THE UNIVERSITY OF SYDNEY
Summer School, 2019

Information Sheet for **MATH1011 Applications of Calculus**

Websites: It is important that you check both the Summer School website and the MATH1011 webpage regularly.

Summer School webpage: `http://www.maths.usyd.edu.au/u/UG/SS`

MATH1011 webpage: `http://www.maths.usyd.edu.au/u/UG/SS/SS1011`

Both sites may be accessed through the Learning Management System (Canvas).

`https://canvas.sydney.edu.au`

Important announcements relating to Summer School will be posted on the Summer School page. On the MATH1011 page you will find online resources (e.g. lecture notes, tutorial sheets, and assessment tasks) and other useful links. Announcements regarding assessment tasks will be made on this page at various times throughout Summer School.

Ed discussion forum: Please post any questions about MATH1011 content on the Ed discussion forum so that other students may either answer your question or benefit from seeing the answer.

`https://edstem.org`

Teaching Days: You will have 12 teaching days (consisting of lectures and tutorials) over 6 weeks, as follows. Please check your personal timetable for the location of your tutorial.

Week	Date	Time	Type	Location	Lecturer
1	Tue 8 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
2	Mon 14 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
	Tue 15 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
	Wed 16 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
3	Mon 21 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
	Tue 22 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
4	Tue 29 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
	Wed 30 Jan	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
5	Mon 4 Feb	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
	Tue 5 Feb	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
	Wed 6 Feb	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		
6	Mon 11 Feb	10am–12pm	Lecture	Institute Lecture Theatre 1	Pantea Pooladvand
		12pm–1pm	Tutorial		

Consultation times: Consultation times and locations will be posted on the MATH1011 webpage.

Tutorials: Tutorials start in Week 1. You should attend the tutorial shown on your personal timetable. Attendance at tutorials will be recorded. Your attendance will not be recorded unless you attend the tutorial in which you are enrolled.

Tutorial and exercise sheets: The question sheets for a given week will be available on the MATH1011 webpage. Solutions to tutorial exercises for week n will be posted on the web by the afternoon of the Friday of week n.

Course notes: *Applications of Calculus (Course Notes for MATH1011)* are available for purchase from Kopystop, 55 Mountain St, Broadway. See the Junior Mathematics Handbook for other useful references.

Other references: Calculus, James Stewart, 8th (Metric International) Edition, ISBN-13: 978-1-305-26672-8, referenced as [Stewart]. Available for loan under closed reserve at SciTech Library
A third pair of texts, covering a vast range of high-school material that is required and expanded upon in this unit. There are two books by Margaret Grove called Maths in Focus (revised 2nd edition) which follow the NSW Extension I Mathematics senior high-school syllabus:

- Preliminary (Year 11), ISBN 978-0-170-35470-7, [GroveP]

- HSC (Year 12), ISBN 978-0-170-35462-2, [GroveH]

Assessment: Your final raw mark for this unit of study will be calculated as follows:

50%:	Final exam
15%:	Quiz 1 mark (using the better mark principle).
15%:	Quiz 2 mark (using the better mark principle).
10%:	Assignment 1 mark.
10%:	Assignment 2 mark.

The *better mark principle* means that for each quiz, the quiz counts if and only if it is better than or equal to your exam mark. If your quiz mark is less than your exam mark, the exam mark will be used for that portion of your assessment instead. For example, if your quiz 1 mark is better than your exam mark while your quiz 2 mark is worse than your exam mark, then the exam will count for 65%, quiz 1 will count for 15%, and the assignments will count for 20% of your overall mark. The assignment marks count for 20% regardless of whether they are better than your exam mark or not.

Final grades are returned within one of the following bands:

High Distinction (HD), 85–100: representing complete or close to complete mastery of the material; **Distinction (D), 75–84:** representing excellence, but substantially less than complete mastery; **Credit (CR), 65–74:** representing a creditable performance that goes beyond routine knowledge and understanding, but less than excellence; **Pass (P), 50–64:** representing at least routine knowledge and understanding over a spectrum of topics and important ideas and concepts in the course.

Examination: There is one examination with 10 minutes of reading time and 90 minutes of writing time. It will be held at 1:50pm on Monday 18 February in a room TBA. Further information about the exam will be made available at a later date on the website.

Quizzes: Quizzes will be held during tutorials. You must sit for the quiz during the tutorial in which you are enrolled, unless you have a Permission Slip from the Student Services Office, issued only for verifiable reasons. Otherwise, your quiz mark may not be recorded.

Assignments: There are two assignments, which must be submitted electronically, **as PDF files only**, in Turnitin (an internet-based plagiarism-prevention service), via the Learning Management System (Canvas) website by the deadline. Note that your assignment will not be marked if it is illegible or if it is submitted sideways or upside down. It is your responsibility to check that your assignment has been submitted correctly.

