Math Camp Summer 2013

August 22-24, 26-28, and September 3-7
Morning Session: 10:00am – 12:00pm
Afternoon Session: 1:30pm – 3:30pm
Corwin 127

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Course Description: The math camp reviews basic calculus and linear algebra necessary for graduate courses in formal and quantitative methods courses. These courses include the mathematical foundation course (POL502), the formal theory sequence (POL575 and 576) and the quantitative methods sequence (POL571–574). The goal of the camp is to provide an opportunity to review these basic mathematical tools by solving a number of practice problems. This camp is NOT, however, designed to teach these materials to students for the first time. Rather, the focus of the camp will be how to apply the basic calculus and linear algebra tools to solve mathematical problems. Therefore, students are strongly encouraged to read the assigned textbooks or review relevant materials *prior to* the camp.

Course Structure: The course will meet for 10 days with morning session (2 hours) and afternoon session (2 hours). There will be daily problem sets to be completed outside of class. The topics for each day's session can be found below.

Course Requirements: There will be pre-session exercises, problem sets, and in-class midterm and final exams. Each pre-session exercise will contain a few elementary problems to check if you understand the assigned readings, and will be due by **6pm** on the day before each session. Each problem set will be distributed at the end of each morning session, and will be due by **2pm** on the following day. The problem sets and exams will be graded and solution sets will be distributed. Students are permitted to work together on problems, but you would learn much better if you try them on your own first before consulting with others: solving problems on your own is the only way to learn mathematics! Please remember that you are required to write up your solutions even.

Course Textbooks: We will use the following textbooks.

- Gilbert Strang (**S**), *Introduction to Linear Algebra*, Wellesley-Cambridge Press. Various useful materials are available at `http://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010`
- Adrian Banner (**B**), *The Calculus Lifesaver*, Princeton University Press. Videos of lectures are available at `http://press.princeton.edu/video/banner/`

Course Outline: As stated earlier, we strongly encourage students to read the relevant chapters of the textbooks before coming to the camp. During the camp, we will be reviewing these materials by solving practice problems and it will not be possible to learn these materials for the first time.

Aug 22 ..... Introduction to Vectors / Solving Linear Equations (**S** Ch.1-2)
Aug 23 ..... Vector Spaces and Subspaces / Orthogonality (**S** Ch.3-4)
Aug 24 ..... Determinants / Eigenvalues and Eigenvectors (**S** Ch.5-6)
Aug 26 ..... Functions / Limits (**B** Ch.1 and 3)
Aug 27 ..... Limit Problems (**B** Ch.4) / Review
Aug 28 ..... **Midterm Exam** (Morning)
Sep 3 ..... Continuity and Differentiability / Differentiation Problems (**B** Ch.5-6)
Sep 4 . Exponentials and Logarithms / Optimization and Linearization (**B** Ch.9 and 13)
Sep 5 ..... Introduction to Integration / Definite Integrals (**B** Ch.15-16)
Sep 6 The Fundamental Theorem of Calculus / Integration Techniques I (**B** Ch. 17-18)
Sep 7 ..... Review / **Final Exam**