MAT 541
ALGEBRAIC TOPOLOGY I

Instructor: Blaine Lawson
Office: 5-109.
Office Hours: Tu.-Thur. 11:30-1:00 or by appointment (just e-mail or speak to me).

References:
   Algebraic Topology, by A. Hatcher
   Algebraic Topology , a First Course (revised), by M. Greenberg and J. Harper
   Lectures on Algebraic Topology, by A. Dold
   Algebraic Topology, by E. Spanier
   A Concise Course in Algebraic Topology, by J. P. May
   Elements Of Algebraic Topology, by J. Munkres
   Differential Forms in Algebraic Topology, by R. Bott and L. Tu
   Algebraic Topology from a Homotopical Viewpiont, Aguilar, Gitler, and Prieto

Lectures Tues.-Thurs. 10:00-11:20 in Physics P122
Homework will be due every two weeks. Each time just hand in three of the problems that I have mentioned in class.

SYLLABUS

1. Some Basic Homotopy Theory:
   - Basic Concepts and Examples
   - Suspension and Loop Spaces
   - Higher Homotopy Groups and some properties
   - Relative Groups and the Long Exact Sequence
   - CW-Complexes
   - Fibrations and Fibre Bundles
   - The Long Exact Sequence for a Fibration

2. Homology:
   - Singular Homology Theory
   - Homotopy Invariance
   - The Exact Homology Sequence
   - Excision
   - Mayer-Vietoris Sequence
   - Cell Complexes
   - The Hurewicz Theorem
   - The Whitehead Theorem

- Axioms

3. Cohomology:
    - Singular Cohomology and Cohomology with Compact Supports.
    - The Universal Coefficient Theorem
    - $K(\pi, n)$-Spaces

4. Products:
    - The Cup Product
    - The Cap Product

5. Dualities
    - Poincaré Duality
    - Alexander Duality
    - Lefschetz Duality

6. (If there is time) Differential Characters or Cohomology Operations

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                http://www.stonybrook.edu/uaa/academicjudiciary

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