

Module Code	ST2004
Module Title	Applying Probability: Introduction
Pre-requisites	None
ECTS	5
Lecturer(s):	Professor John Haslett (john.haslett@tcd.ie)
Delivery	This is a first semester module
Aims	An introduction to probability, intended as preparatory for later courses
Learning Outcomes	<p>When students have successfully completed this module they should:</p> <ul style="list-style-type: none"> • Understand the basic ideas of probability modelling; ie how to describe uncertainty by probability statements, and how to combine uncertainties to make statements about the uncertainty of systems
Syllabus	<p>Specific topics addressed in this module include:</p> <ul style="list-style-type: none"> • Basic concepts in probability, including <ul style="list-style-type: none"> ○ the basic rules ○ probability mass functions, density functions and cumulative distribution functions for discrete and continuous univariate random variables ○ bivariate probability distributions for discrete random variables ○ expected values, variances and standard deviations, covariances • The use of Monte Carlo methods in modelling systems of random variables • Standard models including: <ul style="list-style-type: none"> ○ for discrete random variables, the Binary (Bernoulli) , Discrete Uniform, Binomial, Poisson, and ○ for continuous random variables, the Uniform, Normal and Exponential • The implications for approximations of the Central Limit Theorem
Assessment	Two group assignments and one two-hour examination
Bibliography	<p>Main Text: Dekker, Kraaikamp, Lopuhaa, Meester: A Modern Introduction to Probability and Statistics, Springer,2005</p> <p>Other recommended reading Hand, D.J. Statistics: A Very Short Introduction, Oxford, 2008 Applebaum, D: Probability and Information, 2nd ed Cambridge 2008 Stirzaker, D: Probability and Random Variables: a beginners guide, 2005 Williams, D: Weighing the Odds: a Course in Probability and Statistics; Chap 1-4; Cambridge, 2004 Mitzenmacher, M and Upfal, E, Probability and Computing, Cambridge, 2005 Tijms, H: Understanding Probability, 2nd ed, Cambridge, 2007 Swift, L: Mathematics and Statistics for Business, Management and Finance, MacMillan 1997</p>