

Angelina College
Division of Science and Mathematics
MATH 1414 – College Algebra for Science and Engineering
Instructional Syllabus

I. BASIC COURSE INFORMATION

- A. College Algebra for Science & Engineering – MATH 1414 – In-depth study and applications of polynomial, rational, radical, exponential and logarithmic functions, and systems of equations using matrices. Additional topics such as sequences, series, probability, mathematical induction, binomial theorem, and conics may be included. Four lecture hours each week.

- B. The intended audience is any student whose degree plan requires Precalculus MATH 2412, or Calculus I MATH 2413. This includes Engineering, General Science Concentration, Biology, Mathematics, Physics, Pre-Medical, Pre-Dental, Pre-Pharmacy, Pre-Physical/Occupational Therapy, Pre-Physician Assistant, and Pre-Veterinary Medicine.

- C. Instructor: Mary Craft
E-mail: craftmj@hudsonisd.org

II. INTENDED STUDENT OUTCOMES

A. Core Objectives Required for this Course

- 1. **Critical Thinking:** to include creative thinking, innovation, inquiry, and analysis, evaluation, and synthesis of information
- 2. **Communication:** to include effective development, interpretation and expression of ideas through written, oral and visual communication
- 3. **Empirical and Quantitative Skills:** to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

B. Course Learning Outcomes for all Sections

- 1. Demonstrate and apply knowledge of properties of functions, including domain and range, operations, compositions, and inverses.
- 2. Recognize and apply polynomial, rational, radical, exponential and logarithmic functions and solve related equations.
- 3. Apply graphing techniques.
- 4. Evaluate all roots of higher degree polynomial and rational functions.
- 5. Recognize, solve and apply systems of linear equations using matrices.

III. ASSESSMENT MEASURES

A. Assessments for the Core Objectives

1. **Critical thinking:** Students will use a graphing calculator to analyze changes in properties of quadratic functions with different leading coefficients. The Angelina College Critical Thinking Rubric will be used to assess critical thinking skills and correctness of conclusions.
2. **Communications:** Students will solve a given mathematical modeling problem and communicate the result in writing including a graph. Students will orally present solutions. The Angelina College Communication Rubric will be used to assess written oral, and visual communication skills.
3. **Empirical and Quantitative Skills:** Students will use numerical data in a table to determine if a function is linear, exponential, or neither. The conclusion will be verified. The Angelina College Empirical and Quantitative Skills Rubric will be used to assess correctness and completeness. This may be assessed in embedded test questions.

B. Assessments of Course Learning Outcomes

1. Students' ability to demonstrate and apply knowledge of properties of functions, including domain and range, operations, compositions, and inverses will be monitored through in-class activities, tests, and homework.
2. Students' ability to recognize and apply polynomial, rational, radical, exponential and logarithmic functions and solve related equations will be monitored through in-class activities, tests, and homework.
3. Students' ability to apply graphing techniques will be monitored through in-class activities, tests, and homework.
4. Students' ability to evaluate all roots of higher degree polynomial and rational functions will be monitored through in-class activities, tests, and homework.
5. Students' ability to recognize, solve and apply systems of linear equations using matrices will be monitored through in-class activities, tests, and homework.

IV. INSTRUCTIONAL PROCEDURES:

This course is taught using a combination of lectures, discussions, and practice exercises. The amount of time spent using any one technique will vary from class to class and from lesson to lesson as determined to be most appropriate by the instructor.

V. COURSE REQUIREMENTS AND POLICIES:

A. Required Textbooks and Recommended Readings, Materials and Equipment

1. Precalculus Open Stax College is the required textbook. This text is available free to use online, as a low-cost print edition, or as an e-book. The address to assess and choose among these options is: <https://openstax.org/details/precalculus> .
2. Graphing calculator – A TI (Texas Instruments) graphing calculator is highly recommended. A TI-84 will be used in classroom demonstrations.

B. Course Policies – This course conforms to the policies of Angelina College as stated in the Angelina College Handbook.

- 1. Academic Assistance** – If you have a disability (as cited in Section 504 of the Rehabilitation Act of 1973 or Title II of the Americans with Disabilities Act of 1990) that may affect your participation in this class, you should see Sellestine Hunt – Associate Dean of Student Services, Student Center Room 200. At a post-secondary institution, you must self-identify as a person with a disability; Ms. Hunt will assist you with the necessary information to do so. To report any complaints of discrimination related to disability you should contact Mr. Steve Hudman – Dean of Student Affairs, Student Center, Room 101, or 936-633-5292 or by e-mail shudman@angelina.edu.
- 2. Attendance** – Attendance is required as per Angelina College Policy and will be recorded every day. Any student with three (3) consecutive absences or four (4) cumulative absences may be dropped from the class. Records will be turned in to the academic dean at the end of the semester. Do not assume that non-attendance in class will result in an instructor drop. **You must officially drop a class or risk receiving an F.** This is official Angelina College Policy.
- 3. Additional Policies Established by the Instructor**

MAKE-UP EXAMS

Make-up exams may be offered only in unusual circumstances. The grade on the final exam can replace the lowest exam grade, including grades from a missed exam.

