MERRITT COLLEGE COURSE OUTLINE

COLLEGE:		**STATE APPROVAL DATE:**	09/27/2010
ORIGINATOR:	Tae-Soon Park	**STATE CONTROL NUMBER:**	CCC00035 7482
		BOARD OF TRUSTEES APPROVAL DATE:	01/26/2016
		CURRICULUM COMMITTEE APPROVAL DATE:	09/11/2014
		CURRENT EFFECTIVE DATE:	06/28/2017

DIVISION/DEPARTMENT:

1. REQUESTED CREDIT CLASSIFICATION:

Credit - Degree Applicable
Course is not a basic skills course.
Program Applicable

2. DEPT/COURSE NO: MATH 003B

3. COURSE TITLE: Calculus II

4. COURSE: MC Course Changes only in Non-catalog Info

TOP NO. 1701.00

5. UNITS: 5.000

HRS/WK LEC: 5.00 **Total:** 87.50
HRS/WK LAB:

6. NO. OF TIMES OFFERED AS SELETED TOPIC: **AVERAGE ENROLLMENT:**

7. JUSTIFICATION FOR COURSE:

Course satisfies GE area 4b requirements as well as UC/CSU transfer requirements and degree requirements in Mathematics, and provides a foundation for more advanced students in mathematics and related fields (e.g., physics).

8. COURSE/CATALOG DESCRIPTION

Applications of the definite integral: Methods of integration, polar coordinates, parametric equations, infinite series and power series.

9. OTHER CATALOG INFORMATION

a. Modular: No If yes, how many modules:
b. Open entry/open exit: No
c. Grading Policy: Letter Grade Only
d. Eligible for credit by Exam: No
e. Repeatable according to state guidelines: No
f. Required for degree/certificate (specify):
Mathematics, Mathematics
g. Meets GE/Transfer requirements (specify):
AA/AS area 4b, CSU area B4, IGETC area 2
h. C-ID Number: MATH 220 Expiration Date: 07/26/2015

i. Are there prerequisites/corequisites/recommended preparation for this course? Yes
Date of last prereq/coreq validation: 09/07/2014
j. Acceptable for Credit: CSU/UC

10. LIST STUDENT PERFORMANCE OBJECTIVES (EXIT SKILLS): (Objectives must define the exit skills required of students and include criteria identified in Items 12, 14, and 15 - critical thinking, essay writing, problem solving, written/verbal communications, computational skills, working with others, workplace needs, SCANS competencies, all aspects of the industry, etc.)(See SCANS/All Aspects of Industry

Worksheet.)

Students will be able to:

1. Evaluate definite and indefinite integrals using several methods.
2. Use integration to find areas and volumes.
3. Use integration to compute work, arc length, area of a surface of revolution, moments and centers of mass.
4. Evaluate improper integrals.
5. Determine convergence or divergence of infinite sequences and series.
6. Write functions in infinite series form
7. Represent functions in power series form.
8. Integrate and differentiate using infinite series.
9. Graph, differentiate and integrate functions in polar and parametric form.
10. Use polar coordinates in integration and in finding arc length and areas.
11. Find partial derivatives.
12. Apply the above principles to related fields (e.g., physics) and to continued study in mathematics.
13. Assess given information, explore alternative approaches, and arrive at conclusions based on evidence and the application of applicable concepts.

11A. COURSE CONTENT: List major topics to be covered. This section must be more than listing chapter headings from a textbook. Outline the course content, including essential topics, major subdivisions, and supporting details. It should include enough information so that a faculty member from any institution will have a clear understanding of the material taught in the course and the approximate length of time devoted to each. There should be congruence among the catalog description, lecture and/or lab content, student performance objectives, and the student learning outcomes. List percent of time spent on each topic; ensure percentages total 100%.

LECTURE CONTENT:

1. Areas and Volumes 20%
a. Numerical integration using Trapezoid Rule and Simpson's Rule
b. Areas between curves
c. Volume, volume of a solid of revolution
d. Additional applications such as work, arc length, area of a surface of revolution, moments and centers of mass

2. Techniques of Integration: 20%
a. Integration by parts
b. Trigonometric substitutions
c. Integrals of rational functions
d. Integrals involving quadratic expressions
e. Miscellaneous substitutions
f. Tables of integrals

3. Indeterminate Forms, Improper Integrals, and Taylor's Formulas: 15%
a. Indeterminate forms, 0/0 and infinity/infinity
b. Other indeterminate forms
c. Integrals with infinite limits of integration
d. Integrals with discontinuous integrands
e. Taylor's formula

