SYLLABUS

DATE OF LAST REVIEW: 09/2019

CIP CODE: 24.0101

SEMESTER: Departmental Syllabus

COURSE TITLE: Calculus and Analytic Geometry II

COURSE NUMBER: MATH0123

CREDIT HOURS: 5

INSTRUCTOR: Departmental Syllabus

OFFICE LOCATION: Departmental Syllabus

OFFICE HOURS: Departmental Syllabus

TELEPHONE: Departmental Syllabus

EMAIL: Departmental Syllabus
KCKCC issued email accounts are the official means for electronically communicating with our students.

PREREQUISITE(S): Students need to meet the correct placement measure for this course, or receive a grade of "C" or higher in MATH0122 Calculus and Analytic Geometry I

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, http://kckccbookstore.com for the required text for your particular class. The TI-83 or 84 series graphing calculator is required.

COURSE DESCRIPTION: Calculus & Analytic Geometry II is designed for students in mathematics, hard sciences, and engineering. Content includes calculus of transcendental functions, differential equations, applications of integration, integration techniques, infinite series, conic sections, and parametric and polar equations. Students will be expected to use appropriate technology as one tool to achieve competency in Calculus and Analytic Geometry II.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:

I. Applications of Integration
   - A. Area
   - B. Volume
     1. Disk and washer
     2. Shell
   - C. Arc length
   - D. Surface area

E. Work
F. Moments, centroid, and center of mass
G. Fluid pressure and force

II. Integration Techniques, L'Hopital's rule, and Improper Integrals
A. Basic rules
B. Integration by parts
C. Trigonometric integrals
D. Trigonometric substitution
E. Partial fractions
F. Tables
G. L'Hopital's rule
H. Indeterminate forms
I. Improper integrals
1. Infinite limits
2. Infinite discontinuities

III. Infinite Series
A. Sequences
B. Convergence of series
1. Nth term test
2. Integral test
3. Comparison tests
4. Alternating series test
5. Ratio and root tests
C. Geometric series
D. Harmonic and p-series
E. Alternating series
F. Conditional convergence
G. Taylor and Maclaurin polynomials
H. Power series
I. Application of power series
J. Binomial series

IV. Rectangular and Parametric Equations, and Polar Coordinates
A. Conic sections
B. Parametric equations
C. Calculus of parametric equation
1. Differentiation
2. Arc length and surface area
D. Polar coordinates and equations
E. Calculus of polar equations
1. Differentiation
2. Area
3. Arc length and surface area
F. Polar equation of conics

EXPECTED LEARNER OUTCOMES:

A. The student will be able to solve a variety of applications using definite integrals.
B. The student will be able to evaluate a variety of integrals using integration techniques.
C. The student will be able to represent functions with power, Taylor, and Maclaurin series.

D. The student will be able to represent curves with rectangular and parametric equations and polar coordinates.

COURSE COMPETENCIES:
Upon successful completion of the course:

The student will be able to solve a variety of applications using definite integrals.

1. The student will be able to find the area of a region bounded by curves using a definite integral.
2. The student will be able to find the volume of a solid of revolution using the disk or washer method.
3. The student will be able to find the volume of a solid of revolution using the shell method.
4. The student will be able to find the arc length of a graph over a given interval.
5. The student will be able to find the area of a surface of revolution.
6. The student will be able to determine the work done by a constant or a variable force.
7. The student will be able to find the moments, centroid, and the center of mass for a given system.
8. The student will be able to find the fluid pressure and fluid force on a surface.

The student will be able to evaluate a variety of integrals using integration techniques.

9. The student will be able to fit integrands to basic rules.
10. The student will be able to evaluate integrals using integration by parts.
11. The student will be able to evaluate integrals involving trigonometric functions.
12. The student will be able to evaluate integrals using trigonometric substitutions.
13. The student will be able to evaluate integrals using partial fractions with linear and quadratic factors.
14. The student will be able to evaluate integrals using tables.
15. The student will be able to apply L'Hopital's rule to limits of indeterminate forms.
16. The student will be able to evaluate limits of indeterminate forms.
17. The student will be able to evaluate improper integrals with infinite limits.
18. The student will be able to evaluate improper integrals with infinite discontinuities.

The student will be able to represent functions with power, Taylor, and Maclaurin series.

19. The student will be able to list the terms and find the limit of a sequence.
20. The student will be able to determine if a series is convergent or divergent using the n-th term test.
21. The student will be able to determine if a series is convergent or divergent using the integral test.
22. The student will be able to determine if a series is convergent or divergent using comparison tests.
23. The student will be able to determine if a series is convergent or divergent using the alternating series test.
24. The student will be able to determine if a series is convergent or divergent using the ratio and root tests.
25. The student will be able to identify a geometric series and find its sum if convergent.
26. The student will be able to identify the p-series and the harmonic series.
27. The student will be able to use the alternating series test.
28. The student will be able to classify a series as absolutely or conditionally convergent.
29. The student will be able to find Taylor and Maclaurin polynomials.
30. The student will be able to find the radius and interval of convergence of a power series.
31. The student will be able to differentiate and integrate power series.
32. The student will be able to use the binomial series.

The student will be able to represent curves with rectangular and parametric equations and polar coordinates.

33. The student will be able to identify main characteristics of the conic sections.
34. The student will be able to sketch a curve described by parametric equations.
35. The student will be able to differentiate parametric equations to find slope and concavity of a parametric curve.
36. The student will be able to differentiate parametric equations to find arc length and surface area.

37. The student will be able to describe the graphs of polar curves.
38. The student will be able to differentiate and integrate a polar function to find the slope of a polar curve.
39. The student will be able to differentiate and integrate a polar function to find the area bounded by a polar curve.
40. The student will be able to differentiate and integrate a polar function to find arc length and surface area.
41. The student will be able to sketch a conic from its polar equation.

ASSESSMENT OF LEARNER OUTCOMES:
Student progress is evaluated by means that include, but are not limited to, exams, written assignments, and class participation.

SPECIAL NOTES:
Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student's progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college's policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the disabilities services office at (913) 288 - 7664.

All enrolled students at Kansas City Kansas Community College are subject to follow all rules, conditions, policies and procedures as described in both the Student Code of Conduct as well as the Student Handbook. All Students are expected to review both of these documents and to understand their responsibilities with regard to academic conduct and policies. The Student Code of Conduct and the Student Handbook can be found on the KCKCC website.