Message from Dr. Norton

Welcome to a new academic year! As we hit the final chunk of the 2012 calendar year, we see an upswing in the application (or misuse or absolute avoidance, depending on your perspective) of the mathematical and statistical tools we love to real-world situations, like interpreting political polls and arguing budgets. Of course, the big number-based question for the fall semester is whether the world will come to an end before your final exams. Think of the studying or grading we could avoid! Alas, a headline in an article in *Scientific American* from earlier this year reads: "Mayan Calendar: World Will Not End in December 2012, Expert Says". We reach the end of the 12th b’ak’tun and start the 13th one (since the beginning of time) on December 21, but that was a thing to celebrate for the Mayans, not to fear. (The Mayans weren’t really into gloom and doom, unlike those wacky Mexico who came along 400 years later, no matter what Mel Gibson says.) You gotta love that Mayan calendar. My favorite unit in their Long Count calendar is the ala’tun; one ala’tun is 23,040,000,000 days, or over 63 million years. On the other hand, in the Mayan Haab’ solar calendar, after 18 months of 20 days each came five "nameless days" called the Wayeb’, dangerous days in which the boundaries to the Underworld dissolved, against which danger people took precautions such as not washing or combing their hair. So as we roll into autumn and midterm exams and fall break, I wish you a good semester, a safe Wayeb’, and a wonderful 13th b’ak’tun. Go ahead and shampoo.

Welcome Back Students and Faculty!

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Oct. 12 (F)</td>
<td>Mid-Term begins after last class</td>
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<tr>
<td>Oct. 15 (M)</td>
<td>Semester Recess</td>
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<tr>
<td>Oct. 22 (M)</td>
<td>Classes Resume</td>
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<tr>
<td>Oct. 26 (F)</td>
<td>Registration Advising begins</td>
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<tr>
<td>Nov. 14 (W)</td>
<td>Last Day for Authorized Withdrawal without Academic Penalty (WX)</td>
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<tr>
<td>Nov. 20 (T)</td>
<td>Thanksgiving Recess begins after last class</td>
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<tr>
<td>Nov. 25 (M)</td>
<td>Classes Resume</td>
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<tr>
<td>Dec. 11 (T)</td>
<td>Tuesday, Dec. 11 will be a Friday class day and follow a Friday Schedule (UG Day only)</td>
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<tr>
<td>Dec. 13 (Th)</td>
<td>Final Day of Classes</td>
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<tr>
<td>Dec. 14 (F)</td>
<td>Reading Day</td>
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<tr>
<td>Dec. 15-21 (Sat-F)</td>
<td>Final Examinations (No exams on Sun Dec. 16)</td>
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Spring 2013 MAT Electives

**MAT 4310 Statistical Methods**
This course is an introduction to data summarization and various statistical methods that will allow students to begin to build up a toolbox of statistical techniques for handling data analysis. The class will study probability distributions that will serve as the foundations for these methods. The statistical methods that the class will study include point estimates, interval estimates and hypothesis tests for population means, variances and proportions, categorical data analysis, regression and correlation. Prerequisite: MAT1505.

**MAT 5600 Differential Geometry**
This course will study "how classic Euclidean geometry of parallel lines, angle sums, and Pythagorean theorems becomes really fascinating when done on curved surfaces." If a triangle is drawn on a balloon, is the angle sum still 180 degrees? This course will provide answers to questions such as this one. Prerequisites: MAT 1500, 1505, 2500 and high school geometry is a plus.

**MAT 5700 Math Statistics I**
Topics covered in MAT 5700 include probability, random variables, joint distributions, expected values, covariance, correlation, the moment generating function, Chebyshev's inequality, and important families of random variables. Students who are interested either in statistics or in actuarial science should strongly consider taking this course. There is a substantial overlap between the course syllabus and the syllabus for the first actuarial exam. This course in Spring 2013 will count as a second analysis course. Prerequisites: MAT2500 and MAT2705

**MAT 5705 Math Statistics II**
Survey sampling, parameter estimation, hypothesis testing, two sample tests, analysis of categorical data, linear least squares. Prerequisite: MAT5700

**MAT 5920 Coding Theory**
It's not hard to imagine a world without coding theory. Simply imagine a world bereft of all forms of digital technology, that is to say, no computers, no DVD or CD players, no mobile, cellular or gaming devices, etc. The problem arises due to physical limitations on circuitry and channel reliability. These cannot be avoided, and they manifest as inaccuracies in digitally transmitted information. Decades ago, when processors were capable of carrying out only a few hundred instructions per second, a computer (in the absence of coding theory) could run for perhaps several minutes before shutting down. Picture this same situation today, allowing for the fact that modern processors are capable of carrying out over 500,000,000,000,000 instructions per second. The machine would never even turn on. The reason it can, and does, is due to coding theory. In this course we study the mathematics underlying the design and development of codes, starting with the more naive early ones and moving progressively to the more sophisticated ones (for example, those used in the NASA Space Program).

**MAT 5930 Logic**
Logic is the study of the laws of truth and the fundamental principles of correct reasoning. As such, it forms the very basics of mathematics. Logic is highly relevant to a wide range of other disciplines, most notably the computer sciences (artificial intelligence, computability theory, etc.) and philosophy. For this reason, this course could be equally interesting for mathematics, computer science, and philosophy students, or anyone with mathematical and theoretical inclinations. This course is meant to be an introductory course to the exciting subject of logic, and will be fully self-contained (no formal or informal prerequisites necessary).

