

Course Outline of Record

1. Course Code: MATH-040
2.
  - a. Long Course Title: Intermediate Algebra
  - b. Short Course Title: INTERMEDIATE ALGEBRA
3.
  - a. Catalog Course Description:  
 This course focuses on solving problems using linear, quadratic and exponential models with an introduction to the concept of a function. Topics include solving and graphing linear, quadratic and exponential equations, systems of linear equations, rational exponents, root equations, quadratic inequalities, circles and applications.
  - b. Class Schedule Course Description:  
 This course covers solving and graphing linear, quadratic and exponential equations, systems of linear equations, rational exponents, root equations, quadratic inequalities, circles and applications of these topics.
  - c. Semester Cycle (if applicable): Every Semester
  - d. Name of Approved Program(s):
    - MATHEMATICS Associate in Science for Transfer Degree (AS-T)
4. Total Units: 4.00      Total Semester Hrs: 108.00  
 Lecture Units: 3      Semester Lecture Hrs: 54.00  
 Lab Units: 1      Semester Lab Hrs: 54.00  
 Class Size Maximum: 35      Allow Audit: No  
 Repeatability No Repeats Allowed  
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:  
*Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm1-A)*  
 Prerequisite: MATH 054  
 Advisory: ENG 061 and  
 Advisory: RDG 061
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)
  - a. Yoshiwara (2013). *Intermediate Algebra, A modeling approach* (2nd /e). XYZ Publishing. ISBN: 9781936368358  
 College Level: Yes  
 Flesch-Kincaid reading level: 10.9
  - b. Sullivan & Struve (2018). *Intermediate Algebra* (2nd /e). Pearson Prentice Hall. ISBN: 9780134555805  
 College Level: Yes  
 Flesch-Kincaid reading level: 10.9
  - c. Distance Learning Mode:  
Sullivan and Struve. (2018). *Intermediate Algebra* (3rd ed.), Pearson Prentice Hall.  
Sullivan and Struve, MyMathLab software, Pearson Prentice Hall.
7. Entrance Skills: *Before entering the course students must be able:*
  - a. Know the Real Number System, including the following subsets of the Reals: integers, rationals, and irrationals.
    - MATH 054 - Identify, recognize and classify real numbers, as integers, rationals, or irrationals and locate their approximate positions on the real number line.
  - b. Know and use the commutative, associative, distributive, identity, and inverse properties of the Real Numbers under the operations of addition and multiplication.
    - MATH 054 - Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions involving polynomial, rational and radical expressions - perform arithmetic operations with algebraic

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expressions using the order of operations.

c. Comprehend the concepts of variables and how variables can be used to represent unknown quantities.

- MATH 054 - Understand the concepts of variables and how variables can be used to represent an unknown quantity or a range of quantities.

d. Apply variables to create algebraic expressions that model an application problem.

- MATH 054 - Use variables to create algebraic expressions that model quantities in an application problem.

e. Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions - perform arithmetic operations with algebraic expressions using the order of operations.

- MATH 054 - Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions involving polynomial, rational and radical expressions - perform arithmetic operations with algebraic expressions using the order of operations.

f. Apply variables with the algebraic method to create algebraic equations or inequalities that model an application problem.

- MATH 054 - Employ variables to create algebraic equations or inequalities that model an application problem.

g. Add, subtract, multiply and divide polynomials.

- MATH 054 - Add, subtract, multiply and divide polynomials.

h. Apply the zero product principle to solve quadratic equations by factoring.

- MATH 054 - Solve quadratic equations in one variable by factoring and applying the zero product property.

i. Know square roots and solve square root equations.

- MATH 054 - Interpret square roots and solve square root equations.

j. Know the Cartesian coordinate system and use it to graph linear equations by plotting points.

- MATH 054 - Convert between the geometric (Cartesian) and algebraic representations of a linear relation in two variables. Make use of point-slope and slope intercept forms.

k.

Demonstrate critical thinking skills when reading, composing and participating in class discussions.

- ENG 061 - Demonstrate the ability to think critically and express ideas using various patterns of development.
- RDG 061 - Read a variety of texts fluently.
- RDG 061 - Write organized summaries & reactions that capture main idea and supporting details.

## 8. Course Content and Scope:

### Lecture:

1. Linear Models represented by tables, graphs, equations, or word problems.
2. Applications of Linear Models including  $2 \times 2$  and  $3 \times 3$  systems of linear equations and systems of linear inequalities.
3. Quadratic Models including quadratic equations and inequalities, graphs of parabolas and circles and maximum and minimum problems.
4. Functions represented by graphs, equations and tables, function notation, domain and range questions, and direct and inverse variation.
5. Rational exponents and Nth roots, properties of exponents, and root equations.
6. Introduction to exponential functions represented by tables, graphs, equations, and word problems.

Lab: (if the "Lab Hours" is greater than zero this is required)

1. In-class assignments designed to emphasize material from lecture and enhance problem-solving skills.

## 9. Course Student Learning Outcomes:

1.

Demonstrate the use of properties of real numbers by manipulating algebraic expressions and equations.

2.

Use functions to model a deterministic relationship between two quantities in a variety of applications.

3.

