Math 116 - College Algebra
Fall 2003 Course Syllabus

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

Course Meeting Information

Section 03 meets from 1:00 pm to 1:50 pm on Mon, Tue, Thu, and Fri 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: 12:00 pm - 12:50 pm, 3:00 pm - 3:15 pm
Tue: 12:00 pm - 12:50 pm, 3:00 pm - 3:15 pm
Thu: 9:30 am - 9:50 am, 12:00 pm - 12:50 pm
Fri: 12:00 pm - 12:50 pm

Text

College Algebra, A Graphing Approach, 3rd ed. Larson, Hostetler, Edwards. Copyright 2001, Houghton Mifflin Company. (Required)

Prerequisite

The prerequisite is successful completion of Math 098, Intermediate Algebra or sufficient score on a placement exam.

Course Description

MATH 116 - College Algebra

Hours: 4 lecture - 0 lab - 4 credit

Mathematics 116, College Algebra, is a concentrated study of the topics traditionally found in College Algebra. The topics include a quick and intense review of the topics from Intermediate Algebra, including algebraic expressions, polynomials, equations, problem solving, complex numbers, and graphing. Major topics include functions, exponential and logarithmic functions, matrices, polynomial equations, inequalities, introduction to analytic geometry, conic sections, systems of equations, mathematical induction, and the binomial expansion theorem. A graphing calculator is required.

Applicable toward graduation where program structure permits.

- Certificate or degree: All certificates, A.A.S., A.L.S., A.A, A.S.
- Group requirement: Mathematics
- Area of Concentration: Not applicable.

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 116, College Algebra, does NOT satisfy the Illinois Articulation Initiative Definition of a General Education Mathematics Course.*

Illinois Mathematics and Computer Science Articulation Guide

The following statement is a joint statement of the Illinois Mathematics Association of Community Colleges (IMACC) and the Illinois Section of the Mathematics Association of America (ISMAA).

While College Algebra and Precalculus courses are taught at post-secondary institutions where needed, these courses should not fulfill general education or quantitative literacy requirements. The content and instructional pedagogy applied in these courses should continue to be reviewed with the goal of preparing students to be successful in calculus and other courses that depend on a similar level of knowledge, rigor and maturity. Adjustments to these courses should attempt to build upon appropriate changes in the K - 12 curriculum that are a part of state-wide efforts to advance achievement for all students and, in particular, to smooth the transition from school to college.

Departments are advised not to attempt to design and teach college algebra and pre-calculus courses with the dual purpose as preparation for calculus and meeting goals for quantitative literacy and general education requirements. Expectations for mastery of the objectives considered essential preparation for subsequent calculus courses must take priority and time constraints, together with cognitive demands on the student group to be served, suggest such dual purpose courses are not likely to be successful.

General Course Objectives

While learning the algebra 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 successful completion of this course, the student should be able to ...

- demonstrate an understanding of the concepts related to functions and their inverses.
- identify and graph quadratic, polynomial, rational, exponential, and logarithmic functions as well as the conic sections; also, demonstrate knowledge of the properties of these functions and relations and apply this knowledge to real world situations.
- demonstrate proficiency in solving linear and non-linear systems using various algebraic, matrix, and graphical methods.
- graphically represent the solutions to inequalities and system of inequalities that involve two variables.
- use appropriate theorems and techniques to locate the roots of second and higher degree polynomial equations.
- use the notation and formulae associated with arithmetic and geometric sequences and series.
- demonstrate knowledge of binomial expansion, Pascal's triangle, and combinatorial formulae.
- use technology appropriately in problem solving and in exploring and developing mathematical concepts.

A detailed topical outline of the content covered in this course is at the end of this syllabus.

Type of Instruction

Lecture, discussion, problem solving, and group work will be used. Students are expected to read the material before coming to class and should come to class with a prepared list of questions.

Method of Evaluation

Could include any of the following: problem solving exams, objective exams, oral presentations, group projects, individual projects, classroom activities, quizzes, and 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. 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.

Notebooks
A notebook should be kept which contains every problem worked in class as well as any comments that are appropriate. In general, it should contain everything written on the chalkboard. Be sure to bring your notebook if you come to the instructor or a tutor for help. I strongly urge you to get a three-ring binder to keep your papers in.

Calculators
A TI-82 or TI-83 graphing calculator is required in this course. Other graphing calculators may be used, but the student is expected to know how to use them. Calculators may be used to do

homework. Calculators may be used on exams and/or quizzes in class unless otherwise announced. If you are purchasing a calculator, consider getting the TI-83 instead of the TI-82.

Additional Supplies

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

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.

Video tapes

There are [video tapes](#) for this course on reserve in the Learning Resources Center. These are beneficial if you miss a class and want to pick up the material or if you just want to hear another perspective on things. These are video tapes supplied by the publisher, they are not videotapes of the instructor.

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.

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.

Topical Outline

Hours	Topic

8   **Functions and Their Graphs**
- Graphs of equations, using the calculator to make graphs
- Lines in the plane
- Functions and graphs of functions; vertical line test
- Transformations of functions - shifting, scaling, reflecting
- Combinations of functions, composition of functions
- Inverses of functions, horizontal line test

6   **Intercepts, Zeros, and Solutions**
- Modeling with linear equations
- Solving equations graphically
- Complex numbers
- Solving equations algebraically
- Solving quadratic equations by factoring, extraction of roots, completing the square, and the quadratic formula.
- Solving inequalities algebraically and graphically

9   **Polynomial and Rational Functions**
- Quadratic functions
- Polynomial functions of higher degree including right and left-hand behavior, number of turns, number of intercepts
- Real and complex zeros of polynomial functions; Descartes' rule of signs, upper and lower bound theorems
- Fundamental theorem of algebra
- Rational functions and their graphs; asymptotes, intercepts
- Creating functions from graphs

Hours	Topic

6   **Exponential and Logarithmic Functions**
- Exponential functions and their graphs
- Logarithmic functions and their graphs
- Properties of logarithms
- Solving exponential and logarithmic functions
- Exponential and logarithmic models

5   **Conic Sections and Parametric Equations**
- Recognizing the nine possible graphs from a general second degree equation
- Parabolas, Ellipses, Hyperbolas in standard form
- Transformations of the conics
- Parametric equations

6   **Systems of Equalities and Inequalities**
- Solving systems of equations by using graphing, substitution, and elimination
- Systems of linear equations in two variables
- Multivariable linear systems and applications; fitting circles and parabolas to data, partial fraction decomposition
- Systems of linear inequalities, feasible regions
- Linear programming, fundamental theorem of linear programming

9   **Matrices and Determinants**
- Matrices and Systems of Equations
- Gaussian Elimination with back substitution, Gauss-Jordan elimination
- Operations with matrices
- Inverses of matrices
- Determinants of matrices
- Applications of matrices and determinants

9   **Sequences, Series, and Probability**
- Sequences and series
- Arithmetic sequences and partial sums
- Geometric sequences and series; infinite geometric series
- Mathematical induction
- Binomial theorem, Pascal's triangle
- Counting principles, permutations, combinations, distinguishable permutations
- Probability