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Don't forget to make an appointment with your advisor prior to your registration date/time. All advisors have their office hours posted at their office.
One section of MAT 5900 will be with Doug Norton on Dynamical Systems and Chaos. We begin with an introduction to Dynamical Systems, the application of tools from all over the mathematical landscape (analysis, topology, numerics, algebra, computer investigations) to essentially qualitative questions about systems undergoing change. Students will present some of this foundational material while they begin exploring for project topics: abstract, applied, theoretical, computational, many possibilities! Then students will present updates on their research and end with final presentations on their projects. It’s all about learning, researching, writing, and presenting mathematics.

MAT 5900 Seminar—Number Theory—(R. Styer)
Happy numbers, lucky numbers, amiable numbers, Gaussian primes, persistence of a number, good primes: these are all unsolved problems that students like you have tried to solve. In the "Unsolved Problems in Number Theory" seminar, you will get a brief overview of number theory, then you will choose an unsolved problem to investigate. You will give a series of presentations to your classmates (develop your oral presentation skills) and write a minithesis (develop your writing skills) as well as learn to use the math library tools (develop research skills). So in the end, in addition to becoming one of the world experts on your chosen problem, you will become a well rounded person! What more could you ask for? (Some students have published papers if you want more!)

Job and Internship Information

Office for Undergraduate Students (OUS) and Career Services are great resources for any students interested in job or internship opportunities. Information will also be posted on the new Dept. of Mathematics and Statistics at Villanova University page in Facebook. Students should also fill out a profile on LinkedIn (www. LinkedIn.com) to make other networking connections.

GoNOVA is a web-based career management system to help you manage your career development process. All undergraduate students have an account. Your username is your full Villanova banner id. Freshman will be uploading in October.

For Alumni, Graduate School Students and Transfer Students, you will have to register for an account. You will receive a confirmation email once your account has been activated.

To login, please go to http://villanova.experience.com This will direct you to the Villanova University login page. At the top of the page, type in your username and password and click Enter.

From the home page, you will see important messages and instructions from the career center. Please read these messages carefully!

To start, please complete the following initial steps:

Complete your profile by clicking on “View/Edit Profile Data” listed under the “Profile” heading in the top navigation bar. The more complete your profile is, the more we can help you connect with opportunities!

Upload a resume by clicking on “Upload a Document” listed under the “Documents” heading and following the simple steps to upload a resume. Your resume must be in Word or .rtf to begin the conversion process.

Publish a resume to a Resume Book for recruiters to view your information.

Click on “Career Center Calendar” listed under the “calendar” heading to view upcoming events and opportunities offered by the career center.

If you’re ready to begin looking for opportunities, click on “Job Search” listed under the “Jobs & Internships” heading to conduct a search.

If you’re not sure what types of opportunities you’re interested in, explore the different types of content listed under the “Career Research” heading.
My Study Abroad Experience

By Erin Cuddy
Class of 2013

This past spring studied abroad in Seville, Spain. Seville is the fourth largest city in Spain and the capital of Andalusia, the southern region of Spain. Though I was nervous to live in a foreign country, speaking Spanish for four months, it turned out to be an experience of a lifetime.

But a semester without math? How was I going to survive? All of my classes were in Spanish which allowed me to complete my Spanish minor abroad. Many of the classes focused on the history and unique culture of Seville. Tasting traditional Easter desserts from Seville as well as tasting olive oils from different regions of Spain in class demonstrated the importance of food in the Spanish culture. Classes in which we walked through the city admiring Sevillian architecture reminded me of the incredible city I was living in.

Instead of living in a dorm this past semester, I lived with a Spanish family. Plates full of paella every Friday afternoon were accompanied by Spanish grammar lessons from Carmen and Miguel. Hour long conversations in which we discovered our common interest in food improved my Spanish and helped create a lasting relationship.

My semester abroad is an experience I will never forget. Fully immersing myself in the Spanish culture improved my Spanish and taught me about traditional Spanish customs. Not only was I able to experience the Spanish culture, I was also able to travel to Italy, France, England, Morocco, Portugal, and the Netherlands and experience these cultures as well. Studying abroad was such an amazing experience and I would encourage everyone to take advantage of the opportunity.

For additional information on internships, contact the Internship Office in the St. Augustine Center Room 107.
Department of Mathematics & Statistics
St. Augustine Center Room 305
Villanova University
800 Lancaster Avenue
Villanova, PA 19085
Tel: 610.519.4850
Fax: 610.519.6928
Email: math@villanova.edu

Chair: Dr. Douglas Norton
Staff: Marie O'Brien, 610.519.4809
Lorraine McGraw, 610.519.4850

Mathematics Learning And Resource Center (MLRC)

Location: 211 Falvey Library

Dates: September 4—October 11
October 22—November 19
November 26—December 13

Hours: Sunday 6:30-9:00pm
Mon.-Thurs. 1:00-5:00pm
& 6:30-9:00pm

Phone: 610-519-MLRC (6572)

Check out our web page at www.villanova.edu/mlrc for more MLRC info regarding Villanova math course, tutoring schedules, math links, and MLRC email.

Villanova Math Club

The Math Club this year has many fun things planned. Our next few meetings include homework nights with refreshments provided, making flashcards for children in Philadelphia, designing the math club t-shirts and a career night later in the semester. Come to the next meeting, October 7th at 6:30 in the MLRC! Hope to see you there!

5 REASONS TO ATTEND A MATH CLUB MEETING

1. Meetings are a good place to see that mathematicians are people too.

2. Can fill your closet with a plethora of Math Club T-shirts.

3. You eat an irrational amount of pi on pi day.

4. Statistics show your love of math will exponentially increase.

5. We never mix drinking and deriving.

For additional information on the Math Club, please contact Jessica Carroll (Jcarro08@villanova.edu).
Math Puzzles

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 2 6 4
6 8 3 2 7
 7 3 9 6
3 6 4
 2 1 6 7 5
 7 9 2 1 3
9 6 8
 5 4
 6 2 4
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