

## **COURSE SPECIFICATION DOCUMENT**

**NOTE:** ANY CHANGES TO A CSD MUST GO THROUGH ALL OF THE RELEVANT APPROVAL PROCESSES, INCLUDING LTPC.

<b>Academic School/Department:</b>	Richmond Business School
<b>Programme:</b>	BA Economics with Combined Studies
<b>FHEQ Level:</b>	5
<b>Course Title:</b>	Probability & Statistics II
<b>Course Code:</b>	MTH 5120
<b>Course Leader:</b>	Ali Aboutorabi
<b>Student Engagement Hours:</b>	120
Lectures:	30
Projects / Tutorials:	15
Independent / Guided Learning:	75
<b>Semester:</b>	Fall
<b>Credits Points:</b>	12 UK CATS Credits 3 US Credits 6 ECTS Credits

### **Course Description:**

This Course is a continuation of MTH4120 and is concerned with inferential statistics. It covers sampling distributions, interval estimations and estimating confidence intervals for populations and proportions, hypothesis and significance testing, goodness-of-fit test and Chi-square test, one-way analysis of variance (ANOVA), applications of non-parametric statistics and linear regression analysis. All practical work will be done on SPSS statistical software.

**Prerequisites:** MTH4120

### **Aims and Objectives:**

This Course aims to provide students with understanding and application of sampling distributions, estimation and hypothesis testing methods, primarily in business, economics and psychology. and practical interpretations of statistical outputs from SPSS software in a manner that is understandable, relevant and using the correct statistical language.

### **Programme Outcomes:**

Economics: A2, A4, B3, D

A detailed list of the programme outcomes are found in the Programme Specification. This is located at the Departmental/Schools page of the portal.

### **Learning Outcomes:**

- Understand the difference between descriptive and inferential statistics, and be able to apply a wide range of techniques that involve sampling distributions, interval estimations and confidence intervals for population and proportion data.
- Demonstrate a detailed knowledge of well established statistical theories and concepts and their applications in practical problems that involve using statistical tables to perform hypothesis testing, interval estimations, analysis of variance, linear regression and non-parametric methods.
- Identify suitable method of statistical analyses required for different types of data and be able to perform the required analysis either on paper or by use of suitable statistical software package such as SPSS and to interpret the output obtained in a manner that demonstrates a thorough understanding of statistical concepts.
- Be able to explore data statistically and identify patterns and relationships in data, and to use statistical models to judge the relevance and significance of data being investigated and also identifying the limitations of the method of enquiry.
- Be able to select appropriate techniques/criteria for evaluating data in a given problem and discriminate from competing methodologies the best method to use and for what data.

### **Indicative Content:**

- Sampling distributions of sample statistics.
- Point and interval estimations of population means and proportions.
- Hypothesis and significance testing about the mean and proportion for one and two populations.
- Chi-square tests to cover goodness-of-fit test, test of independence, test of homogeneity and interpretation of test results from analyses using statistical software.
- One-way analysis of variance (ANOVA) to test homogeneity of means of at least three populations, and interpretation of ANOVA test results from analyses using statistical software.
- Linear regression to estimate least square line and test significance of estimated parameters to draw relevant conclusions on nature of estimated model, and interpretation of linear regression output from analysis using a statistical software.
- Non-parametric methods and related tests.

**Assessment:**

This course conforms to the Richmond University Special Programme Assessment Norms for Mathematics approved by Academic Council on 28 June 2012.

**Teaching Methodology:**

The Course is delivered through interactive learning sessions using PowerPoint slides, computer activities, tutorial work, small group formative assessments and individual/group mini projects. Timely feedback and feedforward will be provided to enhance students' learning.

**Bibliography:**

**Indicative Text(s):**

P. S. Mann, "Introductory Statistics", 9th edition, Wiley, 2016

Recommended reading:

- A. Bryman, "Quantitative Data Analysis with IBM SPSS 17, 18 & 19", Routledge, 2011
- S. Lipschutz & J. J. Schiller, "Introduction to probability and statistics", McGraw Hill, 2012
- D.G. Rees, "Essential Statistics", 4th edition, Chapman & Hall/CRC, 2001
- M. Sheldon, "Introductory statistics", 4th edition, Elsevier/AP, 2017
- R. Sheldon, "A first course in probability", 9th edition, Publisher: Boston Pearson, 2014
- Murray R. Spiegel, et al, "Probability and statistics", 4th edition, McGraw-Hill, 2013
- N. A. Weiss, "Introductory statistics", 7th edition, Addison-Wesley, 2004

***Journals***

Journal of Royal Statistical Society  
Journal of Biometric Society  
Journal of the American Statistical Association  
Journal of Applied Statistics

***Web Sites***

Royal Statistical Society <http://www.rss.org.uk/site/cms/contentCategoryView.asp?category=90>

American Statistical Association  
<http://www.amstat.org/>

SPSS tutorials, IBM corporation,  
<https://www.spss-tutorials.com/basics/>, sited July 2019 [also available on the University network under licence]

Change Log for this CSD:

Major or Minor Change?	Nature of Change	Date Approved & Approval Body (School or LTPC)	Change Actioned by Academic Registry
	Reading List	September 2019	