Module Code	ST2351							
Module Name	Probability and Theoretical Statistics 1							
ECTS Weighting <sup>1</sup>	5 ECTS	5 ECTS						
Semester taught	Semester 1							
Module Coordinator/s	Professor Simon Wilson							
<u>Module Learning</u> <u>Outcomes</u>	<ul> <li>On successful completion of this module, students will be able to:</li> <li>LO1. Derive the probability space for simple experiments, and prove simple properties of probabilities from its definition;</li> <li>LO2. Identify when random variables are independent, and derive conditional distributions and expectations;</li> <li>LO3. Define the most common discrete and continuous random variables, and compute their moments and probabilities, moment and characteristic generating functions where appropriate;</li> <li>LO4. Define a multivariate distribution and calculate marginal and conditional distributions from it;</li> <li>LO5. State and prove the laws of averages and of central limit;</li> </ul>							
Module Content	<ul> <li>This is a rigorous development of probability theory from an axiomatic foundation, along with some more advanced topics. The topics covered are:</li> <li>Events and probabilities</li> <li>The laws of probability</li> <li>Independence and conditional probability</li> <li>Discrete random variables</li> <li>Continuous random variables</li> <li>Multivariate distributions &amp; independence</li> <li>Moment and characteristic generating functions</li> <li>The law of averages and the central limit theorem</li> <li>Examples and past exam questions</li> </ul>							
Teaching and Learning Methods	Lectures							
Assessment Details <sup>2</sup>	Assessment Component Examination	Brief Description 2 hour written examination	Learning Outcomes Addressed LO1, LO2, LO3, LO4, LO5	% of total 100%	Week set n/a	Week due n/a		

<sup>&</sup>lt;sup>1</sup> <u>TEP Glossary</u> <sup>2</sup> <u>TEP Guidelines on Workload and Assessment</u>

Reassessment Details	Examination (2 hours	100%)
Neassessment Details	Examination (2 nours,	100/0]

Contact Hours and Indicative Student Workload	Contact Hours (scheduled hours per student over full module), broken down by:         lecture         Independent study (outside scheduled contact hours), broken down by:         preparation for classes and review of material (including preparation for examination, if applicable)         completion of question sheets (including examination, if applicable)         Total Hours	33 hours33 hours72 hours65 hours18 hours116 hours			
Recommended Reading List	<ul><li>Probability: an Introduction by Grimmett and Welsh, published by Oxford University Press.</li><li>Introduction to Probability Models by Ross, published by Academic Press (10th edition or later).</li></ul>				
Module Pre-requisites	Prerequisite modules: ST1251, ST1252 Other/alternative non-module prerequisites: e.g. programming languages, specified topics, etc This information will be particularly relevant for visiting students or students taking this module as an approved module (if applicable).				
Module Co-requisites					
Module Website					
Last Update	01/07/2019 by Simon Wilson				