JOLIET JUNIOR COLLEGE 1901
DEPARTMENT OF MATHEMATICS

Math 171
Calculus with Analytic Geometry II

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; MTH 902

Credit and Contact Hours:

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

Prerequisites: Minimum grade "C" in MATH 170 or equivalent.

Books, Supplies, and Supplementary Materials

A. **Required Textbooks**

Cengage Unlimited Subscription. WebAssign will be used for online coursework (homework, quizzes, tests, etc.) and can be accessed by logging into iCampus/Canvas and selecting this course. If you are comfortable reading the textbook on the computer, you may use the eText alone. **There is no need to purchase a physical textbook for this course; the Cengage Unlimited Subscription for the eText and WebAssign was included in your course fees. Registration instructions are posted in our iCampus/Canvas site.**

B. **Other Required Materials**

Graphing calculator required; TI-83+ or TI-84+ graphing calculator is recommended.

C. **Methods of Instruction:**

Lecture, Hybrid, or Online

General Education Student Learning Outcome

1. Quantitative Literacy: Students possess the ability to reason and solve quantitative problems from an array of contexts.

Course Learning Outcomes (CLOs)

1. Analyze problems using advanced integration techniques.
2. Explore differential equations.
3. Explore conic sections.
4. Explore polar coordinates.
5. Explore infinite series.

Lesson Learning Outcomes (LLOs)

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.

Final Course Grading Scale

Grade	Percentage
A	90-100%
B	80-89%

C	70-79%
D	60-69%
F	lower than 60%

Faculty Commitment
Faculty members are committed to providing a quality learning experience through thoughtful planning, implementation, and assessment of course activities. They are also committed to being readily available to students throughout the semester by returning e-mails and phone calls within 48 hours and to returning graded course work within a week. Furthermore, they are committed to selecting appropriate course materials and making them available in an organized and timely manner.

Student Commitment
For every credit hour a student is enrolled in, they should expect to spend at least 2 hours outside of class studying, working on assignments, and preparing for class each week of the fifteen-week semester. For example, for this four credit-hour class, students can expect to spend four hours per week in class actively engaged in learning the material by participating in face-to-face classes or viewing lectures and instructional material online. In addition, students should expect to spend another eight hours per week outside of class completing homework and assignments, posting to discussion boards online, or studying for quizzes and tests. This means students should spend a minimum of 12 hours per week engaged in achieving the learning outcomes for this course. If you are not achieving your desired results in this class, you should consider increasing your prep time outside of class, in addition to using available resources such as instructor office hours and tutoring services.

By registering for this course, you commit yourself to active participation in course activities as well as the submission of all assignments and exams on time. Furthermore, you commit to accessing the course site and checking your JJC e-mail several times a week.