Logical Foundations of Computer Science
Syllabus

Instructor

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Office hours: Tuesday-Thursday 10:30am - noon

Textbook

Logic for Applications, *2nd edition*
by: Anil Nerode and Richard A. Shore
Springer

Additional recommended reading:
Concrete mathematics: a foundation for computer science, R. Graham, D. Knuth, O. Patashnik, Addison-Wesley, 2nd edition. ISBN:0-201-55802-5. (covers functions, induction, recursion and probabilities)

1 Course description

A presentation of fundamental tools required in advanced computer science, including topics such as propositional and first-order logic, topological properties of networks, managing tasks in parallel systems using graphs as well as modeling, simulation and queueing processes.

1.1 Objectives of the course

the objective of this course is to present the essential mathematical aspects of computer science. As any scientific discipline, computer science requires mathematical tools to formalize concepts, to abstract objects and to model events. Therefore, we will present the mathematical tools that any graduate student should be familiar with, and master well enough to be able to use them in her/his field of choice.

- Sets, ordered sets, functions and introduction to l-calculus
  Applications: l-calculus for functional languages
- Propositional logic, 1st order logic, higher-order logics
  Applications to database theory and reasoning

- Review of Induction, recursion
  Applications to algorithm analysis, program termination proofs
- Probabilities: discrete probabilities, finite markov chains
  Applications to queueing processes, modeling and simulation

2 Homework, exams, etc.

Homework, quizzes

Students will be given homework and quizzes on a regular basis. Homework may not be graded all the time, but students are expected to work hard on them for they constitute a good training for succeeding at the exams. Quizzes are likely to be **unannounced**, so students are expected to work on the lecture material on a regular basis to make sure they come prepared to classes.

Mid-terms and final exams

There will be 2 "mid-terms" during the semester. The tentative schedule is as follows:

- 1st mid-term 5th week of classes
- 2nd mid-term 12th week of classes

The date of the final exam will be posted on my website as soon as possible.

3 Grading

The semester grade will be based on a combination of quizzes, project, midterms, and a final exam. The approximate percentages are as follows:

- 20% Homework / Quizzes
- 50% Mid-terms (3 mid-terms, 25% each)
- 30% Final exam

Letter grades

- $\geq$ 85% is an A
- $75 - 84\%$ is a B
- $65 - 74\%$ is a C
- $56 - 64\%$ is a D
- $\leq$ 55% is a F

4 Course policies

Communication

Students are required to check their e-mail and visit the webpage of the class (reachable from http://www.cs.utep.edu/mceberio/), to keep up to date about possible new annoucements, on a daily basis.

Standards of conduct

Students are expected to conduct themselves in a professional and courteous manner, as prescribed in the Standards of Conduct:

http://it.utep.edu/hoop/Student_Affairs_Index_Page_HOP.htm

Graded work, *e.g.,* homework and tests, is to be completed independently and should be unmistakably your own work (or, in the case of group work, your team's work), although you may discuss your projects or homework with other students in a general way. You may not present as your own work material that is transcribed or copied from another person, book, or other source, *e.g.,* a web page. Professors are required to - and therefore will - report academic dishonesty and any other violation of the Standards of Conduct to the Dean of Students.

In addition to this, note that eating or drinking in the classroom will not be tolerated.

Attendance policy

At most three absences are allowed. Three tardies will count as one absence, and will be recorded each time a student shows up ten minutes after the start of class. Above three absences, the final grade will be lowered by one point for each unexcused absence.

Disabilities

If you feel that you may have a disability that requires accomodation, contact the Disabled Student Services Office at 747-51 84, go to Room 106E Union, or e-mail dss@utep.edu.