JOLIET JUNIOR COLLEGE 1901

Dept. of Mathematics

Math 171 Calculus w/Analytic Geometry II
Spring 2018

Instructor's Name:

Office Location:

Office Hours:

Office Phone:

E-mail:

Course Description
This is the second course in calculus and analytic geometry. Topics include: techniques of integration, applications of the definite integral, and introduction to differential equations and infinite series.

Illinois Articulation Initiative (IAI) number: M1 900-2

Credit and Contact Hours:

Lecture	**4**
Lab	**0**
Credit Hours	**4**

Prerequisites: Satisfactory placement test score or grade of "C" or better in Math 170 or equivalent

Books, Supplies, and Supplementary Materials

A. Textbooks

Required: Calculus Early Transcendentals, 8th Ed., 2015, Stewart, ISBN: 9781285741550, Cengage

Single Variable Calculus student solutions manual (optional), Stewart, ISBN: 9781305272422, Cengage

Multivariable Calculus student solutions manual (optional), Stewart, ISBN: 9781305271821, Cengage

B. Other Required Materials

TI-83+ or TI-84+ graphing calculator or equivalent

Methods of Instruction:
Lecture

Student Learning Outcomes: General Education Student Learning Outcomes:
Students will demonstrate the ability to accurately apply correct mathematical methods and techniques in various applications such as applied sciences, theoretical mathematics, physics, natural sciences and other applied sciences.

Objectives

1. Apply properties of the definite integral
2. Use the Fundamental Theorem of Calculus to evaluate definite integrals
3. Integrate functions including substitution using trigonometric substitutions
4. Integrate functions using Integration by Parts
5. Integrate rational functions using Partial Fractions
6. Integrate using Tables of Integrals
7. Approximate definite integrals using Riemann sums, the Midpoint Rule, the Trapezoid Rule, and Simpson's Rule
8. Determine the error in the above approximations
9. Determine the convergence of the various types of improper integrals; evaluate or approximate convergent improper integrals
10. Given a direction for a function, deduce the properties of an antiderivative

11. Set up Riemann Sums to model applications
12. Use definite integrals to solve applied problems in geometry (volumes, arc length, areas between curves, surface areas)
13. Use definite integrals to solve applied problems in physics (work, force)
14. Determine whether a given function is a solution for a given differential equation
15. Given the direction field of a first-order differential equation, plot solution curves through given points
16. Approximate the value of a function y at a number x given y as a function of x and y using Euler's Method
17. Solve a differential equation by Separation of Variables
18. Use differential equations to solve applied problems in physics and population growth (optional)
19. Find the average value of a function
20. Find the Taylor polynomial of a given degree for a given function.

21. Find the Taylor series for a given function at the number, a, and estimate its interval of convergence
22. Determine the interval of convergence of a series using the limit ratio test
23. Determine bounds for the error in a Taylor series approximation
24. Determine the convergence of a series of constants by the comparison test
25. Determine the convergence of a series of constants by the ratio test
26. Determine the convergence of a series of constants by the integral test
27. Sketch a curve given by parametric equations
28. Find the Cartesian equation of a curve given by parametric equations

29. Find derivatives for curves given by parametric equations
30. Find surface areas generated by rotating about the x-axis curves given by parametric equations

31. Plot points given by polar coordinates and graph equations given by polar equations
32. Convert between Cartesian coordinates and polar coordinates
33. Find derivatives for curves given by polar equations
34. Graph the conic sections using Cartesian coordinates
35. Determine whether a sequence converges or diverges
36. Generate terms of a square given the general term and vice versa
37. Find partial sums of series
38. Determine the convergence of a series of constants by the root test
39. Determine the convergence of a series of constants by the alternating series test
40. Approximate sums of series using the alternating series estimation theorem
41. Find the power series representation for a function
42. Find the radius of convergence and interval of convergence for power series
43. Use the binomial series to expand functions as power series

