Rule, Trapezoid Rule, or Simpson's Rule.

F. LEARNING OUTCOMES (MNTC):
Goal 4/ Mathematics/Logical Reasoning: The student will be able to:
1. Illustrate historical and contemporary applications of mathematics/logical systems.

F. LEARNING OUTCOMES (MNTC): Continued. . .
2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument (proof).
4. Apply higher-order problem solving and/or modeling strategies.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Quizzes
2. Homework
3. Projects
4. Papers
5. Group work
6. Examinations

H. RCTC CORE OUTCOME(S) ADDRESSED:
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):
1. Graphing Calculator required. (Texas Instruments Recommended)