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Use the information obtained in application problems to estimate a solution, identify and execute methods of solution that involve algebraic computations, and evaluate the reasonableness of results.

4.

Apply algebraic principles and deductive reasoning to solve equations and inequalities.

10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. Comprehend that the key characteristic of a linear model is its constant rate of change.
- b. Interpret slope as a rate of change.
- c. Recognize when a table, graph, or equation is linear.
- d. Create a linear model in the form of a table, graph, or equation.
- e. Find the equation of a line and apply it to solve problems with a constant of change.
- f. Solve  $2 \times 2$  and  $3 \times 3$  systems of linear equations.
- g. Graph systems of linear inequalities in two dimensions.
- h. Graph and find the equation of a circle.
- i. Solve quadratic equations by factoring, completing the square, taking square roots or the quadratic formula.
- j. Solve quadratic inequalities.
- k. Recognize when a table, graph, or equation is quadratic.
- l. Create a quadratic model with a table, graph, or equation and solve maximum and minimum problems.
- m. Graph a parabola by finding the vertex, intercepts, and other symmetric points.
- n. Comprehend and manipulate rational exponents and Nth roots.
- o. Solve root equations.
- p. Apply the definition of a function including function notation and terminology (domain and range).
- q. Comprehend that the key characteristic of an exponential function is its constant growth (decay) factor.
- r. Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function.

11. Methods of Instruction: *(Integration: Elements should validate parallel course outline elements)*

- a. Discussion
- b. Laboratory
- c. Lecture

Other Methods:

1. Teamwork 2. Team assignments done asynchronously and in real-time lab. 3. Asynchronous and synchronous communication to review, analyze, and evaluate various methods of solution: Student to Student and Student to Teacher.

12. Assignments: *(List samples of specific activities/assignments students are expected to complete both in and outside of class.)*

In Class Hours: 108.00

Outside Class Hours: 108.00

a. In-class Assignments

- a. Attend classroom lectures and take notes; participate in discussion.
- b. Attend and participate in lab.
- c. Participate in discussion groups to review, analyze, diagnose, and evaluate methods of solution used on homework.
- d. Complete examinations involving problems that require the application of studied principles and skills to new situations as well as problems that mimic those done on homework and in class.
- e. Complete challenging problem sets requiring careful reasoning and application of a variety of course topics.

b. Out-of-class Assignments

- a. Read textbooks and supplementary assignments.

- b. Attend classroom lectures and taking notes.
- c. Attend and participate in labs.
- d. Complete assigned homework including problem solving, exercises to improve skills and mathematical understanding.
- e. Participate in classroom discussions to review, analyze, diagnose and evaluate various methods of solution used on their homework.
- f. Complete examinations involving problems that apply studied principles to new situations.

13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- Written homework
- Computational/problem solving evaluations
- Mid-term and final evaluations
- Student participation/contribution
- Other
  - a. Performance on regularly assigned homework assignments.
  - b. Performance on chapter examinations
  - c. Performance on a 2-hour comprehensive final examination.

14. Methods of Evaluating: Additional Assessment Information:

15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

PO-GE C4.b - Language & Rationality (Communication & Analytical Thinking)

Gather, assess, and interpret relevant information.

Apply logical and critical thinking to solve problems; explain conclusions; and evaluate, support, or critique the thinking of others.

IO - Scientific Inquiry

Analyze quantitative and qualitative information to make decisions, judgments, and pose questions.

IO - Global Citizenship - Scientific & Technological Literacy

Utilize quantitative expression in a variety of contexts. These would include units of measurement, visual representations, and scales and distributions.

Synthesize, interpret, and infer, utilizing information, data, and experience to solve problems, innovate, and explore solutions.

Produce oral and written information in various modes and media, using technology such as computers, the Internet, and library databases.

16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
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17. Special Materials and/or Equipment Required of Students:

Graphing calculator

18. Materials Fees:  Required Material?

Material or Item	Cost Per Unit	Total Cost
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19. Provide Reasons for the Substantial Modifications or New Course:

Change advisory and align SLO's

- 20. a. Cross-Listed Course (*Enter Course Code*): N/A
- b. Replacement Course (*Enter original Course Code*): N/A

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21. Grading Method (*choose one*): Letter Grade Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000266669
- b. T.O.P. Code [CB03]: 170100.00 - Mathematics, General
- c. Credit Status [CB04]: D - Credit - Degree Applicable
- d. Course Transfer Status [CB05]: C = Non-Transferable
- e. Basic Skills Status [CB08]: 2N = Not basic skills course
- f. Vocational Status [CB09]: Not Occupational
- g. Course Classification [CB11]: Y - Credit Course
- h. Special Class Status [CB13]: N - Not Special
- i. Course CAN Code [CB14]: N/A
- j. Course Prior to College Level [CB21]: A = 1 Level Below
- k. Course Noncredit Category [CB22]: Y - Not Applicable
- l. Funding Agency Category [CB23]: Y = Not Applicable
- m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): MATHEMATICS

*Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)*

23. Enrollment - Estimate Enrollment

First Year: 0

Third Year: 0

24. Resources - Faculty - Discipline and Other Qualifications:

a. Sufficient Faculty Resources: Yes

b. If No, list number of FTE needed to offer this course: N/A

25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator John Learned Origination Date 10/20/17