School of Mathematics

Course 239(2BA1) — Mathematics for SF Computer Scientists 1999-2000
(SF Computer Science and CS Linguistics & a Language)

Lecturer: Dr. N. H. Butimore

Requirements/prerequisites: 135 (1BA1) — A course in calculus and linear algebra.

Duration: 24 weeks

Number of lectures per week: 3

Assessment: Assignments counting 15%

End-of-year Examination: One three hour examination

Description:

1. Finite induction; sets; partial orders and lattices; equivalence relations and Fermat's Little Theorem.
2. Mappings: partial, total, injective, surjective, bijective, invertible and Boolean
3. Graphs: complete, bipartite, Euler, Hamilton paths; Directed graph: adjacency matrix, finite relations; Trees: binary, height and nodes
4. Algebraic structures: semigroups, monoids and groups; Homomorphisms and isomophisms.
5. Grammars: phrase structure and Chomsky hierarchy; Languages: context free and regular; Machines: finite state acceptors
6. Ordinary Differential Equations: higher order, initial and boundary value problems
7. Fourier Series: orthonormal functions, Euler coefficients, half-range expansions, truncated series approximation.

Textbooks:

1. M. Piff, *Discrete Mathematics*, Cambridge University Press.
2. Judith L. Gersting, *Mathematical Structures for Computer Science*, W. H. Freeman.
3. D. J. Cooke & H. E. Bez, *Computer Mathematics*, Cambridge University Press.
4. R. P. Grimaldi, *Discrete and Combinatorial Mathematics*, Addison-Wesley.
5. W. E. Boyce & R. C. DiPrima, *Elementary Differential Equations*, John Wiley.

May 13, 1999