CS 353: ALGEBRAIC LOGIC
Syllabus (Regular Material)
Autumn 2002

- Instructor: Prof. Vaughan Pratt, Gates 478, 3-2943, pratt@cs
- Time: MW 1:15-2:30
- Place: Gates 100, Stanford
- First meeting: Wed. Sept. 25

Algebraic logic treats the structure of the interaction of formal proof and mathematics, "where the symbol-crunching rubber meets the Platonic road."

Syllabus. 20 lectures under 4 main headings. Aims to balance coverage, insight, technical depth, and relevance to applications. Complements courses on first order logic and logics of programs.

1. Lattice Theory *Sept. 25 — Oct. 14*

Sep 25 Partial orders
Sep 30 Distributive lattices
Oct 2 Monoids
Oct 7 Closure systems and Galois connections
Oct 9 Fixpoints
Oct 14 Quantales

2. Universal Algebra *Oct. 16—28*

Oct 16 Algebras and free algebras
Oct 21 Equational logic and varieties
Oct 23 Completeness of equational logic
Oct 28 Birkhoff's HSP theorem

3. Algebras for Logic *Oct. 30 — Nov. 6*

Oct 30 Boolean and Heyting algebras
Nov 4 Kripke structures and modal logics
Nov 6 Regular algebras and dynamic logic
Nov 11 De Morgan algebras and linear logic

4. Categories *Nov. 13 — Dec. 4*

Nov 13 Categories and functors
Nov 18 Limits and colimits
Nov 20 Natural transformations and adjunctions
Nov 25 Algebraic theories
Nov 27 Closed categories
Dec 2 Monads
Dec 4 Enriched categories