

AMERICAN UNIVERSITY OF SHARJAH

College of Arts and Sciences Department of Mathematics Course Outline – MTH211 Summer 2010

Course Title: Geometry for the Arts and Architecture

Instructor	Office	Email	Office hours	Phone
Ayman Badawi	NAB 262	abadawi@aus.edu	Su,Mo, Tu,We: 11:20-12:10	2573

Short Course Description:

This course introduces the relation between geometry and architecture. It focuses on the use of geometrical concepts in arts and architecture. Topics include Ruler and Compass constructions, the golden ratio, Fibonacci numbers, Plane transformations, Fractals, Tiling, Hyperbolic Geometry, Basic constructions in the Poincare Model, Ancient Greek geometry, Egyptians and the geometry of the pyramids, Basic geometric constructions, Use of proportion in art, symmetry and isometry, polygons.

COURSE OBJECTIVES

- To use the student's interest in art or architecture as motivation for learning the mathematics needed to construct or to understand the work of art.
- To use student's interest in mathematics as motivation for learning about art and art history.
- To show that mathematics is not in an airtight compartment but is related to many other human endeavors.

Textbook

1. Math and Art: An Introduction to Visual Mathematics by Kalajdzievski in cooperation with Padmanabhan..
2. **Old exams, Quizzes** can be found on I-learn or on my personal webpage www.ayman-badawi.com

GRADING

Projects (HW)	20%
Two exams (June 20 and July 7 in class)	45%
Final exam	35%

CONTENTS

1. The five Axioms of Euclidean Geometry.
2. Ruler and Compass Constructions.
3. The Golden Ratio.
4. Fibonacci Numbers.
5. Group of symmetries of planar objects.
6. Frieze Patterns.
7. Tiling and Art.
8. Similarity
9. Fractals and Some Examples.
10. Inversion with respect to a circle.
11. Hyperbolic Geometries and some basic constructions in Poincare Model.
12. Perspective image of three dimensional object