MA22004 - Statistics and Probability II

Dr Eric Hall

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Contents

Course Documents

Welcome

Welcome to MA22004.

Course Guide

Organisation

The MA22004 module runs for 11 teaching weeks and is worth 20 SCQF credits (equal to 10 ECTS points). All organisation and teaching will be carried out by:

Dr Eric Hall ehall001
@dundee.ac.uk
Mathematics Division
Room TBA, Fulton
Building
01382 TBA

You should make an appointment to see Dr Hall if you have a problem regarding the course. You may also bring matters of concern about the course to the attention of the Mathematics Division Staff/Student Committee, which meets once each semester. A volunteer from Level 2 Mathematics will act as class representative to sit on the Staff/Student Committee; their name will be posted on Ultra.

Timetable

Due to COVID19, these plans may be subject to change.

The delivery of this module consists of a blend of synchronous and asynchronous content delivered both in-person and online. On an average week there will be seven planned teaching and learning activities.

Activity	Timetabled	Group	Hours	Delivery
Reading	asynchronous	individually & in groups	5.0	online
Investigation	asynchronous	individually	1.0	online
Seminar	synchronous	whole class	1.0	online
Computer Lab	asynchronous	individually	5.5	online
Workshop Preparation	asynchronous	individually or in groups	2.0	online
Workshop	synchronous	in groups	1.0	face-to-face
Office Hours	synchronous	in groups	2.0	online

The anticipated student effort is 200 hours (or 17.5 hours per week less the examination time). You are expected to be "present" for all synchronous timetabled activities with the exception of the online office hours. You can engage with the asynchronous material at your own pace, keeping in mind that you meet any deadlines for engagement and/or attainment.

Pre-requisites

In order to take this course you must have passed module MA12003 or an equivalent qualification.

Syllabus

Sampling Distributions Mean and standard deviation of samples, sampling from a single population, sampling from two populations, shape of sampling distributions. Normal distribution, χ^2-square distribution, F-distribution.

Hypothesis tests Null and Alternate hypotheses, inferences, confidence intervals, estimating means, proportions and standard deviations.

Linear Regression Least squares, assessing usefulness of a model, using a model.

Industrial Quality Control Control Charts, acceptance sampling.

R software package Appropriate use of computational software to carry out statistical and probabilistic calculations.

Recommended Books

In addition to these lecture notes, here are some text books you may wish to consult.

You do not need to purchase these books.

- Devore, *Probability and Statistics for Engineering and the Sciences,* Cengage learning, 2011. [§6-10, 12]
- DeGroot and Schervish, *Probability and Statistics,* Addison-Wesley, 2001. [§7-10]

- Rice, *Mathematical statistics and data analysis,* Cengage Learning, 2006. [§6-12]
- Wasserman, *All of Statistics,* Springer-Verlag, 2004. [Concise general reference]

Assessment

The module will be *continuously* assessed using coursework and examinations. Deadlines as well as test dates will be posted on Ultra and announcements made in the class hours. The module assessment weighting is as follows.

Assessment	Weight
Assignments	20%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	40%

Coursework

The coursework will be assessed primarily through:

- six hand-in laboratory reports and
- weekly engagement with the reading material using Perusall.

There will also be alternative means of demonstrating your mastery of course material through:

- one (group) lab presentation and
- short seminar quizzes (announced in advance).

Examinations

The **Midterm Exams** will be computer-assessed and will be one (1) hour in scope. These will likely be held in week 4 and week 8.

The **Final Exam** will be a two (2) hour hand-written exam. You will be given one additional hour to scan and upload your exam script using Gradescope. This process will be thoroughly discussed and practiced with a dummy exam in advance of a real submission. The Final Exam will be given in the last week of term (i.e., during week 11).

To pass this module it is necessary to obtain an overall grade of at least `D3` in the overall assessment **and** to obtain a grade of at least `M1` for the exam **and** to obtain a grade of at least `M1` for the coursework.

> For those who fail the module, there may be an opportunity to take a two-hour resit examination paper at the next available exam diet. However, unless you have mitigating circumstances, if you fail to achieve a module grade of `CF` or above at first attempt then you

may not be permitted to resit the exam. Also, unless you have mitigating circumstances, any pass after a resit will be capped at a grade of `D3` regardless of the weighted average mark obtained. Resit marks are based on the resit exam only.

Your Commitment

You should attend all synchronous timetabled sessions except on medical grounds or with the special permission of the lecturer concerned. If you are unable to attend the degree examination or complete elements of the coursework on time then you should inform the Module Leader and submit a medical certificate. Medical certificates should be submitted to your School Office as soon as possible after the abscence.

> You must also submit a Mitigating Circumstances form to explain which aspects of assessment have been affected by your abscence.

A Medical Certificate will not be taken into account unless a Mitigating Circumstances form that refers to the medical certificate has also been completed.

Approved Calculators

The only types of calculators that have been approved for use in assessments in the School of Engineering, Physics and Mathematics are the Casio FX83 and the Casio FX85.

Study Support

If you are having difficulty with the course you are encouraged to seek help at an early stage by making an appointment to see your lecturer. You may also obtain additional help from the Maths Base (see Ultra for details).

Disability

The University of Dundee is committed to making reasonable, effective and appropriate accommodations to meet the needs of students with disabilities and help create an inclusive and barrier-free campus. If you are in need of accommodation for a documented disability, then you are advised to register with Disability Services. Please communicate any needs you may have directly with me and ahead of time to ensure that we might manage any accommodations in a timely manner.

Academic Honesty

Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Dundee. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Academic dishonesty or misconduct is prohibited in all programs of the University. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty and ignorance of such standards is not normally sufficient evidence of lack of intent. For more information about what constitutes academic dishonesty, please see the *Code of Practice on Academic Misconduct by Students*.

End of Module Questionaire

At the end of each section of the module you will be asked to complete a confidential questionnaire regarding the content and presentation of the module. This is an important element in the University's Academic Standards procedures.

Course Notes

Chapter 1

Lecture 0