80-310/610, Fall 2003

Logic and Computation

Course Description (Buldt)

- **Lecturer information:**

  - Bernd Buldt (Visiting Prof., U of Constance, Germany)
  - Office: BH 155B
  - Email: buldt@andrew.cmu.edu
  - Office hours: MW 12:30–1:30, F 10:30–11:30

- **TA information:**

  - Tianjiao Chu
  - Office: BH 139B
  - Mailbox: BH 135 (philosophy dpt.)
  - Email: tchu@andrew.cmu.edu
  - Office hours: F 11–12 (usually in between 10–3)

  - Henrik Forsell
  - Office: BH A60 B
  - Mailbox: BH 135 (philosophy dpt.)
  - Email: jforssel@andrew.cmu.edu
  - Office hours: W 6–7 PM (usually in all day)

- **Goal.** The goal of this course is to provide you with a concise introduction to mathematical logic with a stress on first-order model theory and its basic results (completeness theorem and its consequences).
  The computability part will be dealt with more thoroughly in the 80-311 "Computability and Unsolvability" in the following spring term. Those who are more interested in other fields of mathematical logic (proof theory, set theory, category theory) are encouraged to attend courses which focus on these fields.

- **Format.** The format of this course is as follows. We will have lectures three times a week; this should provide room not only for introducing basic notions and techniques but for proving interesting results as well. On Mondays we often start a new topic by questions and answers, on Wednesdays and Fridays there will be mostly lectures (questions welcome). Instead of recitations I offer extended office hours three times a week (please, do stop by whenever you feel somehow lost) and also the TAs will be available at their offices five days a week (please, check with them every time you face a problem with the homework assignment).

- **Literature.** The textbook for this course is:

  > H.-D. Ebbinghaus, J. Flum, W. Thomas: *Mathematical Logic*,
  > New York, Berlin: Springer, 1994.

  All references in the syllabus and the homework assignments are to this book. In addition you might want to compare the treatment of the respective topics in Prof. Avigad's *Lecture Notes* for the 80-310, available at http://www.andrew.cmu.edu/%7Eavigad/ (click on "Teaching"). From time to time I will supplement our textbook with handouts.

- **Requirements.** As a course at the 300 level there are certain requirements, but not many. Familiarity with basic mathematical concepts, the ability to follow a mathematical proof, and not being scared by formulas should do fine. More important, I think, is the appropriate attitude: Enthusiasm for learning a new topic and determination to finally master its basics.

- **Assignments.** In order to successfully participate in the course, you have to submit homework assignments (at least once a week) and to take two written in-class examinations. Here are the details:

  – Usually at the end of each lecture there will be given a number of small problems/exercises. Though I encourage you to work on these homework assignments the same or the following day and to bring your solutions to the next class, the official deadline is Friday, 5 PM, of the following week. (This should give you some legroom whenever there is too much on your plate).
  Each Friday I will post a summary of the week's homework assignments to the Blackboard System.

  – There will be two written in-class examinations which review the topics tackled so far. These will be two-hours examinations, which means, on these days class starts one hour earlier, i. e., 8:30. (If this conflicts with other classes of yours, do let me know asap!)

  – I expect you to do most of the technical work in the homework assignments, while the in-class examinations rather deal with the 'big picture' (thorough understanding of the basic notions).

- **Grades.** Grades will be assigned two times, at the time of the Mid-Semester Break and towards the end of class. Each homework problem comes with a number of points you can earn for successfully solving it (as a rule of thumb: 1P – easy, 2P – moderate, 3P – hard). These points will be added up and converted into grades. Suppose n is the number all of points you can earn. Having earned at least half of them, i. e., $n/2$, means passed (grade D); the number of points between $n/2$ and n will then be divided into equal intervalls corresponding to grade C, B, and A respectively. Those registered with the 610 strand of our class have to solve additional homework problems (usually a little bit more advanced.)

  The final grade ($= 100\%$) will be calculated as follows: The homework assignments contribute 60%, each in-class examination contributes 20% to the final grade.