MATH 4760/8766
Topics in modeling: Fractals

INSTRUCTOR: Andrzej Roslanowski
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Office hours (and schedule):

	MON	TUE	WED	THU	FRI
10:00–11:15		MATH3500 (DSC 109)		MATH3500 (DSC 109)	
11:15–12:00		OFFICE (DSC 235)		OFFICE (DSC 235)	
3:00–4:00	OFFICE (DSC 235)		OFFICE (DSC 235)		
4:00–5:15	MATH4240 (DSC 256)		MATH4240 (DSC 256)		
5:30–6:45	MATH4760 (DSC 109)		MATH4760 (DSC 109)		

Office hours by appointment also possible.

TOPIC AND SCOPE:
Fractals belong to most popular mathematical objects both because of their visual beauty and because of their applications. The mathematics behind fractals is rooted in works of Leibniz, Weierstrass, Peano, Cantor, Sierpiński, Hausdorff and many others. After development of computer graphics and works of Mandelbroit in the 1970s, the interest in fractals is steadily rising. We will discuss the basics of *fractal geometry* approaching the topic through iterated function systems. The lectures will be based on the text

> **Fractals Everywhere**, Michael F. Barnsley, Second edition.
> ISBN: 978-0-12-079069-2

In this **proof oriented course** the following topics will be discussed:

- Topology of metric spaces: compactness, connectedness, the space of compact subsets.

- Functions on metric spaces: contractions and iterated function systems, the Collage Theorem.
- Addresses on fractals and the Code Space
- Fractal Dimension
- Julia sets and Mandelbrot sets.

HOMEWORKS AND TESTS:

- Lecture notes, homework assignments, etc are posted at

  `http://www.unomaha.edu/logic/teaching/4760/4760.html`

  Each week it is your responsibility to do those problems !

  I will not collect solutions to homework assignments. However, I will be expecting questions concerning your homework and material discussed in class.
- There will be two tests (midterms).
- The Final Exam will be *comprehensive*.

GRADING:

- The midterms will be worth 100 points each.
- The Final Exam will be worth 200 points.

Therefore, the total number of points is 400. Letter grades will be assigned on the following basis:

A: 95–100%	A-: 90–95%	B+: 85–90%
B: 80–85%	B-: 75–80%	C+: 70–75%
C: 63–70%	C-: 55–63%	D+: 50–55%
D: 45–50%	D-: 40–45%	F: below 40%

Accommodations are provided for students with verified disabilities. For more information contact Services for Students with disAbilities in `EAB 117` *or* `554-2872`*,* `TTY 554-3799`*.*