

## *Syllabus*

Mathematics 496 Section 1, Spring 2016

Capstone: **Random and pseudorandom sequences**

MWF 9:10-10:00

A116 Wells Hall

J. Hall

D219 Wells Hall

x34653

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Office Hours: MWF 10:20-11:10 (or by arrangement)

Course grades will be based on homework (roughly 45%), a written project (roughly 45%), and class participation (roughly 10%).

There will be no text for the course. I may put a few relevant books on reserve in the Math Library.

As there is no text, *it is important that you show up for class* and, while there, are attentive and respectful (no looking at your phone, surfing the internet, checking email, doing homework from other classes, etc., please).

### **Description:**

Almost everyone would agree that flipping a coin a large number of times produces a random sequence of heads and tails, that is, 0's and 1's. But what exactly does it mean for a sequence to be random? Sequences that behave randomly are of great use in cryptography (one-time-pad, quantum cryptography), communication (mobile phones, the Global Positioning System), and elsewhere (dithering of digital images). Therefore, it is important to be able to construct large sets of sequences that individually and collectively appear random. The course will deal with the questions of what it means to be random and how do we construct, analyze, and apply sequences that appear random. We may also talk about the related questions of what is noise and how do we mimic it.

The methods will include probability, analysis, and geometry; but the main tools are algebraic, particularly linear recursions and finite fields.

### **Important dates in the semester**

Monday – 01/11/2016 – Classes Begin.

Monday – 01/18/2016 – Martin Luther King Day - University open, classes cancelled.

Monday 01/18/2016 to Friday 01/22/2016 – Students go to Undergraduate office, C212 Wells Hall for Mathematics enrollment changes. (Late adds, section changes)

Friday – 02/05/2016 – End of 100% Tuition Refund

Wednesday – 03/02/2016 – Middle of Semester. Last day to drop a course without a grade being reported.

Monday 03/07/2016 to Friday 03/11/2016 – Spring Break

Friday – 04/29/2016 – Last day of classes