

Course Syllabus and Information  
MTH 595: Symmetry for K-8 teachers  
Fall 2018

Instructor: Dr. Tibor Marcinek  
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Office Hours: TT 12:30-1:30  
or by appointment  
Virtual office hours (Wimba)  
by appointment

Materials to be furnished by the student:

Materials, manipulatives and tools as requested by the instructor.

Course Content:

Congruence and Similarity Transformations  
Methods of finding images and generating symmetric patterns  
Symmetry in one dimension, kaleidoscope.  
Symmetry in more than one dimensions: Frieze and wallpaper groups, tessellations.  
Mathematics of Symmetry and Algebra  
A broader perspective – symmetry in science and art, fractals.

Course Methodology:

The course is designed to meet the mathematical needs of those students who plan to teach K-8 mathematics. It is based on the philosophy that mathematical ideas are learned only through active involvement. Therefore, in this course a lecturing is reduced to a minimum and teaching methodology includes hands-on activities, small group activities and presentations and whole class discussions – the methodology you will be using to present mathematical topics to your students.

Student learning objectives:

After successful completion of this course, the student will be able to:

- Use geometric transformations to describe and classify symmetrical patterns in the Euclidean plane and space.
- Represent isometries and similarity transformations using various hands-on methods.
- Generate symmetrical patterns with specific symmetries using various methods.
- Use dynamic geometry software and apps to explore symmetries and generate symmetrical patterns.
- Use isometries and their composition to describe symmetry groups as algebraic structures, explain their properties and discuss connections between geometry and (abstract) algebra.
- Identify and analyze famous artwork that draws on the principles of symmetry.
- Discuss a wider perspective on symmetry in the science and art.

Analyze Common Core State Standards and discuss the place of geometric transformations and symmetry in school curriculum.

Course Requirements and Assignments:

**Attendance.** It is an activity-based class. Therefore it is important to attend every day for entire class period with your homework completed so that you can take active part in group work activities. Attendance will be taken every day. If for some reason you must be absent, it is your

responsibility to contact me before (in emergency situations on) the day you miss the class. If you contact me by e-mail, I will send you back copies of handouts and a homework assignment. You are allowed *three* excused absences. Each *unexcused* absence will lower your grade by 5 percent points.

**Daily assignments.** You are expected to complete all in and out of class assignments. I will not collect all your homework but I expect you do it and understand it. I encourage you to work together with other MTH 595 students. There will not be time in class to go over every homework problem so plan on coming to my office or contact me through e-mail if you have any questions regarding the assignment. Short (1-2 questions) unannounced quizzes may be given to monitor your home preparation.

**Group work.** You will be working in groups of 3-4 students. As a group, try to answer all the questions on worksheets or asked by the instructor and discuss how to present your answers to the rest of the class. Make sure that all group members understand it completely and that *any* group member is able to lead the presentation as the instructor will randomly select the presentation leader. If any group member has a question, try to resolve it within your group first. If nobody is able to answer and/or explain it to other group members, then ask the instructor. Please keep in mind that the instructor will be answering group questions, not questions of individual students.

It is the responsibility of each group to get all members on task and participate. Activity of all members counts towards your group grade, which will be explained in the class.

**Presentations.** Each group must have at least 15 satisfactory presentations during the semester. These presentations are typically explanations of the work done by the group and can take various forms. They usually take 3-10 minutes, depending on the task and discussion in the class. The rest of the class will evaluate presentations. Please observe these simple rules when presenting:

1. Do not start your presentation until you have the attention of the whole class.
2. Act as if the instructor were not in the class. Maintain the eye contact with the class not the instructor for important signs and immediate assessment of your presentation.
3. If using the visualizer, do not stand at the visualizer. Instead, go to the screen and point to your notes as displayed on the screen.

**Exams.** You will complete two exams and final examination.

**Projects.** You will submit three projects. Some projects can be worked out in small groups. Topics of projects will be posted to my website <http://cmich.marcinek.sk> .

**Other rules.**

- Academic dishonesty (cheating) is a serious offence with serious consequences. If I see evidence that you are cheating, you will receive a grade of zero on that quiz or exam, and I will contact the Dean of Students and the Director of Teacher Education.
- Late coming, cell phone and other class disruptions will result in decreasing your group grade. To prevent it, make sure you turn OFF your cell phone before entering the classroom. Make sure that you notify me of any unavoidable late arrivals in advance.
- Electronic Devices: In order to protect the intellectual property interests of the instructor, the privacy interests of student members of the class, and to encourage an open and fair exposition of all student views in the classroom without fear that student views expressed will be recorded and possibly posted in another forum, recording of

classroom lectures and conversations is not permissible without the express, prior written consent of the instructor. Unauthorized recording of classroom activity shall be considered a violation of the CMU Student Code of Rights, Responsibilities, and Disciplinary Procedures as disruptive of a student's right to learn under 3.2.3 Disruption of Learning.

What you will be graded on

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Exams	15 points each	30 points
Final Exam		20 points
Projects	10 points each	30 points
Group Work		10 points
15 Group Presentations	2/3 pts each	10 points
Attendance: You are allowed <u>three</u> excused absences. Each <u>unexcused</u> absence will lower your grade by 5 percent points.		
Total possible points		<hr/> 100 points

Please note that there are no extra credit activities, so make sure you start working hard from the beginning of the semester.

Point value of each item is set so that they add up to 100 points. This way it is easy to keep track of your grade:

A: 94 and up	A-: 92-93	B+: 90-91	B: 83-89	B-: 80-82
C+: 77-79	C: 72-76	C-: 69-71	D: 60-68	Failing: below 60

*NOTICE: CMU provides students with disabilities reasonable accommodation to participate in educational programs, activities, or services. Students with disabilities requiring accommodations to participate in class activities or meet course requirements should first register with the Office of Student Disabilities Services (250 Foust Hall, telephone #517-774-3018, TDD #2568), and then contact me as soon as possible.*