

UNDERGRADUATE MATHEMATICS SEMINAR

The next seminar will be

DATE: **MONDAY, October 19th**

Time & **4:15pm** – Refreshments in the Math Common Room, **Bailey 204**

Location: **4:30pm** – Seminar in **Bailey 201**

In this seminar, Union College's **Professor Paul Friedman** will present the following talk:

TITLE: Hamilton's Quaternions

ABSTRACT: One can view the set of complex numbers, \mathbf{C} as a set of ordered pairs of real numbers under the identification $a+bi \leftrightarrow (a, b)$. In this way, multiplication of two complex numbers can be interpreted as a way to multiply ordered pairs: $(a, b)*(c, d)=(ac-bd, ad+bc)$. This viewpoint was developed in 1835 by Sir William Rowan Hamilton. Inspired by this, Hamilton then asked how one ordered *triples* (a, b, c) could be multiplied in analogy to couples.

In this talk, we will discuss Hamilton's attempts to multiply triples ... and why he inevitably failed! However, initial failures often lead to greater successes. Though unable to multiply triples, Hamilton was able to determine how to multiply ordered quadruplets, leading to his discovery (invention?) of the *quaternions*, named \mathbf{H} in his honor. We will then compare and contrast the field \mathbf{C} with (the not quite a field) \mathbf{H} with some interesting results.

Students Invited to October 27 Dinner with Math Alumni

On October 27, the mathematics seminar will be a bit different - The department will be hosting a math career panel composed of Union alumni (math majors). Following the panel, there will be a dinner at 6pm where students can chat with the alumni about job opportunities in mathematics. Students who would like to attend the dinner should email Chris Hardin (hardinc@union.edu) by October 20. Space might be limited, but earlier replies will increase the probability that we can accommodate everyone. More details about the panel itself will appear in next week's newsletter.

Winter '10 Preregistration Process Begins this Weekend

The Timeline

- Petition course signup: Saturday, October 17th - Tuesday, October 20th. Log into webadvising.union.edu to request a slot in a petition course.
 - This winter tem, **NO MATH COURSES ARE PETITION COURSES.**
 - Acceptance period: Tuesday, October 27th – Wednesday, 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: online at Hale House (Closed 12-1 for lunch):
 - Seniors
 - Mon. Nov. 2nd, 10:30 am – 4:30 pm
 - Juniors
 - Tue. Nov 3rd, 8:30 am – 2:30 pm
 - Sophomores
 - Tue. Nov 3rd, 3:00 pm – 4:30 pm
 - Wed. Nov 4th 9:00 am – 4:00 pm
 - First-years
 - Thu. Nov 5th, 9:00 am – 4:15 pm
 - Fri. Nov 6th, 9:00 am – 11:00 am
- (See page 2 for Winter Term Math Courses)**

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 127 is a course in Numerical Methods. Topics include numerical approaches to differentiation, integration, and to solving differential equations. This course has a Math 115 prerequisite and students should also have a degree of fluency in some mathematical programming language.

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. Note that students may only take one of these two courses.

Math 197, Discrete Mathematics for Computer Science, is a course that introduces (continued) students to the basics of proof-writing for math and computer science, and also covers elementary logic, functions, relations, sets, and basic combinatorics. This course is intended for computer science students; students considering a math major or minor should take Math 199, not Math 197,

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 432** (Abstract Algebra II). As a 200-level course, Math 224 is appropriate for students coming straight from Math 199. Math 340, a foundational course in math is **required** for math majors. Math 432, a continuation of Math 332, will be about Galois Theory. This course 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.

Math Problem Solving Sessions

On Wednesdays, in **Bailey 201** from **12:55 to 1:40** **Professor Friedman** will be running a problem-solving seminar. While intended to help students prepare for this year's Putnam Exam, these fun workshops are open to everyone who likes to play with math problems. Join us!

Problem of the Newsletter: October 16, 2009

As no one submitted a winning solution to last week's problem, it will be repeated this week.

Here is this week's problem: A quick calculus problem. For $f(x)=x^3+6x^2-15x+k$, the absolute maximum and absolute minimum values on the interval $[-10,2]$ have the same absolute value. Find the value of k .

Professor Friedman will accept solutions to this problem until noon Thursday, October 15th. 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.