UNSW SCIENCE

School of Maths and Statistics

Course outline

MATH3570

Foundations of Calculus

Term 1, 2023

Cricos Provider Code: 00098G

Staff

Position	Name	Email	Room
Lecturer-in-charge	Dr. Laure Helme-Guizon	laure@unsw.edu.au	RC-3090

Please refer to your Timetable on MyUNSW for your Lecture/Seminar Tut, Lab enrolment days and times.
Timetable weblink: http://timetable.unsw.edu.au/2023/MATH3570.html

Administrative Contacts

Please visit the School of Mathematics and Statistics website for a range of information on School Policies, Forms and Help for Students.

For information on Courses, please go to "Current Students" and either Undergraduate and/or Postgraduate", Course Homepage" for information on all course offerings,

The "Student Notice Board" can be located by going to the "Current Students" page; Notices are posted regularly for your information here. Please familiarise yourself with the information found in these locations. The School web page is: https://www.maths.unsw.edu.au

If you cannot find the answer to your queries on the web you are welcome to contact the Student Services Office directly.

By email Undergraduate ug.mathsstats@unsw.edu.au

By phone: 9385 7011 or 9385 7053

Should we need to contact you, we will use your official UNSW email address of in the first instance. **It is your responsibility to regularly check your university email account. Please state your student number in all emails.**

Course Information

Pre-Requisite: 12 units of credit in Level II Mathematics courses

Exclusions: MATH3611, MATH3620, MATH3610, MATH5645, MATH5705

Course Description

What does it mean for a limit to exist? What does it mean for a function to be continuous or differentiable? There are functions which are continuous everywhere but differentiable nowhere! Are there functions whose integral does not exist? In this course, we look again at the essential concepts of limit, continuity, differentiability and integrability and try to place them on a sure footing. The syllabus includes material on sequences and series of real numbers and also of real valued functions. Although of general interest to those studying mathematics for its own sake, this course is of special relevance to those planning a career in secondary teaching.

MATH3570 is a compulsory component of the program for mathematics teachers.

Course Aims

This course aims to re-examine the key ideas behind the Calculus and to give a deeper understanding of the notions of limit, continuity, differentiability and integrability. We will look at not only what is true, but also what is not true, in order to better understand why definitions are the way that they are, and why the conditions on the main theorems need to be there.

Course Schedule, Assessment and Deadlines

Week	**Lectures and Tutorials**	**Quiz** Due: following Wednesday 23:59pm *[online]*	**Assessments**
1	Introduction. Some history. What are the main theorems? How are they related? What is not true?	Quiz 1	Pre-test 1 (3%) due Sunday Week 1 at 23:59 *[done at home, submitted online on Moodle]*
2	Notation: writing things clearly! Quantified statements *The second class is a tutorial*	Quiz 2	
3	Writing analytic proofs. Limits of sequences. What are the real numbers? Supremum and infimum. Binary expansions.	Quiz 3	
4	Sequence Monotone Convergence Theorem. Cauchy sequences. *The second class is a tutorial*	Quiz 4	Assignment (20%) due Sunday Week 4 at 23:59 *[done at home, submitted online on Moodle]*

5	Limits of functions at a point. Continuity. Sequential continuity. Intermediate Value Theorem.	Quiz 5	
6	**Flexibility week**		
7	Max-Min Theorem. Differentiability.	Quiz 7	Midterm (20%) *[In-person, online on Moodle]*
8	The differentiation rules. Rolle's Theorem. Mean Value Theorem *The second class is a tutorial*	Quiz 8	
9	Integration.	Quiz 9	Pre-test 2 (7%) due Friday Week 9 at 23:59 *[done at home, submitted online on Moodle]*
10	The Fundamental Theorems of Calculus. *The second class is a tutorial*	Quiz 10	
Exam period			Final exam (50%) *[in-person, on campus, supervised]. The exact date will be communicated to us later*

Late Submission of Assessment Tasks

A late penalty of 5% of the maximum mark for the task will be applied per day or part day any assessment task is submitted more than 1 hour late. (Where "late" in this context means after any extensions granted for Special Consideration or Equitable Learning Provisions.) For example, an assessment task that was awarded 75% would be given 65% if it was 1-2 days late. Any assessment task submitted after 5 days will not be accepted.

Note that the penalty does not apply to

- Assessment tasks worth less than 5% of the total course mark, e.g. weekly quizzes, weekly class participation, or weekly homework tasks.
- Examinations and examination-style class tests
- Pass/Fail Assessments

Course Learning Outcomes (CLO)

CLO1 - Demonstrate the level of understanding required to teach calculus to the next generation of mathematics students.

CLO2 - Demonstrate understanding of the real number system.

CLO3 - Demonstrate understanding of the formal structure of differential and integral calculus.

Textbooks

There is no set textbook in this course.

Moodle

Log in to Moodle to find announcements, general information, notes, lecture slide, classroom tutorial and assessments etc.

https://moodle.telt.unsw.edu.au

School and UNSW Policies

The School of Mathematics and Statistics has adopted a number of policies relating to enrolment, attendance, assessment, plagiarism, cheating, special consideration etc. These are in addition to the Policies of The University of New South Wales. Individual courses may also adopt other policies in addition to or replacing some of the School ones. These will be clearly notified in the Course Initial Handout and on the Course Home Pages on the Maths Stats web site.

