## **School of Mathematics**

Course 1BA1 — JF Computer Science/CSLL Mathematics (135) 2000-01 (JF Computer Science)

Lecturer: Colm Ó Dúnlaing

Requirements/prerequisites: None

Duration: 24 weeks

Number of lectures per week: 2 + 1 tutorial

Assessment: 20 homeworks; 2-hour tests at beginning of Hilary and Trinity terms.

End-of-year Examination: One 3-hour paper

## **Description**:

Coordinate geometry. Lines in 2 dimensions. Points, vectors, and displacements in 2 dimensions. Scalar products. Bases of coordinate systems. Vectors in 3 dimensions. Planes. Linear maps. Cross products. Rotations in 3 dimensions. Gauss-Jordan elimination. Invertible matrices. Bases and coordinate systems. Permutations and signatures. Determinants. Cofactor expansions. Adjoint form of inverse. Cramer's Rule. Row space, column space, kernel. Product rule for determinants.

Limits and continuity. Derivatives. Differentiation rules. Tangent line. Graph sketching. Taylor's series. Taylor's Theorem. Integration.

Ordinary differential equations (separable and linear). Recurrences. Linear recurrences. Second order differential equations and recurrences.

Newton-Raphson method with error estimates. Approximate integration: Trapezoidal formula and Simpson's Rule.

**Textbook.** Elementary Linear Algebra, by Howard Anton. (Not a required text.)

October 11, 2000