

## Unit Outline

# MATH1019 Linear Algebra and Statistics for Engineers

## Semester 2, 2020

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<b>Unit study package code:</b>	MATH1019										
<b>Mode of study:</b>	Internal										
<b>Tuition pattern summary:</b>	<p>Note: For any specific variations to this tuition pattern and for precise information refer to the Learning Activities section.</p> <p>Lecture: 1 x 2 Hours Weekly Computer Laboratory: 1 x 1 Hours Weekly Workshop: 1 x 2 Hours Weekly</p> <p>This unit does not have a fieldwork component.</p>										
<b>Credit Value:</b>	25.0										
<b>Pre-requisite units:</b>	Nil										
<b>Co-requisite units:</b>	Nil										
<b>Anti-requisite units:</b>	MATH1021 (v.0) Accelerated Mathematics for Engineers or any previous version										
<b>Result type:</b>	Grade/Mark										
<b>Approved incidental fees:</b>	Information about approved incidental fees can be obtained from our website. Visit <a href="https://fees.curtin.edu.au/incidental_fees.cfm">fees.curtin.edu.au/incidental_fees.cfm</a> for details.										
<b>Unit coordinator:</b>	<table><tr><td><b>Title:</b></td><td>Dr</td></tr><tr><td><b>Name:</b></td><td>Ian van Loosen</td></tr><tr><td><b>Phone:</b></td><td>08 9266 4959</td></tr><tr><td><b>Email:</b></td><td>I.Loosen@curtin.edu.au</td></tr><tr><td><b>Location:</b></td><td>Building: 314 - Room: 358</td></tr></table>	<b>Title:</b>	Dr	<b>Name:</b>	Ian van Loosen	<b>Phone:</b>	08 9266 4959	<b>Email:</b>	I.Loosen@curtin.edu.au	<b>Location:</b>	Building: 314 - Room: 358
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<b>Location:</b>	Building: 314 - Room: 358										
<b>Teaching Staff:</b>	<table><tr><td><b>Name:</b></td><td>Cristina Popa (Weeks 1 - 4)</td></tr><tr><td><b>Phone:</b></td><td>08 9266 3485</td></tr><tr><td><b>Email:</b></td><td>cristina.popa@curtin.edu.au</td></tr><tr><td><b>Location:</b></td><td>Building: 314 - Room: 359A</td></tr></table>	<b>Name:</b>	Cristina Popa (Weeks 1 - 4)	<b>Phone:</b>	08 9266 3485	<b>Email:</b>	cristina.popa@curtin.edu.au	<b>Location:</b>	Building: 314 - Room: 359A		
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<b>Administrative contact:</b>	<table><tr><td><b>Name:</b></td><td>FSAE Teaching Support</td></tr><tr><td><b>Phone:</b></td><td>9266 3735</td></tr><tr><td><b>Email:</b></td><td>FSAETeachingSupport@curtin.edu.au</td></tr><tr><td><b>Location:</b></td><td>Building: 314 - Room: 127</td></tr></table>	<b>Name:</b>	FSAE Teaching Support	<b>Phone:</b>	9266 3735	<b>Email:</b>	FSAETeachingSupport@curtin.edu.au	<b>Location:</b>	Building: 314 - Room: 127		
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<b>Email:</b>	FSAETeachingSupport@curtin.edu.au										
<b>Location:</b>	Building: 314 - Room: 127										
<b>Learning Management System:</b>	<a href="https://lms.curtin.edu.au">Blackboard</a> (lms.curtin.edu.au)										

## Acknowledgement of Country

We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present. The [Centre for Aboriginal Studies](#) aspires to contribute to positive social change for Indigenous Australians through higher education and research.

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## Syllabus

This unit will consider problems arising from engineering related fields. Students will learn the necessary skills to model and solve such problems through the introduction of mathematical techniques of linear algebra, data analysis as well as statistical inference. This unit will cover vectors, lines and planes and their extension into n-dimension space. This unit also covers matrices and their use for solving systems of linear equations through a study of a number of different types of solution methods. Students will be introduced to the world of statistics by looking at the concepts of descriptive statistics and inferential statistics. This unit is designed for those students who have passed WACE Mathematical Methods or equivalent.














## Introduction

This unit covers basic techniques of linear algebra as well as statistics. It is designed for students undertaking an engineering degree and forms an integral part of the Engineering Foundation Year.