Late penalties: All assignments must be submitted by the due date. Students are expected to manage their time and to prioritise tasks to meet deadlines. Assessment items submitted after the due date without an approved extension using a special consideration or special arrangement form or request will incur penalties.

If you encounter a problem submitting your work on time, you may be able to arrange a simple extension. A simple extension is an informal arrangement between you and your unit of study coordinator. You may be able to receive an extension of up to two working days for non-examination tasks, as outlined in clause 66A of the Coursework Policy 2014. If you need an extension for a longer period, you may be eligible to apply for special consideration. `sydney.edu.au/students/simple-extensions`

Special consideration: A special consideration application can be made for short-term circumstances beyond your control, such as illness, injury or misadventure, which affect your preparation or performance in an assessment. `sydney.edu.au/special-consideration-and-arrangements`.

Assessment and feedback schedule:

Task	Available	Deadline/date	Latest extension*	Feedback
Assignment 1	Tues 15 Jan	11:59 pm Tues 22 Jan	11:59 pm Tues 29 Jan	9 am Thu 31 Jan
Quiz 1		Wed 16 Jan (Week 2)		Wed 23 Jan (Week 3)
Assignment 2	Wed 30 Jan	11:59 pm Wed 6 Feb	11:59 pm Wed 13 Feb	9 am Thurs 14 Feb
Quiz 2		Mon 4 Feb (Week 5)		Fri 8 Feb (Week 5)

* Extensions for assignments are only possible for students registered with Disability Services or applying for Special Consideration or Special Arrangements.

Any questions? Before you contact us with any enquiry, please check the FAQ page:

$$\text{http://sydney.edu.au/science/maths/u/UG/JM/FAQ.html}.$$

Where to go for help: For administrative matters, go to the *Student Services Office, Carslaw 520*. For help with mathematics, see your lecturer, your tutor, a duty tutor, or use the Ed discussion forum (`https://edstem.org`). Lecturers guarantee to be available during their indicated office hours, but may be available at other times as well. If you are having difficulties with mathematics due to insufficient background, you may seek help from the *Mathematics Learning Centre*. You may also email questions about the subject to `MATH1011@sydney.edu.au`. Ensure that any emails that you send to this address contain your name and SID, because anonymous emails will be ignored.

Graduate qualities: The graduate qualities are the qualities and skills that all University of Sydney graduates must demonstrate on successful completion of an award course. As a future Sydney graduate, the set of qualities have been designed to equip you for the contemporary world. For more information go to `sydney.edu.au/students/graduate-qualities`.

GQ1 Depth of disciplinary expertise

GQ2 Critical thinking and problem solving

GQ3 Communication (oral and written)

GQ4 Information & digital literacy

GQ5 Inventiveness

GQ6 Cultural competence

GQ7 Interdisciplinary effectiveness

GQ8 Integrated professional, ethical and personal identity

GQ9 Influence

Objectives: This unit aims to illustrate:

- how experimental data, such as that obtained in the life sciences, can be explained by means of elementary functions;

- how differential and integral calculus can be used to solve problems found in the life sciences;

- the development of an interesting area of mathematics.

Outcomes: Students who successfully complete this unit should be able to:

- analyse practical problems using techniques from differential and integral calculus;

- fit as appropriate a linear, exponential or a periodic function to a set of experimental data;

- sketch the generalised sinusoidal functions;

- use differential calculus to solve optimisation problems in one independent variable;

- calculate the partial derivatives of functions of two variables, and hence to solve optimisation problems in two independent variables;

- calculate finite sums and use the sigma notation where appropriate;

- evaluate definite integrals and use definite integrals in applications;

- determine when improper integrals of infinite type exist.

Proposed week-by-week outline:

Week	Topics
1	Trigonometric and circular functions. Inverse functions, logs and exponentials.
2	Data scaling, Single-variable differential calculus. First principles, derivatives of elementary functions, linearity rules, product, quotient and chain rules, logarithmic differentiation.
3	Applications to curve sketching. Applications to optimisation problems. Multi-variable differential calculus.
4	Introduction to functions of two variables and surfaces. Introduction to partial derivatives. Critical points for functions of two variables. Classification. Applications to solving optimisation problems on a region.
5/6	Method of least squares. Series. Single-variable integral calculus. Riemann sums, definite and indefinite integrals, power rule, linearity, indefinite integrals of elementary functions, integration by substitution/recognition.

