Math 122 - Calculus & Analytic Geometry II
Fall 2004 Course Syllabus

James Jones, Professor of Mathematics
Mathematics & Sciences Division
Richland Community College

Course Meeting Information
Section 01 meets from 5:30 pm to 7:20 am on Mon and Wed in room S137.

Instructor Information
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Office Hours
These are the times I'm scheduled to be in my office. If these times are not convenient for you, please see me to make an appointment for some other time.

Mon:	12:20 - 12:50 pm, 4:45 - 5:20 pm
Tue:	4:45 - 5:20 pm
Wed:	1:00 - 1:50 pm, 4:45 - 5:20 pm
Thu:	4:45 - 5:20 pm
Fri:	12:20 - 12:50 pm

Texts
Calculus: A New Horizon, 7th edition.. Howard Anton. Copyright 2002, John Wiley & Sons, Inc. (Required)
Student Resource Manual. Copyright 2002, John Wiley & Sons, Inc. (Optional)

Student Audience
Transfer students. Students pursuing degrees in engineering, mathematics, computer science, natural sciences, and life sciences.

Prerequisite
Successful completion (C or better grade) of Math 121, Calculus and Analytic Geometry I.

Course Description
MATH 122 - Calculus & Analytic Geometry II
Hours: 4 lecture - 0 lab - 4 credit
Math 122, Calculus & Analytic Geometry II, includes the different methods of integration. Students study transcendental functions, L'Hôpital's Rule, sequences and series, infinite series, power series, Taylor series, conic sections, polar coordinates, parametric equations, and mathematical modeling with differential equations.
Applicable toward graduation where program structure permits.
- Certificate or degree: All certificates and all degrees.

- Group requirement: Mathematics
- Area of Concentration: Mathematics.

Illinois Articulation Initiative (IAI)

The mathematics component of general education focuses on quantitative reasoning to provide a base for developing a quantitatively literate college graduate. Every college graduate should be able to apply simple mathematical methods to the solution of real-world problems. A quantitatively literate college graduate should be able to:

- interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them;
- represent mathematical information symbolically, visually, numerically, and verbally;
- use arithmetic, algebraic, geometric, and statistical methods to solve problems;
- estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results; and
- recognize the limitations of mathematical and statistical models.

Courses accepted in fulfilling the general education mathematics requirement emphasize the development of the student's capability to do mathematical reasoning and problem solving in settings the college graduate may encounter in the future. General education mathematics courses should not lead simply to an appreciation of the place of mathematics in society, nor should they be merely mechanical or computational in character.

To accomplish this purpose, students should have at least one course at the lower-division level that emphasizes the foundations of quantitative literacy and, preferably, a second course that solidifies and deepens this foundation to enable the student to internalize these habits of thought.

> *Math 122, Calculus & Analytic Geometry II, satisfies the Illinois Articulation Initiative Definition of a General Education Mathematics Course. It corresponds to M1 900, College-level Calculus.*

General Course Objectives

While learning calculus is certainly one of the goals of this course, it is not the only objective. Upon completion of this course, the student should be able to ...

- demonstrate comprehension and understanding in the topics of the course through symbolic, numeric, and graphic methods
- demonstrate the use of proper mathematical notation
- use technology when appropriate and know the limitations of technology
- work with others towards the completion of a common goal
- use deductive reasoning and critical thinking to solve problems

Specific Course Objectives

Upon completion of this course, the student should be able to ...

- manipulate, differentiate, and sometimes integrate exponential functions, logarithmic functions, inverse trigonometric functions, and hyperbolic trigonometric functions
- apply L'Hôpital's rule to find limits of indeterminate forms
- use integration by parts, trigonometric substitution, partial fractions, numerical integration, and appropriate technology to integrate
- solve first order differential equations

- determine convergence and divergence of infinite series
- use Maclaurin and Taylor series to approximate functions
- find power series and determine radius and interval of convergence
- convert between rectangular and polar coordinate systems
- find arc length and area in polar coordinates
- find the equations of the conic sections in both rectangular and polar coordinate systems
- perform rotation of axes

Type of Instruction

Discussion, problem solving, student questions, student participation, oral presentations, and lecture. Students are expected to read the material before coming to class and are strongly encouraged to come to class with a list of questions and to ask these questions.

Method of Evaluation

Could include any of the following: problem solving exams, objective exams, essays, research papers, oral presentations, group projects, quizzes, homework.

Grading Policy

Letter grades will be assigned to final adjusted scores as follows:

- A: 90 - 100%
- B: 80 - 89%
- C: 70 - 79%
- D: 60 - 69%
- F: below 60%

Consideration may be given to such qualities as attendance, class participation, attentiveness, attitude in class, and cooperation to produce the maximum learning situation for everyone.

The instructor will give you a grade sheet so that you can record your scores and keep track of your progress in the course. If you are concerned about your grades, see the instructor.

Late assignments lose 10% of their value per class period. The instructor reserves the right to apply this rule to missed exams as well as regular assignments.

Attendance Policy

Regular attendance is essential for satisfactory completion of this course. If you have excessive absences, you cannot develop to your fullest potential in the course. Students who, because of excessive absences, cannot complete the course successfully, will be administratively dropped from the class at midterm. Students whose attendance is occasional or sporadic may be dropped from the class at midterm. If a student stops attending after midterm, it is the student's responsibility to withdraw to avoid an "F". The instructor has the ability, but not responsibility, to drop students who are not regularly attending at any time during the semester. The safest way to make sure you're not dropped for non-attendance is to continue to attend classes.