## Unit Learning Outcomes

All graduates of Curtin University achieve a set of six Graduate Capabilities during their course of study. These inform an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and capabilities which employers would value in a professional setting. Each unit in your course addresses the Graduate Capabilities through a clearly identified set of learning outcomes. They form a vital part in the process referred to as assurance of learning. The learning outcomes notify you of what you are expected to know, understand or be able to do in order to be successful in this unit. Each assessment for this unit is carefully designed to test your knowledge of one or more of the unit learning outcomes. On successfully completing all of the assessments you will have achieved all of these learning outcomes.

Your course has been designed so that on graduating you will have achieved all of Curtin's Graduate Capabilities through the assurance of learning processes in each unit.

On successful completion of this unit students can:		Graduate Capabilities addressed
1	Apply vector techniques to solve problems on lines and planes	  
2	Execute routine matrix manipulations which arise in engineering problems, including the determination of solutions of systems of linear algebraic equations and calculating inverses of matrices	  
3	Analyse data using exploratory and inferential statistics	  
4	Use a symbolic manipulation package for more advanced tasks of solving linear algebra and statistical based problems	
5	Generate and use basic logical mathematical arguments in the solution of engineering problems	  

## Curtin's Graduate Capabilities

	Apply discipline knowledge, principles and concepts		Innovative, creative and entrepreneurial		Effective communicators with digital competency
	Globally engaged and responsive		Culturally competent to engage respectfully with local First Peoples and other diverse cultures		Industry connected and career capable

Find out more about Curtin's Graduate Capabilities at the Curtin Learning and Teaching website: [clt.curtin.edu.au](http://clt.curtin.edu.au)

## Learning Activities

Note that the lectures will commence in the first week of semester, however the **workshops and laboratories commence in the second week of semester**.

Students will have 5 contact hours each week for this unit:

**Lecture** (2 hours)

The lecture will begin to introduce new concepts and techniques to students. The focus of the lecture will be WHAT and HOW:

- what new concepts and techniques will be encountered in the topic
- what applications this topic has to real-world problems
- how to apply various techniques
- how to interpret the result obtained

The format will be a combination of lecturer presentation and working through examples. Complete lecture notes as well as lecture slides will be posted on Blackboard for students to bring to class.

**Workshop** (2 hours) & **Laboratory** (1 hour)

Workshops and laboratories will continue to build on the current week's lecture material. The focus of the workshop will be WHY:

- why a given technique is applied, and why it works
- why other techniques do not work or are not as effective
- why we can make certain assumptions or interpretations

The format of the workshops will be interactive group work, with an emphasis on students' oral communication and explanation to one another, to help them consolidate material. For this purpose you will be given a sheet of exercises to work through in groups when you get to a workshop.

Each of the laboratory sessions will be used to introduce various commands and features of the MATLAB and R package as it relates to the course content. At the start of each session you will be given a set of MATLAB or R based exercises to work through either in groups or individually.

**At-home study**

In addition to contact hours at university, students are expected to undertake a significant amount of study in their own time: as a general guide, roughly one hour of at-home study for each contact hour. Students are expected to finish any uncompleted portion of the week's material, and read through the lecture notes - both prior to lectures, to familiarise themselves with the material, and afterwards to consolidate the knowledge.

**Consultation hours / Office hours**

Students are invited to attend consultation hours, with times listed on Blackboard. This is a chance for students to seek individual help from the lecturer on any aspect of the unit, or beyond. It is recommended that students come with specific questions about exercises they have had trouble with, or concepts they do not understand, and bring along any attempted working.

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## Learning Resources

### Essential texts

The required textbook(s) for this unit are:

- Engineering Mathematics Through Applications, Second Edition, by Kuldeep Singh, Palgrave Macmillan, 2011.  
(ISBN/ISSN: 978-0-230-27479-2)

### **Online resources**

- Engineering Mathematics Through Applications, Second Edition, by Kuldeep Singh, Palgrave Macmillan, 2011.  
(<https://he.palgrave.com/companion/Singh-Engineering-Mathematics-Through-Applications/>)  
(ISBN/ISSN: 978-0-230-27479-2)

### **Other resources**

Lecture notes, slides, and other supporting material will be provided on Blackboard. Lectures will be recorded where possible, and links will be provided on Blackboard. Workshop questions will be given out in class, with solutions provided after the class.

### **Calculator and Computer**

In this unit you will only be permitted to use a scientific calculator. You will be allowed to use the calculator during the mid semester test, workshop & laboratory assessments and final examination provided sufficient working of intermediate steps is shown. Graphical calculators, Programmable calculators and ClassPad calculators will not be permitted in neither the mid semester test, workshop quizzes nor the final examination. If you are unsure as to whether your calculator meets the requirements please contact the EFY Office or the Administrative Contact.

It is helpful, but not essential, that you have access to a computer with an Internet connection. You can access the computing facilities on campus if you do not have a computer at home.

