

MAC 1105 College Algebra

Purpose:

- Develop critical and analytical thinking skills
Engage students in sound mathematical thinking and reasoning.
- Enhance and reinforce students' understanding of concepts through the use of technology when appropriate.
EX: graphing calculators, computers, software such as MyMathLab, students' response system, etc.
- Develop mathematical fluency to improve written and verbal communication.
- Analyze the structure of real world problems and plan solutions, and solve the problem using appropriate tools.
EX: Use functions to model real world applications.
- Explore multiple representation of topics (graphical, numerical, symbolic, verbal)

Why:

- Prerequisite for calculus and pre-calculus
- Have not learned, a review of topics of high school
- Prerequisite for other programs such as science, nursing
- To satisfy state requirements and accreditation, for graduation in some programs
- Gateway course for higher mathematics and sciences

FUTURE NOTE: course should be more rigorous (more depth, not more topics??)

Population:

- Students who need the future sequences for prerequisites.

EX: Math, science, engineering, business, accounting majors.

Part of sequence: Yes

General education course: Yes (get clarification)

21st century redefinition:

- As students enter college more prepared, this class in 10 – 15 years might have fewer sections.
- Emphasis more depth, might be too many topics right now.
- Change in ways of teaching (more hands-on, activities based, collaboration, cooperation, technological (with more on-line sources, interaction could go beyond meeting times of the class),
- More abstract and formal coverage
- Focus on concepts rather than just rote skills
- Higher expectation of students knowing well their foundational and arithmetic skills rather than promoting a total dependency on calculators
- **How many credits should be associated with this course?**

Course Content:

- The basic content of this course focuses on functions:
 - definition of functions
 - domain and range
 - function notation
 - types of functions (EX: linear, quadratic, exponential, absolute value, logarithmic, power with rational exponents, piece-wise defined functions)
 - transformations
 - graphs and their properties (EX: extrema, symmetry, even/odd, etc.)
 - solving non-linear inequalities graphically
 - intersection of graphs (non-linear of 2 variables)
 - difference quotients
 - real world applications (EX: average rate of change)
 - operations including composition
 - inverse functions
 - piece-wise defined linear & non-linear functions (evaluate and graphing)
 - asymptotes
 - exponential and logarithmic functions including applications of interest (graph, properties, domain, range, solve simple exponential and logarithmic equations) EX: $\ln x = 3$, $e^{kt} = 45$
 - elementary modeling**
- Coordinate geometry
 - circles (equations, completing the squares, distance, midpoint)

Suggested Delivery and methodologies:

- students should graph by hand and use **technology**
- More focus on analyzing graphs **over making graphs**
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Side Notes:

- Use classroom set of calculator to prevent cheating.
- Students don't get much about functions before college algebra. Students should demonstrate applications of math more heavily than previous course (such as Intermediate algebra)
- In the future, maybe create an alternative, less rigorous college algebra course for students who do not go on!
- Consult with chemistry on depth of logarithmic functions and properties