



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

Course Title:	STAT7614 Probability and Distribution Theory
Coordinators:	Semester 1: Prof Andrew Forbes Dept of Epidemiology & Preventive Medicine, Monash University Semester 2: A/Prof Rory Wolfe Dept of Epidemiology & Preventive Medicine, Monash University
Mode:	External
Prerequisites:	Mathematical Background for Biostatistics
Semester availability:	Semester 1 and semester 2
Time commitment:	8-12 hours total study time per week
Aim:	This unit will focus on applying the calculus-based techniques learned in Mathematical Background for Biostatistics (MBB) to the study of probability and statistical distributions. These two units, together with the subsequent Principles of Statistical Inference (PSI) unit, will provide the core prerequisite mathematical statistics background required for the study of later units in the Graduate Diploma or Masters degree.
Content:	This unit begins with the study of probability, random variables, discrete and continuous distributions, and the use of calculus to obtain expressions for parameters of these distributions such as the mean and variance. Joint distributions for multiple random variables are introduced together with the important concepts of independence, correlation and covariance, marginal and conditional distributions. Techniques for determining distributions of transformations of random variables are discussed. The concept of the sampling distribution and standard error of an estimator of a parameter is presented, together with key properties of estimators. Large sample results concerning the properties of estimators are presented with emphasis on the central role of the normal distribution in these results. General approaches to obtaining estimators of parameters are introduced. Numerical simulation and graphing with Stata is used throughout to demonstrate concepts.
Assessment:	Assignments 80% (two written assignments, each worth 40%) and submission of selected practical written exercises 20%,
Prescribed texts:	Wackerly DD, Mendenhall W, Scheaffer RL. Mathematical Statistics with Applications, 7 th edition, 2008, Duxbury Press, USA. ISBN 978-0-495-11081-1
Special computer requirements:	Stata statistical software
Resources for distance students:	Printed course notes and assignment material by mail, email, and online interaction facilities