18.504 SEMINAR IN MATHEMATICAL LOGIC

SPRING 2009

1. Administrivia

Instructor: Mia Minnes
Office: 2-172 (office hours TBA)
Course website: **http://math.mit.edu/18.504**
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WAC advisor: Susan Ruff, ruff@mit.edu, 38-583

2. Course format

Textbook. Li, Vitanyi *An Introduction to Kolmogorov Complexity and Its Applications*, 2nd or 3rd edition.

Presentations. Most of the lecture periods will be devoted to student presentations of assigned readings. Each student will be expected to present three or four times during the semester. Interspersed with the presentations, we will also have workshops on communication skills, including workshops on effective mathematics writing and informative technical presentations. The component of the grade allotted to class presentations and participation will be determined by attendance and participation, the quality and growth of presentation skills, and student self-assessment.

You must rehearse (at least) your first presentation with the instructor. Set up a time to meet with me by email or after class.

Problem Sets. Weekly psets will be assigned based on the lectures and readings. They are due in class at the beginning of each Thursday meeting. You are allowed and encouraged to work on the pset problems together. However, you must write up the solutions individually. Since 18.504 is designated a CI-M (communication intensive) course, you will be graded on the style of your solutions in addition to their correctness. The lowest pset grade will be dropped. No late homework will be accepted.

Date: July 7, 2009.

Final project. Each student is required to write a paper on the topic of their choice relating to Kolmogorov complexity or algorithmic randomness. This paper is intended to be expository and original mathematics research is not expected. Your paper should be accessible and interesting to members of the class. Suggested topics and sample papers are available on the course website.

Your paper should be 10-12 pages long and be typed in LaTeX. It should have an introduction containing some mathematical and historical context for your chosen subject and an outline of the rest of the paper. You must include all necessary definitions and provide proofs to any theorem that is used in your exposition. Make sure to cite your sources and include a bibliography. You are expected to consult two to four references (referreed and/or published works). It may also be helpful to provide at least one worked out example which clarifies the definitions or theorems you discuss in the paper.

The grade for the final project (35 points) will be broken down into five components: proposal (5 points), first draft (5 points), your peer editing of your partner's paper (5 points), how you incorporate the editorial suggestions (5 points), final paper (15 points).

Grading. Final grades in the course will be assigned according to the following approximate weighting.

- Class presentations and participation: 35 %
- Psets: 30 %
- Final paper: 35 %

3. Important Dates

Thursday, **2/12**	First pset due.
Tuesday, **2/17**	No class.
Thursday, **3/5**	Workshop on presentation skills.
Thursday, **3/19**	Project proposal and outline due.
Thursday, **3/19**	Workshop on paper writing.
Tuesday, **3/24**	Spring break: no class.
Thursday, **3/26**	Spring break: no class.
Tuesday, **4/14**	First full draft of paper due.
Tuesday, **4/21**	No class.
Thursday, **4/23**	In-class peer feedback on drafts.
Thursday, **5/14**	Final paper due.