

**Instructor: Professor Jae Choon Cha**

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Office hour   by an appointment

**Course Home Page**

<http://gt.postech.ac.kr/~jccha/intro-geometric-topology-2017-spring/>

**Class Hour and Room**

Monday and Wednesday 14:00–15:15am, Science Building II 105

**Course Description**

Geometric topology is essentially the study of topology of manifolds. This course introduces key ideas of two central approaches in modern research of geometric topology: algebraic and differentiable methods. Our treatments will be based on ingredients from undergraduate level algebra, vector calculus, and general topology, and will be as elementary as possible. Topics include homotopy, fundamental groups, covering spaces, liftings criterion, classification of coverings, van-Kampen theorem, smooth manifolds, regular values, Sard's theorem, degree of maps, orientations, vector fields, and more.

**Preliminaries**

Students are expected to understand basic definitions and theorems in general topology (e.g., parts of MATH 421), and recommended to have basic knowledge on undergraduate level group theory (e.g., parts of MATH 301 Modern Algebra), and vector calculus (e.g., parts of MATH 110 Calculus). Key necessary facts from algebra and calculus will be reviewed in this class.

**Textbook and Supplementary**

Primarily I will use my own lecture notes, which will be posted on the course website. In addition, I would recommend the following as useful references:

- W. Massey, A basic course in algebraic topology, Springer-Verlag, 1991.
- A. Hatcher, Algebraic topology, Cambridge University Press, 2002.  
A pdf version is available for free: <https://www.math.cornell.edu/~hatcher/AT/ATpage.html>
- J. Milnor, Topology from the differentiable viewpoints, Princeton University Press, 1997. (Revised reprint of the 1965 original.)
- M. Spivak, Calculus on manifolds, Benjamin, 1965.

**Grading Procedure**

There will be a final exam or project. No midterm exam. The course grade will be determined from homework (40%) and exam/project (50%), plus attendance and attitude records (10%).

Homework problems will be assigned every other week. Problems will be posted on the course webpage.