

Fall 2003 Geometry of Art and Nature Libsci 3110

Instructor: Frank Timmes ftimmes@artic.edu 312 345 3793 Room 609, 112 S. Michigan

Coordinates: Tuesday 1–4pm between 03Sep–10Dec in room 707 of 112 S. Michigan

Office Hours: Before or after class

Text: Symmetry, Shape, and Space by Kinsey & Moore
You'll need to bring various items - paper, pens, string, scissors, compass - to class at various times.

Web: <http://flash.uchicago.edu/~fxt> Click on "Teaching". Click on "Geometry"

Course: In designing this course, I had in mind two groups of students: liberal art majors who are required by the Higher Powers to take a mathematics course, and students of the visual arts who would like to strengthen their visualization skills and learn mathematical tools for recognizing and classifying geometric patterns.

This won't be a traditional theorem and proof geometry class led by the instructor. I subscribe to the idea that one learns mathematics by doing mathematics, and I hope that what I've designed is an opportunity to realize the joy of figuring things out for yourself. About half of each class will be devoted to creating and playing with geometric constructions, such as Celtic Knots or Escher tilings.

Passing: There are 12 in-class constructions/homeworks, and 1 project in this course. To pass this class you must receive credit for 11 constructions/homeworks, and 1 project. If you do only 10 constructions, or elect not to do the project, you will not pass this class. Late homework or in-class constructions done outside of class will not be accepted.

Exams: There are no exams for this class.

Project: A project on "Geometry of Art and Nature" due on the last class. Your own drawing, painting, film, sound, sculpture, or digital creation are all fair game. You'll get the opportunity to share a 5-10 minute presentation on your project to the class.

Schedule for Fall 2003

Class 01 03Sep

- Some Euclidean basics

Construction/homework: Celtic knots, section 2.2 of the text

Reading for next class: To the Reader and Section 3.1 on Ruler and compass constructions

Class 02 10Sep

- The Golden ratio

Construction/homework: Ruler and compass constructions, section 3.1 of the text

Reading for next class: Section 9.1 on Spirals and helices

Class 03 17Sep

- Fibonacci numbers and Phyllotaxis

Construction/homework: Spirals and helices, section 9.1 of the text

Reading for next class: Section 4.1 on Regular and semiregular tilings

Class 04 24Sep

- Regular and semiregular tessellations

Construction/homework: Regular and Semiregular tilings, section 4.1 of the text

Reading for next class: Section 4.2 on Irregular tilings

Class 05 01Oct

- Irregular tessellations

Construction/homework: Irregular tilings, section 4.2 of the text

Reading for next class: Sections 5.2 and 5.3 on Rosette and Frieze patterns

Class 06 08Oct

- Rosette and Frieze symmetries

Construction/homework: Frieze patterns, section 5.3 of the text

Reading for next class: Section 5.4 and 5.5 on Islamic lattice patterns

Class 07 15Oct

- Wallpaper symmetries

Construction/homework: Islamic lattice patterns, section 5.5 of the text

Reading for next class: Section 7.2 on Platonic solids

Class 08 22Oct

- Platonic solids

Construction/homework: Platonic solids, section 7.2 of the text

Reading for next class: Section 7.3 on Archimedean solids

Class 09 29Oct

- Archimedean solids

Construction/homework: Archimedean solids, section 7.3 of the text

Reading for next class: Sections 11.1 and 11.2 on Noneuclidean geometry

Class 10 05Nov

- Non-Euclidean geometries

Construction/homework: Map projections, section 11.2 of the text

Reading for next class: Section 11.5 on Soap bubbles

Class 11 12Nov

- Soap bubbles

Construction/homework: Soap bubbles, section 11.5

Reading for next class: To be assigned on Fractals

Class 12 19Nov No class, Critique week

Class 13 26Nov No class, Thanksgiving

Class 14 03Dec

- Fractals
- Student projects

Class 15 10Dec

- Student Projects