The student is responsible for all assignments, changes in assignments, or other verbal information given in the class, whether in attendance or not.

If a student must miss class, a call to the instructor (RCC's phone system has an answering system) is to be made, or an email message sent. When a test is going to be missed, the student should contact the instructor ahead of time if at all possible. Under certain circumstances, arrangements can be made to take the test before the scheduled time. If circumstances arise where arrangements cannot be made ahead of time, the instructor should be notified and a brief explanation of why given by either voice or email. This notification must occur before the next class period begins. At the instructor's discretion, the student may receive a zero, make up the exam with (or without) penalty, or substitute the final exam score for the missed exam.

Calculators

A TI-89 or TI-92 calculator is highly recommended for this course. There are computers in the classroom with Derive on them, and these may be used by students who don't have the TI-92 calculator. Calculators may be used to do homework. Calculators may be used on exams and/or quizzes in class unless otherwise announced.

Additional Supplies

The student should have a pencil, red pen, ruler, graph paper, stapler, and paper punch. The student is expected to bring calculators and supplies as needed to class. The calculator should be brought daily. There will be a paper punch and stapler in the classroom.

Homework

Homework out of the book is not collected for a grade. However, success in the class is correlated to the amount of homework done. Do not expect to master the subject without doing homework. Students have the option of doing the homework and replacing their lowest test score with the homework.

Additional Help

The student is encouraged to seek additional help when the material is not comprehended. Mathematics is a cumulative subject; therefore, getting behind is a very difficult situation for the student. There are several places where you can seek additional help in your classes.

Instructor

I try to make myself as available to the students as I can. My office hours are listed at the beginning of this syllabus, but those are just the times I'm scheduled to be in my office. Grab me and ask me questions if you see me in the hallway. Ask questions before or after class. If I'm in my office and it's not my scheduled office hours, go ahead and stop in.

The instructor should be considered the authoritative source for material related to this class. If a tutor or other student says something that disagrees with the instructor, believe the instructor.

Study Groups

Probably the best thing you can do for outside help is to form a study group with other students in your class. Work with those students and hold them accountable. You will understand things much better if you explain it to someone else and study groups will also keep you focused, involved, and current in the course.

Student Learning Center

The Student Learning Center is located in rooms S116, S117, and S118. There is mathematics tutoring available in room S116. The Student Learning Center and the tutoring is a service that Richland Community College offers you free of charge.

Quality tutors for the upper level mathematics are difficult to find. Please consider forming a study group among your classmates.

Learning Accommodation Services
There are accommodations available for students who need extended time on tests, note takers, readers, adaptive computer equipment, braille, enlarged print, accessible seating, sign language interpreters, books on tape, taped classroom lectures, writers, or tutoring. If you need one of these services, then you should see Learning Accommodation Services in room C136. If you request an accommodation, you will be required to provide documentation that you need that accommodation.

Many of you will need additional time on tests. There is no need to go to learning accommodation services to request that. If you need additional time, just let me know and I'll allow you to continue working past the allotted time. You may need to move to another room as there may be another class coming into your room. If you're unable to finish the test by staying late, it may be possible to start the test earlier to gain additional time.

Feel free to bring a tape record to class and tape my lectures. If you need tutoring, then go to the Student Learning Center. For other services, see Learning Accommodation Services.

Academic Dishonesty
Each student is expected to be honest in his/her class work or in the submission of information to the College. Richland regards dishonesty in classroom and laboratories, on assignments and examinations, and the submission of false and misleading information to the College as a serious offense.

A student who cheats, plagiarizes, or furnishes false, misleading information to the College is subject to disciplinary action up to and including failure of a class or suspension/expulsion from the College.

Non-Discrimination Policy
Richland Community College policy prohibits discrimination on the basis of race, color, religion, sex, marital or parental status, national origin or ancestry, age, mental or physical disability (except where it is a bonafide occupational qualification), sexual orientation, military status, status as a disabled or Vietnam-era veteran.

Topical Outline

Hours	Topic
11	**Exponential, Logarithmic, and Inverse Trigonometric Functions** • Inverse functions • Exponential and logarithmic functions • Derivatives and integrals of exponential and logarithmic functions • Graphs and applications of exponential and logarithmic functions • Derivatives of inverse trigonometric fucntions • L'Hôpital's rule and indeterminate forms • Hyperbolic trigonometric functions, derivatives, integrals, and inverses
14	**Principles of Integration Evaluation** • Overview of integration techniques from Calculus I • Integration by parts • Trigonometric integrals • Trigonometric substitutions • Rational functions using partial fraction decomposition • Tables of integrals and computer technology • Numerical integration and Simpson's Rule
6	**Mathematical Modeling with Differential Equations** • First order differential equations; separable and integrating factor • Direction fields and Euler's method • Modeling with first order differential equations • Second order linear homogenous differential equations
16	**Infinite Series** • Maclaurin and Taylor polynomial approximations • Sequences • Monotonic sequences • Infinite series; geometric, telescoping • Convergence tests • Comparison, ratio, and root tests • Alternating series, conditional convergence, absolute convergence • Maclaurin and Taylor series; power series • Convergence of Taylor series, computational methods • Differentiation and integration of power series
10	**Analytic Geometry in Calculus** • Polar coordinate system. Graphs and conversion between polar and rectangular coordinates • Tangent lines and arc length for parametric and polar curves • Area in polar coordinates • Conic sections in rectangular coordinates • Rotation of axes • Conic sections in polar coordinates and applications