TOPICAL OUTLINE

Based on a 16 week semester with 64 lectures of 60 minutes

No. Lessons	Topics
10	Applications of Integration 1. Area between curves 2. Volumes of rotation with the method of disks, washers and cylindrical shells 3. Work application 4. Average value of a function
11	Techniques of Integration 1. Review method of substitution 2. Integration by parts, trigonometric powers, trigonometric substitution, integration by parts, integration using tables 3. Approximate integration: Midpoint, Trapezoid and Simpson's rules with error bounds 4. Improper integrals
5	More Applications of Integration 1. Arc length, area of a surface of revolution 2. Applications including hydrostatic pressure and force, moments and center of mass, consumer surplus and fluid flow.
8	Differential Equations 1. Slope fields and Euler's method 2. Separable equations, linear equations of first order 3. Applications including population growth, mixtures and predator-prey systems
9	Parametric Equations and Polar Coordinates 1. Parametric equations, oriented plane curves, slope, tangent lines, concavity and area 2. Polar coordinates, polar graphs, slope, tangent lines, concavity, arc length and area with polar integrals 3. Conic sections and conic sections in polar coordinates
13	Sequences and Series 1. Sequences and convergence 2. Series, definition of convergence 3. Geometric series, p-series 4. Convergence tests to include integral test, alternating series test, direct and limit comparisons 5. Absolute convergence, ratio and root tests 6. Power series, Taylor and Maclaurin series, Taylor polynomials

8 days remain for exams and leeway

Graded Assignments and Policies

Graded Assignments

In class Quizzes	0 – 20%
Participation	0 - 5 %
Projects	0 – 20%
Homework	0 – 30%
Tests	50 - 85%
Final	15 – 30%

Grading Policy
The individual instructor will determine which items he or she considers essential for the student to memorize without error and test accordingly.

Each instructor will set minimum standards for performance on tests.

Major Tests and Quizzes
The individual instructor will determine which items he or she considers essential for the student to memorize without error and test accordingly. Each instructor will set minimum standards for performance on tests. A comprehensive final examination will be given.

Classroom Policies and Procedures

General Information

Attendance Policy

Make-up Policy

Extra-credit Policy

Final Exam Information
A comprehensive final examination will be given.

Academic Honor Code
The objective of the academic honor code is to sustain a learning-centered environment in which all students are expected to demonstrate integrity, honor, and responsibility, and recognize the importance of being accountable for one's academic behavior.

College Statement about grades of "F" and Withdrawal from Class
Students may withdraw from a course by processing an add/drop form during regular office hours through the Registration and Records Office at Main Campus or Romeoville Campus, or by phone at 815-744-2200. Please note the withdrawal dates listed on your bill or student schedule. Every course has its own withdrawal date. Failure to withdraw properly may result in a failing grade of "F" in the course.

At any time prior to the deadline dates established, an instructor may withdraw a student from class because of poor attendance, poor academic performance or inappropriate academic behavior, such as, but not limited to, cheating or plagiarism.

Intellectual Property
Students own and hold the copyright to the original work they produce in class. It is a widely accepted practice to use student work as part of the college's internal self-evaluation, assessment procedures, or other efforts to improve teaching and learning and in promoting programs and recruiting new students. If you do not wish your work to be used in this manner, please inform the instructor.

Student Code of Conduct
Each student is responsible for reading and adhering to the Student Code of Conduct as stated in the college catalog.

Sexual Harassment Joliet Junior College seeks to foster a community environment in which all members respect and trust each other. In a community in which persons respect and trust each other, there is no place for sexual harassment. JJC has a strong policy prohibiting the sexual harassment of one member of the college community by another. See the Catalog or Student Handbook.

Student Support http://jjc.edu/services-for-students/pages/default.aspx

a. Disability Services: http://www.jjc.edu/disability-services/Pages/default.aspx. Student Accommodations and Resources (StAR): If you need disability-related accommodations, specialized tutoring, or assistive technology in this class, if you have emergency medical information you wish to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class. New students should request accommodations and support by scheduling an appointment with the Student Accommodations and Resources (StAR) Office, Campus Center 1125, (815) 280-2230.
b. Tutoring: http://jjc.edu/tlc/Pages/default.aspx
c. Counseling and Advising: http://www.jjc.edu/counselingadvising/Pages/default.aspx
d. Academic Resources: http://www.jjc.edu/academic-resources/Pages/default.aspx
e. Support Programs and Services: http://www.jjc.edu/support-programs-services/Pages/default.aspx
f. Technology Support: http://jjc.edu/services-for-students/Pages/technology-support.aspx
g. My Degree Progress: My Degree Progress is a computerized system to track a student's progress toward graduation. The report indicates every course and places these courses into their appropriate category as a General Education, Major Course, or Elective, according to the degree requirements. This tool is useful for preparing before an advising appointment, for planning, for registering, and for checking that the student is on track for graduation. https://eresources.jjc.edu

*** Instructor reserves the right to modify, add to or change the syllabus. Any changes to the syllabus or schedule will be announced in class.**

Prepared by:

Prof. Robert Tuskey

Reviewed by:

Prof. Jean McArthur
Department Chair Date

Reviewed 5/15
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Revised 08/09
Revised 04/09
Revised 04/16