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## Assessment

### Assessment policy exemptions

- There are no exemptions to the assessment policy

### Assessment schedule

	Task	Value %	Date Due	Unit Learning Outcome(s) Assessed	Late Assessments Accepted?*	Assessment Extensions Considered?*
1	Quizzes	25%	<b>Week:</b> 6 & 12 <b>Day:</b> Lab class in Week 6; Workshop class in Week 12 <b>Time:</b> During lab in Week 6; During workshop in Week 12	1,2,3,4	No	Yes
2	Mid-Sem Test	25%	<b>Week:</b> 6 <b>Day:</b> TBC <b>Time:</b> TBC	3,5	No	Yes
3	Final Exam	50%	<b>Week:</b> TBC <b>Day:</b> TBC <b>Time:</b> TBC	1,2,5	No	Yes

\*Please refer to the Late Assessment and the Assessment Extension sections below for specific details and conditions.

### Detailed information on assessment tasks

- The Quizzes assessment task is broken up into two components, a laboratory quiz (worth 10%) and a workshop quiz (worth 15%).  
In the laboratory during Week 6 you will be given a small set of questions to do using R on your own which are to be submitted to the tutor for marking. The quiz will be based on the topics covered in the lectures during Week 1 - Week 3.  
In the workshops during Week 12 you will be given a small set of questions to do on your own which are to be submitted to the tutor for marking. The quiz will be based on the topics covered in the lectures during Week 6 - Week 10. You will be permitted to take in an A4 sheet of paper with handwritten or typed notes on both sides as well as the use of a scientific calculator (see Page 4). After assessing your quiz the tutor will return these to you in the next workshop.
- The test will be based on the topics covered in the lectures during Week 1 - Week 4, and the test will be held during Week 6 (i.e. week of 7-11th September). The time and venue of this additional class will be announced on Blackboard. You will be permitted to take in an A4 sheet of paper with handwritten or typed notes on both sides as well as the use of a scientific calculator (see Page 4). The solutions to the mid semester test will be available on Blackboard after the evaluated tests have been returned.
- The final assessment will be based on the topics taught during Week 5 - Week 14. Students granted a Further Assessment or Assessment Extension will be notified via OCC. Further Assessments and Assessment Extensions will be held during the week of 15-19th February 2021.

## Pass requirements

To pass this unit you must:

1. Achieve an overall mark greater than or equal to 50, and
2. Obtain a minimum of 40% in the final examination.

## Assessment Moderation

### Fair assessment through moderation

Moderation describes a quality assurance process to ensure that assessments are appropriate to the learning outcomes, and that students work is evaluated consistently by assessors. Minimum standards for the moderation of assessments are described in the Assessment and Student Progression Manual, available from [policies.curtin.edu.au/findapolicy/](https://policies.curtin.edu.au/findapolicy/)

### Pre-marking moderation

Staff responsible for assessing student work will, as a minimum, be provided with an assessment rubric (or marking guide) in advance of the marking task. Assessment task details and marking criteria will be made available to students when the assessment task is assigned, assessments from previous semesters can be used as a guide and are located on Blackboard. Other pre-marking moderation activities may be employed as appropriate to each assessment task.

### Intra-marking / Post-marking moderation

Intra-marking strategies may be implemented as deemed necessary following submission of assessment artefacts.

Post-marking moderation will include (but is not limited to) at least one of the following methods:

- An analysis of the variances between markers and locations
- Second marking or check second marking of a random sample of student work
- Second marking or check second marking of a sample of student work deemed to be at significant thresholds
- Second marking or check second marking of a sample of outliers (high or low scoring assessments)
- Panel of academics discuss and collectively reach a consensus.

## Late assessment

Where the submission of a late assessment is permitted, late penalties will be consistently applied in this unit.

Where a late assessment **is** permitted for an assessment item or the entirety of the unit (refer to the Assessment Schedule table in this Unit Outline) and the student does not have an approved assessment extension:

1. For assessment items submitted within the first 24 hours after the due date/time, students will be penalised by a deduction of 5% of the total marks allocated for the assessment task;
2. For each additional 24 hour period commenced an additional penalty of 10% of the total marks allocated for the assessment item will be deducted; and
3. Assessment items submitted more than 168 hours late (7 calendar days) will receive a mark of zero.

