Module Code	STU34508						
Module Name	Statistical Inference 2						
ECTS Weighting	5 ECTS						
Semester taught	Semester 1						
Module Coordinator/s	Dr. Jason Wyse						
<u>Module Learning</u> <u>Outcomes</u>	<ul> <li>On successful completion of this module, students will be able to:</li> <li>LO1. Use moment generating functions to understand sums of iid random variables</li> <li>LO2. Derive method of moments and maximum likelihood estimators</li> <li>LO3. Describe the properties of an estimator ursing bias and mean square error</li> <li>LO4. Derive approximate sampling distributions for maximum likelihood estimators</li> <li>LO5. Construct confidence intervals for unknown parameters</li> <li>LO6. Construct tests of hypothesis of unknown parameters</li> </ul>						
Module Content	This module provides an overview of key topics in classical statistical theory. It begins with the study of sums of independent and identically distributed random variables, proceeding to a proof of the Central Limit Theorem using moment generating functions. Estimation of the parameters of statistical models based on observed data is then dealt with. The method of moments and maximum likelihood are examined. Properties of the estimators these methods produce are defined and explored. The Central Limit Theorem proved earlier is used to derive asymptotic properties of maximum likelihood estimators. Throughout the module, the basic inferential techniques of constructing confidence intervals and conducting hypothesis tests are revisited, and then discussed formally at the end.						
Teaching and Learning Methods	Lectures 3 classes per week. Some of these classes will be used as tutorials.						
Assessment Details 2	Assessment Component	Brief Description	Learning Outcomes Addressed	% of total	Week set	Week due	
	Examination	2 hour written examination	LO1, LO2, LO3, LO4, LO5, LO6	90%	n/a	n/a	
	Assignments	Four assignments throughout the semester	LO1, LO2, LO3, LO4, LO5, LO6	10%	3, 5, 7, 9		

<sup>1</sup> <u>TEP Glossary</u>

<sup>2</sup> <u>TEP Guidelines on Workload and Assessment</u>

Reassessment Details       Examination (2 hours, 100%)         Contact Hours and Indicative Student       Contact Hours (scheduled hours per student over full module), broken down       33 hours         Indicative Student       Lecture       29 hours         Workload       Lecture       29 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Independent study (outside scheduled contact hours), broken down by:       82 hours         Introduction to classes and review of material (including examination, if applicable)       40 hours         Total Hours       Statistical Inference (second edition), George Casella and Roger Berger, Duxbury Press			1				
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