

Math 444 Geometric Topology Fall 2009

Professor John Hempel

Office: 418 HB, hours 10-11 am MWF, or call ext 5126 (713 285 5126)
or email hempel@rice.edu for other arrangements.

Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities should also contact Disability Support Services in Allen Center.

Topics: Introduction to algebraic methods in topology and differential topology. Elementary homotopy theory— mostly the fundamental group. Covering spaces. Classification of surfaces. Some treatment of manifolds of arbitrary dimension.

Text: *Introduction to Topological Manifolds* by John M. Lee, Springer. See [Lee errata](#) for corrections.

Prerequisites:

- A bit of point set topology: compactness, connectedness, metric spaces, etc. will be assumed. A semester course in this material (e.g Math 443) would be ideal background, but is not necessary— particularly since the Text has a good review of this material in the first four chapters.
- Some group theory will be used, but most of the material needed— free groups, group presentations, etc. will be developed in the course. I think it can be beneficial to take this course concurrently with one covering groups.
- Please see me if you have further questions.

Grading:

- There will be a final exam and one or two mid-term exams. Homework will count for 50% of the grade.
- Homework is not pledged, but I encourage you to put as much of your own effort into it as possible. In particular, the composition and write up of homework must be your own work. Discussion of ideas, approaches, etc. in general (with fellow students, me, the grader, etc.) is encouraged and for particular problems is better than getting hopelessly stuck.
- Good mathematical exposition will be counted on both exams and homework.
- Homework is due at the beginning of class on the due date.

Owl Space: This course has an Owl Space site with links to this page. I will use Owl Space primarily for emailing announcements, and, if interest exists, organizing chat rooms, forums, etc.. However, this web page will be the official source for all information about the course.

Grader: Andrew Elliott elflord@rice.edu, Office: HB 447.

Homework Assignments:

#1. Pg. 62.: 3-2, 3, 5, 6, 8, 10, 11 and 3 additional problems at... [hempel/444F09HW1.pdf](#).
Due Wed. 9/2.

#2. Pg. 114: 5-1, 2, 3 (Do the last two as stated, but for ESCs), 4, 6, 7, 8, 9, 10. Due Fri. 9/11.

#3. Pg. 146: 6-1, 2, 4 and 4 additional problems at ... [hempel/444F09HW3.pdf](#).
Due Fri. 9/18.

#4. All at: ... [hempel/444F09HW4.pdf](#). Due. Fri. 9/25.

#5. Pg. 156: Ex. 7.2; pg. 162: Ex. 7.7; pg. 176: 7-2, 3, 4, 5, 6; Plus: Show that the not-so-fundamental group of every space is trivial. Due Fri. 10/2.

#6. Pg. 191: 8-2, 3, 4, 5, 6, 7. Due Fri. 10/9

#7. Pg. 208: 9.1, 2, 3, 4(see correction), plus additional problems at ... [hempel/444F09HW.p](#)
Due Mon. 10/19.

#8. Pg. 230: 10-1, 2, 3, 5, 6, 7, plus additional problems at ... [hempel/444F09HW8.pdf](#).
Due Mon. 10/26.

#9. Pg. 230: 10-8, 10, 12, 13, plus additional problems at ... [hempel/444F09HW9.pdf](#).
Due Mon. 11/2..

Take home exam. Pick up in class Wed. 11/4. Return in class Fri. 11/6.

#10. Pg. 253: 11- 2, 3, 4, 6, 7, 8, 10, 14, 15, 17. Due Mon. 11/16 (Change)

#11. Pg. 289: 12-1, 2, 3, 4, 5, 7, plus additional problems at ... [hempel/444F09HW11.pdf](#).
Due Mon. 11/30.

This page is maintained by John Hempel ([email](#) or, link to [homepage](#)). Last updated
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