Students in courses run by the School of Mathematics and Statistics should be aware of the School and Course policies by reading the appropriate pages on the Maths Stats web site starting at:

https://www.maths.unsw.edu.au/currentstudents/assessment-policies

The School of Mathematics and Statistics will assume that all its students have read and understood the School policies on the above pages and any individual course policies on the Course Initial Handout and Course Home Page. Lack of knowledge about a policy will not be an excuse for failing to follow the procedure in it.

Academic Integrity and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

The **UNSW Student Code** provides a framework for the standard of conduct expected of UNSW students with respect to their academic integrity and behaviour. It outlines the primary obligations of students and directs staff and students to the Code and related procedures.

In addition, it is important that students understand that it is not permissible to buy essay/ writing services from third parties as the use of such services constitutes plagiarism because it involves using the words or ideas of others and passing them off as your own. Nor is it permissible to sell copies of lecture or tutorial notes as students do not own the

rights to this intellectual property.

If a student breaches the Student Code with respect to academic integrity, the University may take disciplinary action under the **Student Misconduct Procedure**.
The UNSW Student Code and the Student Misconduct Procedure can be found at:
https://student.unsw.edu.au/plagiarism

An online Module "Working with Academic Integrity" (https://student.unsw.edu.au/aim) is a six- lesson interactive self-paced Moodle module exploring and explaining all of these terms and placing them into your learning context. It will be the best one-hour investment you've ever made.

Plagiarism

Plagiarism is presenting another person's work or ideas as your own. Plagiarism is a serious breach of ethics at UNSW and is not taken lightly. So how do you avoid it? A one-minute video for an overview of how you can avoid plagiarism can be found https://student.unsw.edu.au/plagiarism.

Additional Support

ELISE (Enabling Library and Information Skills for Everyone)

ELISE is designed to introduce new students to studying at UNSW.

Completing the ELISE tutorial and quiz will enable you to:

- analyse topics, plan responses and organise research for academic writing and other assessment tasks
- effectively and efficiently find appropriate information sources and evaluate relevance to your needs
- use and manage information effectively to accomplish a specific purpose
- better manage your time
- understand your rights and responsibilities as a student at UNSW
- be aware of plagiarism, copyright, UNSW Student Code of Conduct and Acceptable Use of UNSW ICT Resources Policy
- be aware of the standards of behaviour expected of everyone in the UNSW community
- locate services and information about UNSW and UNSW Library

Some of these areas will be familiar to you, others will be new. Gaining a solid understanding of all the related aspects of ELISE will help you make the most of your studies at UNSW.

The *ELISE* training webpages:

https://subjectguides.library.unsw.edu.au/elise/aboutelise

Equitable Learning Services (ELS)

If you suffer from a chronic or ongoing illness that has, or is likely to, put you at a serious disadvantage, then you should contact the Equitable Learning Services (previously known as SEADU) who provide confidential support and advice.

They assist students:

- living with disabilities
- with long- or short-term health concerns and/or mental health issues
- who are primary carers
- from low SES backgrounds
- of diverse genders, sexes and sexualities
- from refugee and refugee-like backgrounds
- from rural and remote backgrounds
- who are the first in their family to undertake a bachelor-level degree.

Their web site is: https://student.unsw.edu.au/els/services

Equitable Learning Services (ELS) may determine that your condition requires special arrangements for assessment tasks. Once the School has been notified of these, we will make every effort to meet the arrangements specified by ELS.

Additionally, if you have suffered significant misadventure that affects your ability to complete the course, please contact your Lecturer-in-charge in the first instance.

Academic Skills Support and the Learning Centre

The Learning Centre offers academic support programs to all students at UNSW Australia. We assist students to develop approaches to learning that will enable them to succeed in their academic study. For further information on these programs please go to:

http://www.lc.unsw.edu.au/services-programs

Applications for Special Consideration for Missed Assessment

Please adhere to the Special Consideration Policy and Procedures provided on the web page below when applying for special consideration.

https://student.unsw.edu.au/special-consideration

Please note that the application is not considered by the Course Authority, it is considered by a centralised team of staff at the Nucleus Student Hub.

The School will contact you (via student email account) after special consideration has been granted to reschedule your missed assessment, for a *lab test or paper-based test* only.

For applications for special consideration for *assignment extensions*, please note that the new submission date and/or outcome will be communicated through the special consideration web site only, no communication will be received from the School.
For Dates on Final Term Exams and Supplementary Exams please check the “Key Dates for Exams” ahead of time to avoid booking holidays or work obligations.

https://student.unsw.edu.au/exam-dates

If you believe your application for Special Consideration has not been processed, you should email specialconsideration@unsw.edu.au immediately for advice.

Course Evaluation and Development (MyExperience)

Student feedback is very important to continual course improvement. This is demonstrated within the School of Mathematics and Statistics by the implementation of the UNSW online student survey *myExperience*, which allows students to evaluate their learning experiences in an anonymous way. *myExperience* survey reports are produced for each survey. They are released to staff after all student assessment results are finalised and released to students. Course convenor will use the feedback to make ongoing improvements to the course.