ADDITIONAL INFORMATION

Attendance: Unless otherwise indicated, students are expected to attend a minimum of 80% of timetabled activities for a unit of study, unless granted exemption by the Associate Dean.
For some units of study the minimum attendance requirement, as specified in the relevant table of units or the unit of study outline, may be greater than 80%.
The Associate Dean may determine that a student has failed a unit of study because of inadequate attendance.
Further details are available from the Science Undergraduate Handbook 2018: `http://sydney.edu.au/handbooks/science/coursework/faculty_resolutions.shtml` and the Science Postgraduate Handbook 2018: `http://sydney.edu.au/handbooks/science_PG`.

Online Components: This unit of study requires regular use of the University's Learning Management System (LMS). This could be either Blackboard or Canvas. Internet access is required to use the LMS.

Assessment Submission: Assessment tasks must be submitted by the due date. Submission will be online through the LMS unless instructed otherwise.

Compliance Statement All students must submit a signed statement of compliance with each piece of work submitted to the University for assessment, presentation or publication. A statement of compliance certifies that no part of the work constitutes a breach of the Academic Honesty in Coursework Policy 2015: `https://sydney.edu.au/policies/showdoc.aspx?recnum=PDOC2012/254&RendNum=0`.
This will be completed as part of the Turnitin assignment submission.

Educational integrity: While the University is aware that the vast majority of students and staff act ethically and honestly, it is opposed to and will not tolerate academic dishonesty or plagiarism and will treat all allegations of dishonesty seriously.
All written assignments submitted in this unit of study will be submitted to the similarity detecting software program known as Turnitin. Turnitin searches for matches between text in your written assessment task and text sourced from the Internet, published works and assignments that have previously been submitted to Turnitin. If such matches indicate evidence of plagiarism to your teacher, they are required to report your work for further investigation.
Plagiarism is defined as presenting another persons work as ones own by presenting, copying or reproducing it without appropriate acknowledgement of the source.
Plagiarism includes presenting work for assessment, publication, or otherwise, that includes:

  a. phrases, clauses, sentences, paragraphs or longer extracts from published or unpublished work (including from the internet) without appropriate acknowledgement of the source; or

  b. the work of another person, without appropriate acknowledgement of the source and in a way that exceeds the boundaries of legitimate co-operation.

Further information on academic honesty and the resources available to all students can be found on the Academic Integrity page of the current students website: `sydney.edu.au/educational-integrity`.

Academic Honesty Education Module (AHEM) All students commencing their study at the University of Sydney are required to complete the Academic Honesty Education Module. You will find the AHEM in your Learning Management System.

Special Consideration In the event of serious illness or misadventure which affects your preparation or performance in an assessment task, you may be eligible for Special Consideration. Further information is available at: `https://sydney.edu.au/students/special-consideration-and-arrangements.html`. You should *not* submit an application for Special Consideration or Special Arrangements for this unit of study

- if you are absent from a tutorial and there is no assessment associated with the missed tutorial, or

- if you miss a quiz, since the better mark principle applies.

The assessment category for the assignments is "Submitted Work".

Student Feedback: The Unit of Study Survey
At the completion of each Unit of Study, students are asked via email to complete an online survey to provide feedback on their experiences in that Unit of Study. This feedback is invaluable when reviewing curriculum design and implementation styles.

University Work, Health and Safety Policy: We are governed by the Work Health and Safety Act 2011, Work Health and Safety Regulation 2011 and Codes of Practice. Penalties for non-compliance have increased. Everyone has a responsibility for health and safety at work. The University's Work Health and Safety policy explains the responsibilities and expectations of workers and others, and the procedures for managing WHS risks associated with University activities.
General Laboratory Safety Rules

- No eating or drinking is allowed in any laboratory under any circumstances

- A laboratory coat and closed-toe shoes are mandatory

- Follow safety instructions in your manual and posted in laboratories

- In case of fire, follow instructions posted outside the laboratory door

- First aid kits, eye wash and fire extinguishers are located in or immediately outside each laboratory

As a precautionary measure, it is recommended that you have a current tetanus immunisation. This can be obtained from University Health Service (`http://www.unihealth.usyd.edu.au/`).
For more details please refer to Emergencies and safety on campus: `https://sydney.edu.au/students/emergencies-and-safety-on-campus.html`

Student Support Services:
A guide for new students:
`https://sydney.edu.au/students/browse.html?category=new-students&topic=getting-started`
Counselling and mental health support:
`https://sydney.edu.au/students/counselling-and-mental-health-support.html`
Disability Support:
`https://sydney.edu.au/students/disability-support.html`
International Student Support:
`https://sydney.edu.au/students/support-for-international-students.html`
Learning Services / Study Skills Support:
`https://sydney.edu.au/students/learning-services.html`
Student IT and online learning:
`https://sydney.edu.au/students/browse.html?category=student-it-and-online-learning&topic=online-learning`
Academic Writing:
`https://sydney.edu.au/students/writing.html`