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 and/or successful completion of Calculus 1; College Level Reading
4. Co-requisites (Course discipline/number): None
5. MnTC Goals (if any): Goal 2/Critical Thinking, Goal 4/Mathematics/Logical Reasoning

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.

B. DATE LAST REVISED (Month, year): January, 2014

C. 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: memory forms, substitution, integration by parts, trigonometric forms with substitution, partial fractions, rational form in trigonometry, miscellaneous substitutions
6. Applications of integration including arc length, surface area of rotation, hydrostatic force, and centroids of mass.
7. Graphing in parametric forms with an emphasis on polar forms in two variables and infinite sequences and series including Taylor series.

D. 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: memory forms, substitution, integration by parts, trigonometric forms, trigonometric substitution, rational form in trigonometry or the Weierstrass substitution, partial fractions with linear, quadratic and repeated factors, and other miscellaneous 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 patterns and apply convergence and divergence.
7. Recognize patterns of common infinite series and apply convergence and divergence.
8. Derive and use Taylor and McLaurin series for differentiable functions.
9. Recognize and identify aspects of conic sections including: parabolas (vertex, focus, axis of symmetry, directrix), circles (center and radius), ellipses (center, major/minor axes, foci, and vertices), and hyperbolas (center, foci, transverse and conjugate axis), all with eccentricity. Also know the calculus, differentiability and integrability as they apply to the conic sections.
10. Know parametric forms and polar forms of graphing as compared to Cartesian with respect to symmetries, area, tangent lines and surface area

E. LEARNING OUTCOMES (MNTC):
Goal 2/Critical Thinking: The student will be able to:
1. Gather factual information and apply it to a given problem in a manner that is relevant, clear comprehensive, and conscious of possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.
4. Recognize and articulate the value assumptions, which underlie and affect decisions, interpretations, analyses, and evaluations made by ourselves and others.
E. LEARNING OUTCOMES (MNTC): Continued.
Goal 4/Mathematics/Logical Reasoning: The student will be able to:
1. Illustrate historical and contemporary applications of mathematics/logical systems.
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.

F. METHODS FOR EVALUATION OF STUDENT LEARNING:
1. Objective and short answer tests
2. Quizzes
3. Homework
4. Projects
5. Papers
6. Group work

G. RCTC CORE OUTCOME(S)/addressed:
[ ] Communication  [ ] Civic Responsibility
[ ] Critical Thinking  [ ] Personal/Professional Accountability
[ ] Global Awareness/Diversity  [ ] Aesthetic Response

H. SPECIAL INFORMATION (if any):
1. Additional fees may be required for field trips.
2. A graphics calculator (TI supported) is required.