4. Infinite Sequences and Series: 20%
a. Infinite sequences
b. Convergent or divergent infinite series
c. Positive-term series
d. The ratio and root series
e. Alternating series and absolute convergence
f. Power series; radius and interval of convergence
g. differentiation and integration of power series
h. Power series representation of functions
i. Taylor series, Maclaurin series
j. The binomial series

5. Plane Curves and Polar Coordinates: 20%
a. Plane Curves and parametric equations
b. Calculus with parametric curves
c. Polar coordinates

d. Integrals in polar coordinates
e. Polar equations of conics

6. Partial Differentiation: 5%
a. Functions of several variables
b. Partial derivatives

11B. LAB CONTENT:
n/a

12. METHODS OF INSTRUCTION (List methods used to present course content.)

1. Lecture
2. Projects
3. Other (Specify)
4. Activity
5. Discussion

Other Methods:
Demonstrations which emphasize alternative approaches and their underlying rationale

13. ASSIGNMENTS: 0.00 hours/week (List all assignments, including library assignments. Requires two (2) hours of independent work outside of class for each unit/weekly lecture hour. Outside assignments are not required for lab-only courses, although they can be given.)

Out-of-class Assignments:
1. Assigned reading and project(s). 2. Solving problem sets equivalent in content and level of difficulty to those covered in the lectures. 3. Solving problems that introduce supplemental concepts and formulas and require synthesizing of various concepts.

ASSIGNMENTS ARE: (See definition of college level):
Primarily College Level

14. STUDENT ASSESSMENT: (Grades are based on):
COMPUTATION SKILLS
NON-COMPUTATIONAL PROBLEM SOLVING (Critical thinking should be demonstrated by solving unfamiliar problems via various strategies.)
SKILL DEMONSTRATION
OTHER (Describe):
Quizzes, unit tests, examinations, project(s), and final exam which include problem solving questions where students demonstrate their ability to devise, organize and present complete solutions to problems.

Why "ESSAY" is not checked:
Assessment techniques employed are those typical for lower-division (transferable) college math courses, involving primarily skill-based classroom exams and homework assignments, many of which require critical thinking skills. Lengthy essays are not part of the classroom assignments in this course.

15. TEXTS, READINGS, AND MATERIALS

A. Textbooks:

Larson,Ron and Edwards, Bruce H. 2014. *Calculus* 10th . Cengage Learning
Rationale: -

Stewart, J. 2012. *Calculus: Early Transcendentals* 7th. Cengage Learning

*Date is required: Transfer institutions require current publication date(s) within 5 years of outline addition/update.

B. Additional Resources:

Library/LRC Materials and Services:

The instructor, in consultation with a librarian, has reviewed the materials and services of the College Library/LRC in the subject areas related to the proposed new course

Are print materials adequate? Yes

Are nonprint materials adequate? No

Are electronic/online resources available? No

Are services adequate? Yes

Specific materials and/or services needed have been identified and discussed. Librarian comments:

C. Readings listed in A and B above are: (See definition of college level):

Primarily college level

16. DESIGNATE OCCUPATIONAL CODE:
E - Non-Occupational

17. LEVEL BELOW TRANSFER:
Y - Not Applicable

18. CALIFORNIA CLASSIFICATION CODE:
Y - Credit Course

19. NON CREDIT COURSE CATEGORY:
Y - Not Applicable

20. FUNDING AGENCY CATEGORY:
Not Applicable - Not Applicable

SUPPLEMENTAL PAGE

Use only if additional space is needed. (Type the item number which is to be continued, followed by "continued." Show the page number in the blank at the bottom of the page. If the item being continued is on page 2 of the outline, the first supplemental page will be "2a." If additional supplemental pages are required for page 2, they are to be numbered as 2b, 2c, etc.)

1a. Prerequisites/Corequisites/Recommended Preparation:

PREREQUISITE:
- MATH 003A: Calculus I or (4B)

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STUDENT LEARNING OUTCOMES

1. **Outcome:** Utilize integration to determine areas, volumes, lengths, and work.
   This outcome maps to the following Institution Outcomes:
   • Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
   • Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

   Assessment: exam, student project, written exercise, skill demonstration

2. **Outcome:** Apply intermediate integration techniques to solve an expanded class of integrals.
   This outcome maps to the following Institution Outcomes:
   • Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
   • Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

Assessment: exam, student project, written exercise, skill demonstration

3. **Outcome:** Solve problems using parametric and polar representations of functions.
   This outcome maps to the following Institution Outcomes:
   • Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
   • Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

   Assessment: exam, student project, written exercise, skill demonstration

4. **Outcome:** Use power series approximation of functions to predict behavior of real world phenomena.
   This outcome maps to the following Institution Outcomes:
   • Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
   • Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

   Assessment: exam, student project, written exercise, skill demonstration

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