UNDERGRADUATE MATHEMATICS SEMINAR

Bookmark it! The seminar schedule, abstracts, and (sometimes) slides presented by a speaker can be found on a webpage maintained by **Professor Jue Wang**: http://www.math.union.edu/~wangj/seminar08f.htm

The information for the next meeting of the seminar is as follows:

DATE: **TUESDAY, October 21st**

Time & **3:45pm –** Refreshments in the Math Common Room, **Bailey 204**

Location: **4:00pm –** Seminar in **Bailey 207**

In this seminar, **Dr. Martin L. Pollack**, a Corporate Scientist at Applied Physical Sciences Corporation and Adjunct Associate Professor at the Union Graduate College will deliver the following talk:

TITLE: Engineering Analysis: Mathematical Modeling of Physical Processes

ABSTRACT: Engineering Analysis is the development of mathematical models of physical processes and systems. Mathematical models enable an understanding of the physics governing the processes. They enable rapid parametric studies, benchmarking of numerical models, and planning of experiments. The process for developing and interpreting analytical models will be discussed. Several case studies will be used to demonstrate their usefulness in interpreting the physics of the processes.

Winter '09 Preregistration Process Begins this Weekend

The Timeline

- Petition course signup: Saturday, October 18th - Tuesday, October 21st. Log into webadvising.union.edu to request a slot in a petition course.
  - With the exception of honors projects, independent studies, and theses, all upper division math courses in the winter term are petition courses.
- Acceptance period: Monday, October 27th – Tuesday, October 28th. Log into webadvising.union.edu and change the ones marked "Faculty Approved" to "Student Accepted" if you wish to register for the course.
- Registration Period on Web at Hale House (Closed 12-1 for lunch):
  - Seniors: Thurs., Oct. 30th, 9am-4pm
  - Juniors: Fri., Oct. 31st, 9am-4pm
  - Sophomores: Mon., Nov. 3rd, 9am-4pm AND Tue. Morning, Nov. 4th, 9am-12pm.
  - First Years on Tue. afternoon, Nov. 4th and Wed., Nov. 5th, 9am-4pm.

The Courses

Next fall, the Math Department is offering several interesting courses beyond the calculus sequence that are suitable for math majors and minors.

Math 104 is the old Math 52. It is a (non GenEd) Introduction to Statistics. Students who might be interested in a career as an actuary or in financial mathematics should consider this course.

Math 128 is a calculus-based introduction to probability. Again, students who might be interested in a career as an actuary or in financial mathematics should consider this course. This course is also useful for prospective teachers.

Math 130 is a course in Ordinary Differential Equations. This course is a more computational version of Math 234, a Spring term offering. Applied Math majors are required to take one of these courses. Note that students may only take one of these two courses.

(Continued)

Math 238 (Methods of Applied Math II) is the sequel to Math 138 and provides a more rigorous development of the mathematical techniques and analysis of differential equations that arise from physical, biological, or economic phenomena. This course satisfies a requirement of the Applied Math major.

Math 199 is the department's "bridge course," intended to help students make the transition from computationally oriented courses to more theoretical proof-writing courses. It is a **required** course for all math majors and minors that is *usually* taken after a student has taken Math 115.

Beyond Math 199: There are three courses being offered in the fall that have a Math 199 prerequisite: **Math 224** (Geometry), **Math 340** (Linear Algebra), and **Math 448** (Differential Geometry). As a 200-level course, Math 224 is appropriate for students coming straight from Math 199. Math 340 is **required** for Math and Applied Math majors. Math 448 is a good choice for advanced students who would like to earn honors in the major and/or are thinking about graduate school in math.

Features from the American Mathematical Society

Every month, The American Mathematics Society posts a "Feature Column" on its website, at: http://www.ams.org/featurecolumn/. As explained by the editor of this column: "These web essays are designed for those who have already discovered the joys of mathematics as well as for those who may be uncomfortable with mathematics. Mathematics is a fast growing and evolving subject. The domain of ways that mathematics is being applied is growing by leaps and bounds. Examples include CT scans, audio CD's, face recognition systems, and cell phone technology. Our goal is to share our excitement about these developments with you."

In past months and years, columns with titles such as "The Process of Electing a President", "Pulling Digits out of Pi", "Image Compression: Seeing What's Not There", "When Kissing Involves Trigonometry", and many, many more. **JUNIORS: Visit this website! If there is an article or topic that really grabs your interest and excites you, then you might be able to use it as a springboard into your senior thesis!**

This month, Tony Phillips of Stony Brook University has written "Inside-out Frieze Symmetries in Ancient Peruvian Weavings." In the past, some Union math majors have written theses about Frieze symmetries, and also about the math of the Incas, Mayas, or Aztecs. This article combines some of these topics, and opens with:

"The pre-Columbian civilizations of Peru had no written language and, as far as we know, no formal mathematics beyond the still inscrutable recording of information by patterns of knots in strings called *quipu*. But thanks to their custom of burying large quantities of textiles with their dead, and to the unusual aridity of the coastal area in central and south central Peru, many of their woven, embroidered or painted textiles have been preserved. The intricate symmetries of the decoration bear witness to the pre-numerical mathematical genius of these peoples, and give us a rare window into cultures which were first superseded by the Incas and then extirpated in the aftermath of the Conquest (1532).

"Branko Grünbaum has analyzed the Peruvian exploitation of planar symmetries in textile decoration. In this column I plan to examine *frieze symmetries* as manifested in woven strips, and especially the uniquely Peruvian device of using double- and multiple-weaving to create an additional symmetry between the front and the back of a textile."

Problem of the Newsletter: October 17, 2008

As the proposer of last week's problem had not yet solved it, unsurprisingly no one submitted a correct solution. We will leave that problem open for you to work on throughout the term.

Here is this week's problem (from an old Putnam Exam): For a partition Π of {1, 2, 3, 4, 5, 6, 7, 8, 9}, let $\Pi(x)$ be the number of elements in the part containing x. Prove that for any two partitions Π and Π', there are two distinct numbers x and y in {1, 2, 3, 4, 5, 6, 7, 8, 9} such that $\Pi(x)= \Pi(y)$ and $\Pi'(x)= \Pi'(y)$. [A partition of a set S is a collection of disjoint subsets (parts) whose union is S.]

Professor Friedman will accept solutions to this problem until 12:00 noon Thursday, October 23rd. Email your solution to him (friedmap@union.edu) or put it in his mailbox in the Math Department's office on the second floor of Bailey Hall.