STUDENT CONDUCT

A positive environment for learning will be maintained by students being courteous to each other and to the instructor. This includes being on time to class and working throughout the class period. Regular attendance is also expected as per college policy.

Cheating on tests is not tolerated as per Angelina College policy. No electronic devices, other than approved calculators, may be used during any quiz or test. These prohibited electronic devices may include, but not be limited to: cell phones or smart phones, smart watches or other electronic visual aids, audio players, recorders, tablets, notebooks, Google glass, or any other similar devices, any digital device that can be used to record, transmit, receive, or play back audio, photographic, text, or video content.

Failure to follow this rule may result in the student receiving a grade of zero on the quiz or test. If the student receives a test score of zero due to failure to follow this rule, the zero test score cannot be replaced by the final exam.

and may result in expulsion from the course. Plagiarism is not tolerated and will result in a zero for any assignment in which it is detected.

VI. COURSE OUTLINE:

See attached SUPPLEMENTAL ASSIGNMENTS

VII. EVALUATION AND GRADING:

- A. Your grade will be assessed by:
 - 1. Three tests valued at 100 points each for a total of 300 points.
 - 2. Homework, quizzes, and activities, etc. valued at approximately 100 points.
 - 3. A comprehensive final examination at 100 points. (Note: TI-89, TI-92, or any calculator with CAS-software may not be used on the final.)
- B. **The final exam will replace one missed test or the lowest of the four test grades.**
- C. Students who drop the course on or before September 13th will not receive a grade for this class. Students who drop between September 14th and November 6th (inclusive) will receive a W. November 6th is the last day to drop a course.

The instructor may modify the provisions of the syllabus to meet individual class needs by informing the class in advance as to the changes to be made.

COURSE CONTENT and TOPICS

| LESSON | SECTION | TOPICS |
|-----------|-------------------|--|
| 1 | 1.1 | Functions and Function Notation |
| 2 | 1.2 | Domain and Range |
| 3 | 1.3 | Rates of Change and Behavior of Graphs |
| 4 | 1.4 | Composition of Functions |
| 5 | 1.5 | Transformation of Functions |
| 6 | 1.7 | Inverse Functions |
| 7 | 2.1 | Linear Functions |
| 8 | 2.2 | Graphs of Linear Functions |
| | 2.3 | Modeling with Linear Functions |
| 9 | | Review |
| 10 | Test 1 | |
| 11 | 3.1 | Complex Numbers |
| 12 | 3.2 | Quadratic Functions |
| 13 | 3.3 | Power Functions and Polynomial Functions |
| | 3.4 | Graphs of Polynomial Functions |
| 14 | 3.5 | Dividing Polynomials |
| | 3.6 | Zeros of Polynomial Functions |
| 15 | 3.7 | Rational Functions |
| 16 | 3.8 | Inverses and Radical Functions |
| | 3.9 | Modeling Using Variation |
| 17 | | Review |
| 18 | Test 2 | |
| 19 | 4.1 | Exponential Functions |
| | 4.2 | Graphs of Exponential Functions |
| 20 | 4.3 | Logarithmic Functions |
| | 4.4 | Graphs of Logarithmic Functions |
| 21 | 4.5 | Logarithmic Properties |
| | 4.6 | Exponential and Logarithmic Equations |
| 22 | 4.7 | Exponential and Logarithmic Models |
| 23 | | Review |
| 24 | Test 3 | |
| 25 | 11.1 | Sequences and Their Notations |
| 26 | 11.2 | Arithmetic Sequences |
| | 11.3 | Geometric Sequences |
| 27 | 11.4 | Series and Their Notations |
| 28 | 11.6 | The Binomial Theorem |
| 29 | 9.5 | Matrices and Matrix Operations |
| | 9.7 | Solving Systems with Inverses |
| | | Review |
| 30 | Final Exam | |

