MATH 362 - ADVANCED CALCULUS II
Projects

1. Peano curve: a space filling curve. See exercise 31 in p.94 in Rosenlicht, and section 9.3 p.407 in Strichartz. **Bob Cordwell.**

2. Show that in finite dimensional vector spaces, all norms are equivalent. Need some linear algebra, see exercises 22 and 23 p. 93 in Rosenlicht.

3. Equicontinuity and Arzela-Ascoli Theorem. See Sec 7.6 p.309 and exercise 10 in section 9.2 in Strichartz.

4. The contraction mapping theorem or fixed point theorem. Applications (Newton's method, how to compute the square root of a number?). Rosenlicht Section 7.1, Strichartz Section 9.3.4 p.397. **T. J. Middleton and Jeniffer Campbell.**

5. Approximation by polynomials: best approximation by n degree polynomials, Chebychev polynomials and applications to engineering. In *Real analysis with Real Applications* by K. R. Davidson and A. P. Donsig, Sections 10.5, 10.6 and 10.7. **Robert Seletsky, Wei Lui and Sezi Bakim.**

6. Approximation by polynomials: splines and uniform approximation. Applications to engineering. In *Real analysis with Real Applications* by K. R. Davidson and A. P. Donsig, Sections 10.8, 10.9. **Bill Young and Carlos Gallegos.**

7. Convexity and optimization. In *Real analysis with Real Applications* by K. R. Davidson and A. P. Donsig, Chapter 16. **Peter Al-Hokayem.**

8. Rearrangements for conditionally or absolutely convergent series. Strichartz Section 7.2.2 p.256, Rosenlicht, Section 7.2, p. 146-149 and exercise 14 in p. 162. **Danielle Kellerup.**

9. The fundamental theorem of algebra, an analytic proof. Rosenlicht exercise 34, p. 165; will need exercise 32 p. 164 or exercise 17 in p. 162. **Bryan Price.**

For the last projects I can give you hand outs to guide you. You can work on your own, or in a team. I would like a paper of no more than 5 pages per person in the team. It will be ideal if you agreed to make a short presentation in class so that all of you can learn what each of you is working on. You could propose a project not listed, but you should talk to me about it.