Geometry and the Art of Design

Syllabus MA142 Section OL2 Winter 25

Info

3 Credits
Room: None (OL course)

Instructor Information

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Description

A contemporary primer of geometric topics that expand the concepts of shape and space, this course presents some of the established and emerging ways geometry can provide tools and insights for artists and designers. Included are a variety of visual phenomena such as fractals, knots, mazes, symmetry, and the golden ratio. (G2: Mathematics) Prerequisite(s): mathematic proficiency (see beginning of mathematics section)

Topics

Module 1: Properties of Polygons

- Google Drawing Tool: Intro to Google Drawing
- Pythagorean Theorem
- Properties of Polygons
- Sum of Vertex Angles
- One Vertex Angle of Regular Polygon

Module 2: Kaleidoscopes and Rosette Patterns

- Reflections
- Two Mirror Kaleidoscopes
- Three Mirror Kaleidoscopes
- Rosette Patterns
- Interesting Examples of Kaleidoscopes from Ads and Movies

Module 3: Symmetries of Triangle and Combining Symmetries

- Symmetries of Triangle
- Combining Symmetries
- Symmetries Applied to a Motif

Module 4: Frieze Patterns

- Frieze Patterns
- Combining Frieze Patterns
- Classifying Frieze Patterns

Module 5: Celtic Knots

- Celtic Designs and Knots
- Simple Celtic Knot Designs
- Walls and Obstructions for Celtic Knots
- References and Links to Celtic Knots

Module 6: Golden Ratio

- Golden Ratio Basics
- Golden Ratio in Art and Architecture

Course Policies

Modules

This course is organized into 6 modules:

Each module lasts 2 or 3 days. A module becomes available on the first day it is assigned. (See the section below for the dates.) When a module is finished it will remain open so you can refer to it but you will not be able to do further work in that module.

There is no way to make-up any module work once a module is finished, so stay up-to-date with the modules, otherwise you will lose the credit for work in that module.

Module Activities - Overview

For each module you will follow essentially the same activities listed below:

1. Watch a demo video from the instructor talking about the topics and techniques
2. Look at any accompanying documents or references
3. Do the assignments

Course Materials

There is no textbook. I have notes, videos and lecture slides I will distribute throughout the course.

There is no additional software needed aside from Google Docs. You should always use your FIT google account for all work in this class.

Submissions

We only use free Google tools, which you have through your school gmail account. Make sure you share all work with me via the normal sharing mechanism for google docs. Make sure you make me an "Editor" on the document. Make sure it is shared before the due date.

Evaluation

Demos - 20%

Demos are constructions or calculations or problems that are done by you as you watch videos of me explaining them. You follow along with any Demo videos and reproduce what I do using Google Drawings, or Google Docs. You will share these Demos with via the normal google sharing mechanism.

Assignments - 80%

Assignments are problems you complete after the Demos and Readings that are also shared with me via google docs. Please make sure

NOTE ON LATE WORK:

- Work submitted within 24 hours of due date receives at most 50% of full credit
- Work submitted after 24 hours but within 48 hours of due date receives at most 75% of full credit
- Work submitted after 48 hours of the due date receives 0 credit

Due Dates

- Module 1 DUE Friday, 3 Jan 11:59 PM EST
- Module 2 DUE Tuesday, 7 Jan 11:59 PM EST
- Module 3 DUE Friday, 10 Jan 11:59 PM EST
- Module 4 DUE Monday, 13 Jan 11:59 PM EST
- Module 5 DUE Wed, 15 Jan 11:59 PM EST
- Module 6 DUE Friday, 17 Jan 11:59 PM EST

No Assignment Dropboxes.

THERE ARE NO BRIGHTSPACE DROPBOXES for assignments. You simple share the documents with me via Share button on the google document. Make me an Editor on all documents so I can leave comments.

AI Policy

You may use any AI tool (ChatGPT, Gemini, Claude, and all others) to work on material for this course. However keep in mind the accuracy of these tools for mathematics and statistics is still in question, with some AI better than others. It is beneficial to understand the limitations and be comfortable with working with AI, so you are encouraged to use these tools and evaluate critically how much they assist you. If they keep you from understanding what is really going on, you will have problems on the work in the course. So use with caution.