Northern Michigan University  
Mathematics and Computer Science Department  
College Algebra with Applications in the Sciences and Technologies (4 credits)  
MA104-55 (50631) Web-based

**Instructor:** Dr. Carol Bell  
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**Office Hours:** by appointment only

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**Prerequisite:**  
MA100 (passed with a C- or better) or satisfactory score on the Mathematics Placement Exam.

**General Introduction and Goals:**  
This course is designed for students who need college algebra but do not intend to take calculus. The applications of algebra are stressed; mathematical topics are chosen primarily on the basis of their immediate applicability. Such applications are drawn mainly from the natural sciences and technologies. This course will prepare students to study Trigonometry, **MA 106**, and Calculus with Applications, **MA 271**. And although **MA 103** is the recommended preparatory course for the study of statistics, MA 104 is as an alternative prerequisite for Statistics. To move to the precalculus track (**MA115**) from MA104, a student must achieve at least a B- in this course.

This course satisfies the Foundation of Natural Science/Mathematics requirement. Students who complete this course should be able to demonstrate a basic understanding of mathematical logic; use mathematics to solve scientific or mathematical problems in college classes; express relationships in the symbolic language of mathematics; and appreciate the role of mathematics in analyzing natural phenomena.

**Text and Other Course Information:**
- Online course materials may be accessed at [http://www.bvtlab.com](http://www.bvtlab.com). The course code is 488891.
- A non-CAS graphing calculator or download a TI Emulator for the TI-73, TI-83+, and TI-83+ Silver Edition at [http://education.ti.com/educationportal/sites/US/productDetail/us_sdk_73_83_84.htm](http://education.ti.com/educationportal/sites/US/productDetail/us_sdk_73_83_84.htm). Click on the download button underneath the calculator. Select the first link “TI-83 Plus SDK” and click “continue as guest.” Then, choose Run from the pop-up menu. You will need to restart your computer after installing the emulator.
  
  To operate this emulator, instructions may be found at [http://www.austintown.k12.oh.us/~aust_tr/homework/quickfiles/TI%20Emulator/TI83%20Emulator%20Install%20How%20Use.pdf](http://www.austintown.k12.oh.us/~aust_tr/homework/quickfiles/TI%20Emulator/TI83%20Emulator%20Install%20How%20Use.pdf).
Learning Outcomes:
Upon successful completion of this course the student will be able to:
- Understand and apply the rules of linear, quadratic, polynomial, exponential, and logarithmic relations to solve equations.
- Understand and apply the concepts and properties of a function to model real-world situations, and solve scenarios involving these functions.
- Apply trigonometry to solve problems involving triangle relationships.
- Use calculators to set up and solve problems using graphs, tables, and formulas.
Evaluation of these learning outcomes will be done through assignments and exams.

Content Outline:
1. Review of Algebra
   - Polynomials and operations on polynomials
   - Solving linear and quadratic equations
   - Integral and rational exponents and radicals
   - Fractional expressions
   - The coordinate plane and graphing
2. Learning to Use the Calculator
   - To draw graphs and to solve equations and systems of equations
3. The Function Concept
   - Functional notation and graphs of functions
   - Expressing functional dependence algebraically
4. The Study of Special Functions
   - Linear, quadratic, polynomial, and rational functions
   - Functions involving radicals
5. Solving Equations
   - Algebraic and graphical methods
   - Solving literal equations
6. Exponents and Logarithms
   - Properties of the exponential and logarithmic functions
   - Solving exponential and logarithmic equations
   - Applications of the exponential and logarithmic functions
7. Systems of Equations
   - Linear systems: solving algebraically, graphically
   - Solving special non-linear systems
8. Other Topics
   - Introduction to probability
   - Introduction to right triangle trigonometry

Assessment Format: Specific information on each assessment is provided below.
- **Homework (30%)**: Each chapter has several homework assignments covering one or two sections in the text. Refer to text examples as well as the online resources (step-by-step solutions and videos) to aid in working the homework problems.
- **Tests (40%)**: You will be required to take a comprehensive end-of-chapter test after completing each chapter. You must submit your written work for all tests. You may scan your test solutions or take photos and then upload them into EduCat or drop off a
hard copy at the Mathematics and Computer Science Department office before 4:30pm on the day of the exam. Tests may only be taken one time and there is a time limit so be sure you have prepared yourself to take the test. Half of your test grade will be based on your written work submitted and the other half is based on the score calculated by the computer.

- **Final Exam (30%)**: The final exam is cumulative and will be a written final. You will need to get a proctor or come to the Mathematics and Computer Science Department to take it during their scheduled office hours.

**Grading Scale (%)**: Your course grade will be based on the percentages outlined under Assessment Format. Corresponding grades as a percentage of the total are listed below.

<table>
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<tr>
<th>Percentage Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>100 – 95.0</td>
<td>A</td>
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<tr>
<td>94.9 – 93.5</td>
<td>A-</td>
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<tr>
<td>93.4 – 89.5</td>
<td>B+</td>
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<tr>
<td>89.4 – 86.5</td>
<td>B</td>
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<tr>
<td>86.4 – 82.5</td>
<td>B-</td>
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<tr>
<td>82.4 – 79.5</td>
<td>C+</td>
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<tr>
<td>79.4 – 76.5</td>
<td>C</td>
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<tr>
<td>76.4 – 72.5</td>
<td>C-</td>
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<tr>
<td>72.4 – 69.5</td>
<td>D+</td>
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<td>69.4 – 66.5</td>
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<td>66.4 – 62.5</td>
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<td>62.4 – 59.5</td>
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<td>59.4 – 0</td>
<td>F</td>
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**NMU’s Non-Discrimination Statement**:  
Northern Michigan University does not unlawfully discriminate on the basis of race, color, religion, sex, national origin, age, height, weight, marital status, familial status, handicap/disability, sexual orientation, or veteran status in employment or the provision of services, and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities an equal opportunity to participate in all programs and activities.

Anyone having civil rights inquiries may contact the Equal Opportunity Office, 502 Cohodas Hall, telephone number 906-227-2420.

**ADA Statement**:  
If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office by: coming into the office at 2001 C. B. Hedgcock; calling 227-1700; or e-mailing disserv@nmu.edu. Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.