Instructor: Dr. Carol Bell
Office: Jamrich 2212
Office Phone: (906) 227-1603
email: cbell@nmu.edu
Office Hours: MF 12:00-1:00, WR 2:00–4:00, or by appointment

*** ”Walk-in’s” are welcome as long as I do not have a prior commitment. E-mail is a good way to contact me to ask questions or voice your concerns related to the class.

Text and Other Course Requirements:

Please bring with you to every class the following items.
1) a ruler
2) a protractor
3) a compass

This course uses EduCat so you must have Internet access in order to complete assignments and receive course information. Your user id and password should be the same as your NMU campus email user id and password.

This course also uses the software program The Geometer’s Sketchpad by Key Curriculum Press. As long as you have a university issued laptop, you may have the program (version 5) installed at no charge to you at the computer help desk. If you are using a non-university issued laptop, it is your responsibility to purchase the program. Please have the program installed on your computer by class time Wednesday, January 21.

Prerequisite:
MA211 or consent of instructor.

General Introduction and Goals:
This course is required of all secondary education mathematics majors. It may also be used as an elective for the general mathematics major. Material in the course is essential for mathematics teachers and its major purpose is to prepare students to teach high school geometry.

The course considers classical synthetic and metric geometry as an axiomatic-deductive structure. While many of the Euclidean theorems are familiar to the students from past experience, the course provides an overview of the subject and studies theorems, which heretofore have been accepted without proof. Some attention is given to elementary logic (quantifiers, rules of inference, forms of proof) and to the philosophy of mathematics (axiomatic structures, independence, models, consistency proofs). The student is also
introduced to non-Euclidean geometries with the intent to strengthen their knowledge of definitions within Euclidean geometry.

In addition to various geometries, the student is also introduced to current real world applications of Geometry. With the use of The Geometer's Sketchpad, systems such as the Global Positioning System and other applications will be studied.

**Learning Outcomes:**
Upon successful completion of this course, a student should be able to:

1. Demonstrate knowledge of basic concepts, relationships, and results of fundamental Euclidean geometry;
2. Speak and write the language and symbolism of geometry with accuracy and precision;
3. Construct geometric figures by hand (straightedge and compass) and using technology (The Geometer’s Sketchpad);
4. Make conjectures, explore cases, and draw and justify conclusions based on explorations;
5. Apply the process of mathematical proof to justify claims or conclusions that are made;
6. Describe at least one non-Euclidean geometry.

Evaluation of these learning outcomes will be done through assignments and exams.

**Content Outline:**
This course will examine topics from the following areas:

A. Euclidean Geometry
   a) Similarity theory
   b) Polygonal regions and their areas
   c) circles, arc measure, arc length, and area
   d) Ruler and compass constructions on the Geometer's Sketchpad
   e) The Angle Trisection Problem
   f) Volumes and surface areas of solids

B. An introduction to various other geometries and systems
   a) Analytic
   b) Parabolic
   c) Taxicab

C. Mission Mathematics by NCTM
   a) Global Positioning System
   b) Independent study of various geometrical problems

**Assessment Format:** Specific information on each assessment measure is provided below.

- **Class Participation (20%)**: You will be required to participate in online discussions of problems or other topics that are posted via EduCat. Included in your participation grade is that each of you critiques other students’ work that is posted on the discussion board in EduCat.
• **Problem Sets (20% - 15% written and 5% presentation):** Exercises from the concepts discussed in class will be assigned regularly. There are two components that you will be graded on for each problem set: written work turned-in and presentation of exercises to the class. All problem sets will have two deadlines: presentation and written work to be turned-in.

  **Written Work**
  All written work must be neat, organized, and may not be submitted on spiral notebook paper. The instructor reserves the right to make you re-submit your written work, if it is not legible and organized. Past-due assignments will be penalized 50% and will be accepted only up to one class period after the original due date for written work to be turned-in.

  **Presentation**
  Part of your overall problem set grade will be based on your ability to present exercises to the class at the board. Beginning the class period following a problem set assignment, any student who is able to work one or more of the exercises will present a solution to the class at the board. It is possible that more than one method exists for solving the problem. In this case, several presentations of the same exercise are possible so different students may do a presentation of the same problem. Exercise presentations are worth 2.5, 1.5, 0.5, or 0. A grade of 2.5 will be awarded if you give a correct explanation and solution. A grade of 1.5 will be awarded if you give a correct solution, but not a very good explanation. A grade of 0.5 will be awarded if you do not give a correct solution, and a score of 0 will be given if you do no presentations. You may not ask the instructor for help on any exercises prior to the presentation deadline. This is to help you gain confidence in your own mathematical abilities and to help you improve your abilities to explain mathematical concepts. You are required to do a minimum of two problem presentations. The two best problem presentations will be used to determine your presentation grade. Additional problem presentations beyond the required two presentations that are graded as 2.5 will count toward a percentage of extra credit.

• **Projects (20%):** Projects will be given throughout the course that address the topics discussed in class.

• **Examinations (40%):** Each exam will consist of questions from the material discussed in class. A university-approved excuse is generally a prerequisite for rescheduling any exam. The final exam will be comprehensive. The date and time of the final exam are **Wednesday, April 29, 12:00 – 1:50pm.** The final exam schedule is also available online.

**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>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 – 95.0</td>
<td>A</td>
</tr>
<tr>
<td>94.9 – 89.5</td>
<td>A-</td>
</tr>
<tr>
<td>89.4 – 86.5</td>
<td>B+</td>
</tr>
<tr>
<td>86.4 – 82.5</td>
<td>B</td>
</tr>
<tr>
<td>82.4 – 79.5</td>
<td>B-</td>
</tr>
<tr>
<td>79.4 – 76.5</td>
<td>C+</td>
</tr>
<tr>
<td>76.4 – 72.5</td>
<td>C</td>
</tr>
<tr>
<td>72.4 – 69.5</td>
<td>C-</td>
</tr>
<tr>
<td>69.4 – 66.5</td>
<td>D+</td>
</tr>
<tr>
<td>66.4 – 62.5</td>
<td>D</td>
</tr>
<tr>
<td>62.4 – 59.5</td>
<td>D-</td>
</tr>
<tr>
<td>59.4 – 0</td>
<td>F</td>
</tr>
</tbody>
</table>
**Appropriate Classroom Laptop Use:**
Although having a laptop in class opens up new learning possibilities for students, sometimes students utilize it in ways that are inappropriate. Refrain from instant messaging, e-mailing, surfing the Internet, playing games, writing papers, doing homework, etc. during class time. Acceptable uses include taking notes and working on assigned in-class activities, projects, and discussions that may be enhanced by laptop use. It is easy for your laptop to become a distraction to you and to those around you so please use good judgment in using your laptop during class.

**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.

**Important Deadlines**
- Last day to drop with 100% refund (No grade): Monday, January 13, 5:00pm
- Last day to drop with "W" grade: Friday, March 27