MODULE TITLE	**Probability, Statistics and Data**	**CREDIT VALUE**	**30**
MODULE CODE	**MTH1004**	**MODULE CONVENER**	**Dr Stefan Siegert (Coordinator)**

DURATION: TERM	**1**	**2**	**3**
DURATION: WEEKS	**11**	**11**	**0**

Number of Students Taking Module (anticipated)	**275**

DESCRIPTION - summary of the module content

Our ability to collect and analyse data is increasingly driving our world. Statistics is concerned with both the practice of analysing data to learn about the world, and the theory that underpins the methods and models used for data collection and analysis. This theory is itself based on probability, the mathematics of chance and uncertainty. In this module, you will learn about the mathematics of combinatorics and probability, and the key ideas of statistical modelling and inference, in which probability is used to quantify uncertainty. You will also gain experience of employing these ideas to analyse data using statistical software such as the R programming environment. The module develops key ideas and techniques that form the foundation of modules such as MTH2006 Statistical Modelling and Inference.

AIMS - intentions of the module

The aim of this module is to introduce you to basic topics in probability, statistics and data analysis. This module provides the foundation for the second-year stream in Statistical Modelling and Inference, and subsequent modules in statistics in years 3 and 4.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed)

On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge:

demonstrate a sound understanding of selected essential topics in probability theory, including the ability to apply those concepts in tackling an appropriate range of problems;
demonstrate a knowledge of the basic ideas of statistical inference, including probability distributions, point and interval estimation and hypothesis tests;
use the statistical programming environment R to manipulate, visualise and analyse data.

Discipline Specific Skills and Knowledge:

show sufficient knowledge of fundamental mathematical and statistical concepts, manipulations and results.

Personal and Key Transferable/ Employment Skills and Knowledge:

reason using abstract ideas, formulate and solve problems and communicate reasoning and solutions effectively in writing;
use learning resources appropriately;
exhibit self-management and time-management skills.

SYLLABUS PLAN - summary of the structure and academic content of the module

the nature of data;
data visualisation
probability theory and applications;
random variables and moments;
discrete and continuous distributions;
bivariate and multivariate distributions;
parametric statistical models;
prediction and simulation;
applications of models;
combinations of random variables;
transformation of random variables;
point estimation;
interval estimation;
hypothesis testing.

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning & Teaching Activities	88.00	**Guided Independent Study**	212.00	**Placement / Study Abroad**	

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled learning and teaching activities	66	Lectures
Scheduled learning and teaching activities	11	Practical classes in a computer lab
Scheduled learning and teaching activities	12	Tutorials
Guided independent study	211	Guided independent study

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

Form of Assessment	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Weekly theoretical and practical exercises	1 hour each week	All	Class feedback
Report 1 practice	4 hours	All	Class feedback
Report 2 practice	4 hours	All	Class feedback

SUMMATIVE ASSESSMENT (% of credit)

Coursework	30	**Written Exams**	70	**Practical Exams**	

DETAILS OF SUMMATIVE ASSESSMENT

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Written exam – closed book	60	2 hours (Summer)	1,2,4-7	Via SRS
Report 1	15	Short report, about two pages	All	Feedback sheet
Report 2	15	Short report, about four pages	All	Feedback sheet
Mid-term Tests	10	2x40 minutes	All	Via SRS

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)

Original Form of Assessment	Form of Re-assessment	ILOs Re-assessed	Time Scale for Re-reassessment
Written Exam*	Written exam (2 hours)	1,2,4-7	August Ref/Def period
Report 1*	Report 1	All	August Ref/Def period
Report 2*	Report 2	All	August Ref/Def period
Mid-term test 1*	Mid term test 1	All	August Ref/Def period
Mid-term test 2*	Mid term test 2	All	August Ref/Def period

*Please refer to reassessment notes for details on deferral vs. Referral reassessment

RE-ASSESSMENT NOTES

Deferrals: Reassessment will be by coursework and/or exam in the failed or deferred element only. For deferred candidates, the module mark will be uncapped.
Referrals: Reassessment will be by a single written exam worth 100% of the module only. As it is a referral, the mark will be capped at 40%.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type & level of information that you are expected to consult. Further guidance will be provided by the Module Convener

ELE – http://vle.exeter.ac.uk

Reading list for this module:

Type	Author	Title	Edition	Publisher	Year	ISBN	Search
Set	McColl, J.	Probability		Arnold	1995	0000340614269	[Library]
Set	Grolemund, G. and Wickham, H.	R for Data Science		O'Reilly Media	2016	978-1491910399	[Library]
Set	Rice, J A	Mathematical Statistics and Data Analysis	3rd	Brooks Cole	2007	978-0495118688	[Library]

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	None		
CO-REQUISITE MODULES	None		
NQF LEVEL (FHEQ)	4	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	Tuesday 10 July 2018	**LAST REVISION DATE**	Monday 16 May 2022
KEY WORDS SEARCH	Probability; probability distributions; random variables; statistics; inference; estimation; prediction; simulation; data analysis; data visualisation; R.		