**MATH 1414 ASSIGNMENTS
(MW) Fall 2017**

| DATE | LESSON | SECTION | PAGES | EXERCISES |
|-------|--------|---------|---------|---|
| 08/29 | 1 | 1.1 | 18-21 | 1-5, 7, 9, 11, 17, 27, 29, 33, 35, 37, 41, 43, 51, 53, 55, 57, 61, 63, 67, 73, 75, 89, 91, |
| 08/30 | 2 | 1.2 | 35-37 | 1-4, 7, 9, 11, 15, 17, 27, 29, 33, 35, 37, 55, 59, 59 |
| 09/05 | 3 | 1.3 | 48-50 | 1, 2, 4, 5, 7, 9, 15, 17, 19, 21, 23, 27, 29, 33, 35, 41, 45, 47 |
| 09/08 | 4 | 1.4 | 60-63 | 1, 2, 5, 9, 11, 13, 17, 19, 25, 27, 35, 43-49 odd, 59, 61, 67, 73, 77, 85, 91, 93, 97 |
| 09/13 | 5 | 1.5 | 85-88 | 1-5, 7-21 odd, 25, 27, 29, 33, 35, 37, 41, 43, 47-61 odd, 65, 69, 71, 79, 81 |
| 09/18 | 6 | 1.7 | 110-112 | 1, 2, 4, 5, 7, 11-29 odd, 33-39 odd, 43, 45 |
| 09/19 | 7 | 2.1 | 139-142 | 1-9 odd, 15, 17, 19, 25, 31, 33, 37, 39, 41, 45, 47, 50, 55, 57, 61, 63, 69-75 odd |
| 09/25 | 8 | 2.2 | 159-161 | 1, 2, 4, 5, 7-13 odd, 19, 21, 23, 29, 33, 35, 37, 41, 59-65 odd, 75 |
| | | 2.3 | 170-174 | 1-4, 5-21 odd, 29, 31, 33, 39, 41, 45, 55 |
| 09/26 | 9 | Review | | |
| 09/27 | 10 | Test1 | | |
| 19/29 | 11 | 3.1 | 206-207 | 1, 3, 5, 9, 11, 17, 19, 23, 31, 35, 45, 49 |
| 10/04 | 12 | 3.2 | 221-223 | 1, 2, 3, 5, 7, 11, 15, 16, 21, 22, 27, 31, 35, 37, 43, 45, 49, 53-63 odd, 73-79 odd, 85, 93, 95, |
| 10/06 | 13 | 3.3 | 236-238 | 1-5, 7, 8, 13, 15, 17, 19, 23-33 odd, 36, 39, 41, 51, 57, 61, 63, 67, 69 |
| | | 3.4 | 254-256 | 1, 2, 4, 5, 7-15 odd, 31, 35, 37, 43, 47-59 odd, 67, 73, 75, 79 |
| 10/17 | 14 | 3.5 | 264-265 | 1, 2, 13, 15, 23, 31, 39, 41, 45, 47, 49, 65, 67, 71 |
| | | 3.6 | 276-277 | 1, 2, 3, 5, 7, 9, 15, 17, 23, 27, 33, 35, 41, 43, 57, 61, 67, 71, 73, 77 |
| 10/20 | 15 | 3.7 | 295-298 | 1, 3, 4, 5, 7, 9, 11, 15, 17, 23, 25, 29, 33, 35-43 odd, 47, 51, 57, 61, 63, 65, 71, 77, 81, 83, 85 |
| 10/23 | 16 | 3.8 | 308-309 | 1-5, 9, 17, 23, 35, 37, 43, 47, 57-65 odd |
| | | 3.9 | 315-316 | 1, 3, 5, 7, 11, 15, 25, 29, 41, 47, 51, 53 |
| 10/24 | 17 | Review | | |
| 10/25 | 18 | Test 2 | | |
| 10/31 | 19 | 4.1 | 340-342 | 1, 2, 3, 5-23 odd, 39, 45, 49, 61, 63 |
| | | 4.2 | 352-354 | 1, 3, 5, 9, 11, 23-43 odd, 47, 51 |

| | | | | |
|-------|----|------------|--------------------|---|
| 11/03 | 20 | 4.3 4.4 | 361-362 377-379 | 1-5, 7-43 odd, 47, 59-65 odd 1-5, 7, 9, 11, 17, 21, 23, 27-35 odd, 39, 41, 43, 47, 49, 51 |
| 11/08 | 21 | 4.5 4.6 | 389 399-400 | 1, 2, 5-17, 21-27odd, 39 1-3, 5-17 odd, 21, 23, 25, 29, 31, 33, 37, 39, 49, 51, 53, 55, 59, 67, 69, 73, 77 |
| 11/13 | 22 | 4.7 | 413-415 | 1, 2, 3, 5, 7, 9, 11, 19, 21, 23, 29, 30, 31, 39, 40, 51, 52, 53 |
| 11/14 | 23 | Review | | |
| 11/15 | 24 | Test 3 | | |

| | | | | |
|-------|----|----------------------|--------------------|--|
| 11/28 | 25 | 11.1 | 948-950 | 1-5, 7, 9, 11, 25, 27, 37, 41, 45, 47, 53, 61, 67 |
| 12/01 | 26 | 11.2 11.3 | 958-960 967-968 | 1-5, 7-15 odd, 19, 27, 29, 39, 45, 51, 57, 61 1-5, 7, 9, 11, 15, 19, 21, 25, 33, 35, 43, 45, 47, 57 |
| 12/05 | 27 | 11.4 | 979-981 | 1-4, 7, 11, 13, 17, 19, 21, 22, 23, 25, 27, 28, 29, 31, 35, 37, 39, 43, 45, 59, 61 |
| 12/06 | 28 | 11.6 | 997-998 | 1, 3, 4, 9, 11, 13, 17, 25, 33, 35, 41, 45, 47, 49 |
| 12/08 | 29 | 9.5 9.7 Review | 814-815 840-842 | 1-3, 5, 7, 11, 13, 23, 25, 35, 41, 42 (Using calculator) 29, 33, 37, 39, 43, 45 |
| 12/13 | 30 | Final Exam | | |

All homework and class activities are possible test questions.
Answer keys to the exercises in () are available on Blackboard.

Most classes will begin with a short quiz over the 3 most important basic concepts from the previous lesson.

Longer quizzes will be announced in advance. No make-up quizzes are permitted.

