Syllabus, Math 431/531
Fall, 2005

Instructor:	Richard Koch
Office:	108A Deady
Office Hours:	Tuesday 1:00 - 3:00, Thursday 1:00 - 3:00, Friday 9:30 - 11:00
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Book: **A First Course in Algebraic Topology** by Czes Kosniowski
This is available as a zeroxed packet at the UO bookstore.

Approximate outline:

September 26 - 30:	Metric Spaces
October 3 - 7:	Topological Spaces
October 10 - 14:	Continuous Functions; Induced Topology
October 17 - 21:	Quotient Topology; Product Spaces
October 24 - 28:	Compact Spaces; Midterm
October 31 - November 4:	More Compact Spaces, Hausdorff Spaces
November 7 - 11:	Connected Spaces, Pancake Problems
November 14 - 18:	Manifolds and Surfaces
November 21 - 25:	Classification of Surfaces; Thanksgiving
November 28 - December 2:	Path Connected Spaces

Grading:	Homework 40% Midterm 20% Final: 40%
Remarks:	The midterm will be on Friday, October 28. The final is on Wednesday, December 7, at 10:15. Homework is due each Friday. There will be a problem session each Wednesday from 5 - 6, starting the second week of classes. I encourage you to discuss problems with each other as well.
First Assignment:	Read the preface. Skim section 0, ignoring everything about groups for now. Carefully read section 1 on metric spaces. I will probably not lecture on this section until Friday, so you will be on your own with the first exercise set. *This will never happen again.* If you are puzzled, come to my office hours on Thursday. For Friday, do exercises 1.2, 1.3abe. In part a), only do the cases $d = \|\|x - y\|\|$ and $d = \sum \|x_i - y_i\|$. When you do the first of these cases, you will find it useful to use the inequality $\|\|x + y\|\| \leq \|\|x\|\| + \|\|y\|\|$. Undergraduates can just assume this. Graduate students should prove this inequality. I recommend the following approach. Define $< x, y >$ to be the standard dot product $\sum x_i y_i$. Prove the Schwarz Inequality $\| < x, y > \| \leq \|\|x\|\| \; \|\|y\|\|$. The required inequality should follow from this by noticing that $\|\|x + y\|\|^2 =< x + y, x + y >$. To prove the Schwarz inequaltiy, notice that the following expression is nonnegative: $\left\langle x - \frac{<x,y>}{\|\|y\|\|^2} y, x - \frac{<x,y>}{\|\|y\|\|^2} y \right\rangle$
Second Assignment:	Read section two on topological spaces. For Friday, October 7, do exercises 1.5, 1.6b, 1.8abd, 2.2, 2.3abce, 2.6bcd.