Module Code	STU22005
Module Name	Applied Probability II
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Dr. Bahman Honari
Module Learning Outcomes	On successful completion of this module, students will be able to: LO1. Derive confidence intervals and hypothesis tests for means and variances LO2. Derive prediction intervals for simple statistical models and explain how they differ from confidence intervals LO3. Conduct and explain the outputs of hypothesis testing in regression analysis LO4. Define maximum likelihood estimates and how compute them LO5. Implement a bootstrap to construct confidence intervals LO6. Construct a q-q plot and use simple transformations of data that can make it more Normally distributed LO7. Construct a probability plot for any given distribution where its distribution function is known LO8. Calculate the properties of multivariate distributions LO9. Derive marginal and conditional probabilities of the bivariate Normal distribution
Module Content	Recap: derivation of the confidence interval and tests of hypothesis for normal data; the difference between a confidence interval and a prediction interval The Central Limit Theorem and what it says about confidence intervals and tests of hypothesis Hypothesis testing for regression analysis The bootstrap approach to confidence intervals and tests of hypothesis Introduction to maximum likelihood estimation and computation The q-q plot and transforming data to make it more Gaussian Introduction to multivariate distributions
Teaching and Learning Methods	Lectures and laboratories

[1] TEP Glossary

Assessment Details[2]

Assessment Component	Brief Description	Learning Outcomes Addressed	% of total	Week set	Week due
Examination	2 hour written examination	All	85%	n/a	n/a
Project	Lab CA	All	15%	n/a	n/a

Reassessment Details

Examination (2 hours, 100%)

Contact Hours and Indicative Student Workload

Contact Hours (scheduled hours per student over full module), broken down by:	**32 hours**
lecture	22 hours
laboratory	10 hours
Independent study (outside scheduled contact hours), broken down by:	**32 hours**
preparation for classes and review of material (including preparation for examination, if applicable)	22 hours
completion of assessments (including examination, if applicable)	10 hours
Total Hours	**64 hours**

Recommended Reading List

George Casella, Roger L. Berger, Statistical Inference, 2nd Edition

Douglas C. Montgomery, George C. Runger, Norma F. Hubele, Engineering Statistics, 5th Edition

Douglas C. Montgomery, Elizabeth A. Peck, G. Geoffrey Vining, Introduction to Linear Regression Analysis, 5th Edition

Module Pre-requisites

Prerequisite modules: STU11002, STU22004

Other/alternative non-module prerequisites: N/A

Module Co-requisites

N/A

Module Website

Blackboard

Last Update

31/08/2019 by Bahman Honari

[2] TEP Guidelines on Workload and Assessment