This unit consists of 29 lectures on calculus and 10 lectures on probability and distribution theory for continuous random variables.

Topics in calculus are: vector functions of one variable, limits, continuity, parametric space curves, integrals; arc length, curvature and principal normal, velocity, acceleration; functions of several variables, level surfaces, limits and continuity, partial derivatives; directional derivatives, derivatives as linear transformations, Jacobians, chain rule for scalar and vector valued functions, inverse and implicit function theorems, Newton’s method, implicit differentiation, gradients, normals, tangent planes, linear approximations, unconstrained and constrained optimisation; integrals over two-dimensional regions in various co-ordinate systems; Riemann sums for triple integrals, Fubini’s theorem, change of variables, areas of surfaces, volumes, centres of mass, moments of inertia.

Topics in probability are: probability density functions on the line and plane; uniform, normal, exponential and gamma distributions; functions of a single random variable, moments and moment generating functions; joint, marginal and conditional distributions, covariance, correlation and independence; conditional expectations; bivariate normal distribution.

For more info see the Handbook: http://handbooks.uwa.edu.au/units/math/math2209