



**UNSW SCIENCE**  
**School of Maths and**  
**Statistics**

**Course outline**

**MATH2089**

**Numerical Methods and Statistics**

**Term 1, 2023**

## Staff

Position	Name	Email	Room
Lecturer-in-charge (Numerical Methods)	Prof Frances Kuo	<a href="mailto:f.kuo@unsw.edu.au">f.kuo@unsw.edu.au</a>	

This course gives an introduction to numerical methods and statistics essential in a wide range of engineering disciplines.

Numerical methods: Computing with real numbers. Numerical differentiation, integration, interpolation and curve fitting (regression analysis). Solution of linear and nonlinear algebraic equations. Matrix operations and applications to solution of systems of linear equations, elimination and triangularization.

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### **Further resources on MatLab:**

1. J. H. Mathews and K. D. Fink, Numerical methods using MATLAB, Upper Saddle River, N.J: Pearson, 2004.
2. C. Moler, Numerical Computing with Matlab, SIAM, 2004, <http://www.mathworks.com/moler/>
3. Gilat, MATLAB: an introduction with applications, New York; Chichester: Wiley, 2005.

### **Statistics**

#### **Recommended Text:**

J. Devore and N. Farnum, Applied Statistics for Engineers and Scientists, 2nd Edition, 2005 Duxbury Press, Thomson Publishers (or 3rd edition of this book).

#### **Additional Reading:**

Any text with "Statistics" and "Engineers" in its title. A quite comprehensive reference is: D. Montgomery and G. Runger, Applied Statistics and Probability for Engineers, 5th Edition, 2011, Wiley (or a previous edition of this book)

### **Course Learning Outcomes (CLO)**

CLO1 Identify risks associated with floating point computations

CLO2 Demonstrate a basic knowledge of the techniques for accurate and efficient solution of models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations

CLO3 Apply these techniques to practical problems in Engineering

CLO4 Use Matlab for the implementation and application of numerical methods and the visualization of results

CLO5 Apply various graphical and data analysis methods for summarizing and understanding data

CLO6 Apply various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts

CLO7 Apply Matlab for graphical and statistical analysis

### **Moodle**

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

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

### **Computing lab**

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then going down the stairs to the Ground Level. A second smaller lab is Room M020, on the mezzanine level of the Red Centre.

For more information, including opening hours, see the computing facilities webpage: <https://www.unsw.edu.au/science/our-schools/maths/student-life-resources/student-services/computing-information/computing-facilities>

Remember that there will always be unscheduled periods when the computers are not working because of equipment problems and that this is not a valid excuse for not completing assessments on time.

## **School of Mathematics and Statistics 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 documents in the

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)” (<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

- 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

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[specialconsideration@unsw.edu.au](mailto: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.