MA3831-ADVANCED CALCULUS I, TERM C, 2009, January 15 - March 5.

Instructor: Professor Umberto Mosco, SH 307 Ext 5074, mosco@wpi.edu
Office Hours: M,T,R 2:00 pm - 2:50 pm.

Teaching Assistant: Emily Evans, SH 205, montu@wpi.edu
Office Hours: M 1:00-1:50pm, M 3:00-3:50pm, T 3:00-3:50pm.

Course schedule: MT RF 12:00 - 12:50 SH202

Text: Tom M. Apostol, Mathematical Analysis, second edition, Addison, Wesley, Longman, 1974. (The text by W. Rudin: Principles of real analysis, would also be appropriate).

Content: The course - the first in a sequence of two - gives a rigorous presentation of some of the fundamental concepts of classical analysis, with special attention to the construction of proofs of fundamental results. Basic knowledge of Calculus, as from MA1021 and MA1022, is required. This course covers basic material from chapters 1, 3, 4, 5 and part of chapters 7 and 8 of Apostol's book (and a similar selection of Rudin's book). The course starts with an introduction to the real numbers, with focus on the notion of l.u.b., and to the complex numbers. It proceeds with the basic properties of sequences of real numbers and their limits, monotone sequences, Bolzano-Weierstrass theorem, Cauchy criterion; series with nonnegative terms, power series, series with alternating sign, absolute convergence and rearrangement of series. Further topics are: continuous and uniformly continuous functions, Lipschitz functions, intermediate zeros and intermediate values, Weierstrass maximum theorem; then, derivatives, differentiation, Rolle's and Lagrange's theorems, Taylor's formulas. If time permits, the Riemann-Stieltjes integral will be also introduced. The most important theorems will be proved. In addition to exercises of computational nature, also exercises with theoretical character will be assigned as homework. Attendance of classes and diligent homework are required. Students will be encouraged to focus on the main highlights, to practice with proofs and exercises, to find their own motivation to this study and enjoy the subject.

Homework: Weekly assignments and quizzes to be handed in will be announced in class. Homework will be collected weekly. At random, some of the exercises will be graded.

Tests: There will be two one-hour tests: Test 1 (mid-term exam), on February 10, 2009; Test 2 (final exam), on March 5, 2009. There will be a test review for the midterm on February 9th, and a review for the final on March 3rd. Time and Location of these test reviews will be announced at a later date.

Evaluation and grades: Grades of A, B, C are guaranteed by final averages of 90, 80 and 68 percent, respectively; NR: other. The final grade can be affected by factors such as attendance, homework, participation, effort and progress. The following ingredients determine the final grade:

- Homework, quizzes, participation, effort and progress: 25%

- Test 1 (mid-term): 30%

- Test 2 (final): 45%

Conference: There will be no conference this term. Students desiring additional help and exercises are especially encouraged to attend the TA's office hours on Monday.

Academic honesty: You are encouraged to work together, in pairs or small groups, on the matter covered in class and on assignments. However, you will be asked to work independently on class tests, and possibly on other circumstances. You are expected to be familiar with the WPI Academic Honesty Policy (http://www.wpi.edu/Pubs/Policy/Honesty/policy.html).

Special needs: If you have a disability or medical condition that may require special consideration, please inform your Instructor. You should also contact in this regard the Disability Services Office (DSO) at ext 5235 or dso@wpi.edu.