MASTER COURSE OUTLINE

A. MATH 1220 Calculus II

B. COURSE DESCRIPTION:

The second-semester course in this calculus sequence focuses on applications of the definite integral, inverse functions and their derivatives, differentiation and integration of logarithmic, exponential, trigonometric, inverse trigonometric, hyperbolic, and inverse hyperbolic functions, techniques of integration, improper integrals; conic sections, polar coordinates, sequences, series, and convergence tests. Prerequisite: MATH 1210 with a grade of C or better.
MnTC (Goals 4/MA and 2/CT); (5 Cr – 5 lect, 0 lab)

C. *MnTC Discipline: Mathematical/Logical Reasoning **Core Theme: Critical Thinking

D. MAJOR CONTENT AREAS:

- Applications of Integration
  - Areas
  - Volume
  - Work
  - Arc length
  - Average value
  - Fluid forces
  - Center of mass

- Logarithmic and Exponential Functions
  - Inverse functions
  - Logarithmic and exponential functions
  - Exponential Models
  - Inverse Trigonometric Functions
  - Growth Rates of functions
  - Hyperbolic Functions

- Integration Techniques
  - Integration by Parts
  - Trigonometric integrals
  - Trigonometric substitution
  - Additional techniques of integration
  - Approximate integration
  - Improper integrals

- Conic sections and polar coordinates
  - Parametric equations
  - Polar coordinates
  - Conic sections

- Infinite Sequences and Series
  - Sequences
  - Series
  - Convergence tests
  - Power series
  - Taylor and Maclaurin Series

E. GOAL TYPES, OBJECTIVES, AND OUTCOMES:

GOAL	**OBJECTIVES** **Students will be able to**	**OUTCOMES** **The student will successfully**
MnTC Goal 4a	illustrate historical and contemporary applications of mathematical/logical systems.	1. discuss applications of differential and integral calculus.
MnTC Goal 4c	explain what constitutes a valid mathematical/logical argument (proof).	1. use applicable definitions and theorems to prove other theorems or results. 2. discuss the development and proof of the substitution of partial fractions to reduce an integral into solvable form.
MnTC Goal 4d	apply higher-order problem-solving and/or modeling strategies.	1. use modeling strategies to solve problems in integral calculus.
MnTC Goal 2a	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.	1. use a variety of mathematical tests to determine the convergence or divergence of series. 2. recognize that some tests fail, leading to further testing or the determination that the behavior of a series cannot be predicted.
MnTC Goal 2b	imagine and seek out a variety of possible goals, assumptions, interpretations, of perspectives which can give alternative meanings or solutions to given situations or problems.	1. evaluate the volume of a solid figure using a variety of methods and determine which method is most efficient.
MnTC Goal 2c	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.	1. analyze problems of an indeterminate form and use learned methods to evaluate implications of indeterminate forms.
CS	demonstrate mastery in calculating integrals.	1. calculate integrals using techniques such as u-substitution, integration by parts, trigonometric substitution, and partial fractions.
CS	solve applied problems using integrals.	1. use definite integrals to solve problems such as finding area, work, volume, arc length, fluid forces, and center of mass.

CS	approximate definite integrals.	1. approximate definite integrals using Simpson's Rule and/or the Trapezoidal Rule.
CS	demonstrate mastery of sequences and series.	1. find Taylor series representations of basic functions. 2. apply the definition of convergence to calculate the limit of a sequence or the sum of a convergent series.
CS	demonstrate knowledge of convergence of improper integrals.	1. discuss convergence or divergence of an improper integral.
CS	demonstrate knowledge of parametric curves.	1. find the slope of a tangent line to a parametric curve.
CS	demonstrate competency in working with functions in polar coordinates.	1. graph functions in polar coordinates and find slopes of tangent lines.

F. SPECIAL INFORMATION:

This course may require use of the Internet, the submission of electronically prepared documents and the use of a course management software program. Students who have a disability and need accommodations should contact the instructor or the Student Success Center at the beginning of the semester. This information will be made available in alternative format, such as Braille, large print, or current media, upon request. A graphing calculator is required.

G. COURSE CODING INFORMATION: Course Code A/Class Maximum 48; Letter Grade

Revision date: 10/10/17
AASC Approval date: 11/21/17

***Riverland Community College Disciplines**	**MnTC Goal Number**
Communication (CM)	**1**
Natural Sciences (NS)	**3**
Mathematics/Logical Reasoning (MA)	**4**
History and the Social & Behavioral Sciences (SS)	**5**
Humanities and Fine Arts (HU)	**6**

****Riverland Community College Core Themes**	**MnTC Goal Number**
Critical Thinking (CT)	**2**
Human Diversity (HD)	**7**
Global Perspective (GP)	**8**
Ethical and Civic Responsibility (EC)	**9**
People and the Environment (PE)	**10**

*These five MnTC Goals have been identified as Riverland Community College Disciplines.
** These five MnTC Goals have been identified as Riverland Community College Core Themes.
NOTE: The Minnesota Transfer Curriculum “10 Goal Areas of Emphasis” are reflected in the five required discipline areas and five core themes noted in the Riverland Community College program of study guide and/or college catalog.