

ACCESS TO SCIENCE, ENGINEERING AND AGRICULTURE: MATHEMATICS 1

MATH00030

TRIMESTER 1 2023/2024

DR. ANTHONY BROWN

The objective of this course is to give a grounding in a wide variety of mathematical techniques which will be needed in both your degree and also in Mathematics 2 which you will take in the second trimester.

Lecture notes

Lecture notes, exercises, assignments and solutions will be available to download as the course progresses from Brightspace, which can be accessed through UCD Connect. It can also be useful to bookmark the direct Brightspace MATH00030 Home Page since this sometimes works even if UCD Connect is down. I will also upload the material to The MSC MATH00030 Page as a backup.

Textbooks

There is no need to buy a book to study this course, since everything will be covered in the notes. However if you want to do extra reading and find some extra problems then two very good books are 'Countdown to Mathematics, Volumes 1 and 2' by Lynne Graham and David Sargent. There are copies of each of these in the Library and there are several more copies of each volume in the Maths Support Centre (see below).

Classes

These will be held in either the Science Hub or Science East and will run at the following dates, times and places:

Wednesday September 20th : 18.00-21.30, Science Hub H1.49

Wednesday September 27th : 20.00-21.30, Science Hub H1.49

Saturday September 30th : 10.00-13.00, Science East E1.17

Wednesday October 4th : 20.00-21.30, Science Hub H1.49

Wednesday October 11th : 20.00-21.30, Science Hub H1.49

Saturday October 14th : 10.00-13.00, Science East E1.17

Saturday October 21st : 10.00-13.00, Science East E1.17

Wednesday October 25th : 20.00-21.30, Science Hub H1.49

Saturday October 28th : 10.00-13.00, Science East E1.17

Wednesday November 1st : 18.00-21.30, Science Hub H1.49

Wednesday November 8th : 20.30-21.30, Science Hub H1.49

Saturday November 11th : 10.00-13.00, Science East E1.17
Wednesday November 15th : 20.00-21.30, Science Hub H1.49
Saturday November 18th : 10.00-13.00, Science East E1.17
Wednesday November 22nd : 18.00-21.30, Science Hub H1.49
Wednesday November 29th : 20.00-21.30, Science Hub H1.49
Saturday December 2nd : 10.00-13.00, Science East E1.17

I will be also streaming the classes live on Zoom.

You can join these using a browser with this link

Alternatively, if you have the Zoom app installed, you can join using the following details:

Meeting ID: 475 903 1888

Passcode: N7pTLQ

I will also post recordings of the classes to Brightspace.

Continuous Assessment

This will consist of three class tests during the trimester. In these class tests, you will be allowed to use your notes.

Exam

There will be a two hour face to face exam in December. In this exam, you will not be allowed to use your notes, but a formula sheet will be provided at the end of the exam paper.

Grading Policy

The continuous assessment will count for 25% of the final mark and the exam will count for the other 75%.

Please note that grading scheme is different from some other modules:

A+ 90-100%
A 80-89.99%
A- 70-79.99%

For the entire table see <http://mathsci.ucd.ie/tl/grading/en02>.

Resit Opportunity

There will be a two hour face to face exam before the start of Trimester 2. Note in particular that you have to pass MATH00030 before progressing to the second trimester maths module MATH00040.

Contact details

If you wish to contact me outside class times then my contact details are as follows.

- My e-mail address is anthony.brown@ucd.ie
- My mobile number is 087-9947027.
- My office is Room E3.16 in Science East (it is beside the lift), but please send me an email to check that I will be there before you visit. It will probably be more convenient for you to meet me in the Maths Support Centre.

Maths Support Centre

The Maths Support Centre provides a free service to Level 0, 1 and 2 students of UCD who want to improve their mathematics. It is very much intended for students of all abilities. It is just as much for a student who wants to move from an A to an A+ as it is for a student who wants to move from an E to a D. It is situated in the James Joyce Library Building in Belfield. You will find it just to the left after you enter the library through the turnstiles.

You are welcome to visit either when I am there or when I am not there. This service is completely confidential: if you visit at a time when I am not there, although I will be able to see a list of the subjects covered, I will not be able to see the names or student numbers of anyone who attends. Note that my ordinary hours in the Maths Support Centre are from 10.00-13.00 on Mondays (but please also see below about the special sessions). Details of the opening hours of the Maths Support Centre are posted on the website. It will be open for face to face visits from September 18th. You can either book a session or you can just turn up, and if the tutors are free, then they will see you. I think it is better to book beforehand though, since then you will definitely be seen.

As well as the regular opening hours, I will be running a special session each week specifically for Access Students. These used to be face to face sessions on Wednesdays at 4pm. However, during the covid pandemic, these were moved online and they were much better attended, so I am keeping them online this year. They will be held in the Zoom room above and will run from 20.00-21.30 and will be on Fridays, starting on September 22nd. I would strongly recommend that you attend these sessions if at all possible. It is my experience that they really do make a substantial difference to your final grade.

Keeping in Touch

The main ways of keeping in touch with your fellow students and with myself will be by attending classes and the special Maths Support Centre sessions.

Syllabus

- (1) Arithmetic and algebra.
 - Arithmetic of numbers.
 - Powers, roots, rules of indices and order of operations.
 - Logarithms.
 - Decimal places, significant figures and scientific notation.
 - Arithmetic of algebraic expressions.
 - The Binomial Theorem
- (2) Lines and their equations.
 - Slope and y-intercept.
 - Solving equations.
 - Simultaneous equations.
 - Pythagoras and the length of a line segment.
 - Midpoint of a line segment.
- (3) Quadratic equations.
 - Graphs of quadratic functions.
 - Completing the square and the quadratic formula.
 - Real and complex roots.
 - Sketching quadratic graphs.
 - Factorizing quadratic expressions.
- (4) Functions.
 - What is a function: domain, codomain and rule.
 - Graph of a function.
 - Exponential and logarithmic functions.
 - Trigonometric functions.
 - Surjective, injective and bijective functions.
 - Inverse of a function.
- (5) Trigonometry.
 - Pythagorean identities.
 - Sine and cosine rules.
 - Double angle formulas.
 - Sum and product identities.
- (6) Differential calculus.
 - Differentiation from first principles.
 - Some common derivatives.
 - The sum and multiple rules.
- (7) Integral calculus.
 - Integrals as areas and the definite integral.
 - The fundamental theorem of calculus and the indefinite integral.
 - Some common integrals.
 - The sum and multiple rules.
- (8) Statistics.
 - Measures of centre: mean, mode and median.
 - Measures of spread: standard deviation and variance.
 - Line of best fit, least squares.