School of Mathematics

Course 444 — Topics in Theoretical Physics 2000–01
(JS & SS Theoretical Physics
JS & SS Mathematics)

Lecturer: Professor W. McGlinn

Requirements/prerequisites: 441 at least concurrently

Duration: 21 weeks

Number of lectures per week: 3

Assessment:

End-of-year Examination: Examination in May/June

Description:

Introduction of group theory with applications to physics.

Basics of group theory — subgroup, invariant subgroup, cosets, representations, etc. — illustrated by examples from discrete and continous groups.

Lie groups and their associated Lie algebras.

Group representation theory — important in the application of group theory to quantum theory.

Group theory in quantum mechanics; examples taken from the permutation, rotation, Euclidean, Galilean, Lorentz, Poincaré and elementary particle symmetry groups.

Textbooks:

1. J.E.Cornwell, Group Theory in Physics, Vols I and II
2. E. P. Wigner, Group Theory
3. Howard Georgi, Lie Algebras in Particle Physics
4. Wu-Ti Tung, Group Theory in Physics, World Scientific, 1985

October 11, 2000