Where late assessment **is NOT** permitted for an assessment item or the entirety of the unit (refer to the Assessment Schedule table in this Unit Outline) and the student does not have an approved assessment extension:

1. All assessment items submitted after the due date/time will receive a mark of zero.

### Assessment extension

Where an application for an assessment extension **is** permitted for an assessment item(s) within this unit (refer to the Assessment Schedule table in this Unit Outline):

1. A student who is unable to complete an assessment item by/on the due date/time as a result of exceptional circumstances beyond the student's control, may apply for an assessment extension on the Assessment Extension Application Form as prescribed by the Academic Registrar. The form is available on the Forms page at <https://students.curtin.edu.au/essentials/forms-documents/forms/> and also within the student's OASIS (My Studies tab – Quick Forms) account.
2. The student will be expected to submit their application for an Assessment Extension with supporting documentation:
  - a. Australian Campuses: via the online form
  - b. Offshore campuses: to the School representative nominated below
3. Timely submission of this information supports the assessment process. For applications that are declined, delayed submission may have significant ramifications on the possible marks awarded.
4. An application may be accepted up to five working days after the due date/time of the assessment item where the student is able to provide a verifiable explanation as to why they were not able to submit the application prior to the assessment due date/time

Where an application for an assessment extension **is NOT** permitted for an assessment item(s) within this unit (refer to the Assessment Schedule table in this Unit Outline):

1. All assessment items submitted after the due date/time will be subject to late penalties or receive a mark of zero depending on the unit permitting late assessment submissions.

Australian campuses - School contact for Assessment Extension enquires (submission is via the online form):  
FSAETeachingSupport@curtin.edu.au

### Deferred assessments

If your results show that you have been granted a deferred assessment you should immediately check OASIS for details.

Deferred examinations/tests will be held from 15/02/2021 to 19/02/2021 . Notification to students will be made after the Board of Examiners' meeting via the Official Communications Channel (OCC) in OASIS.

### Further assessment

Further assessments, if granted by the Board of Examiners, will be held between 15/02/2021 and 19/02/2021 . Notification to students will be made after the Board of Examiners meeting via the Official Communications Channel in OASIS.

It is the responsibility of the student to be available to complete the requirements of a further assessment. If your results show that you have been granted a further assessment you should immediately check OASIS for details.

## Reasonable adjustments for students with disabilities/health circumstances likely to impact on studies

A [Curtin Access Plan](#) (CAP) is a document that outlines the type and level of support required by a student with a disability or health condition to have equitable access to their studies at Curtin. Carers for people with disability may also be eligible for support. This support can include alternative exam or test arrangements, study materials in accessible formats, access to Curtin's facilities and services or other support as discussed with an advisor from [AccessAbility Services](#).

Documentation is required from your treating Health Professional to confirm your health circumstances or carer responsibilities.

If you think you may be eligible for a CAP, please contact AccessAbility Services. If you already have a CAP please provide it to the Unit Coordinator in week 1 of each study period.

## Referencing style

The referencing style for this unit is Chicago 17th B.

More information can be found on this style from the Library web site:  
<http://libguides.library.curtin.edu.au/referencing>.

## Privacy

As part of a learning or assessment activity, or class participation, your image or voice may be recorded or transmitted by equipment and systems operated by Curtin University. Transmission may be to other venues on campus or to others both in Australia and overseas.

Your image or voice may also be recorded by students on personal equipment for individual or group study or assessment purposes. Such recordings may not be reproduced or uploaded to a publicly accessible web environment. If you wish to make such recordings for study purposes as a courtesy you should always seek the permission of those who are impacted by the recording.

Recording of classes or course materials may not be exchanged or distributed for commercial purposes, for compensation, or for any other purpose other than personal study for the enrolled students in the unit. Breach of this may subject a student to disciplinary action under Statute No 10 – Student Disciplinary Statute.

If you wish to discuss this please talk to your Unit Coordinator.

## Copyright

The course material for this unit is provided to you for your own research and study only. It is subject to copyright. It is a copyright infringement to make this material available on third party websites.



## Academic Integrity (including plagiarism and cheating)

### Academic Integrity

Curtin's [Student Charter](#), [Academic Integrity Program \(AIP\)](#), and core [Values](#) guide expectations regarding student behaviour and responsibilities. Information on these topics can be found on the [Student Essentials Website](#) or the Academic Integrity tab in Blackboard.

### Academic Integrity Warnings

An Academic Integrity Warning may be issued to a New-to-Curtin student if they have inadequately acknowledged sources or collaborated inappropriately. [The Management of Academic Integrity Warnings for New to Curtin Students Procedures](#) provide further information and explain who is considered to be New-to-Curtin.

### Academic Misconduct

Students with an academic breach that do not meet the New-to-Curtin criteria will be managed through the misconduct process. [Academic Misconduct](#) means conduct by a student that is dishonest or unfair in connection with any academic work. This includes all types of plagiarism, cheating, collusion, falsification or fabrication of data or other content, and Academic Misconduct Other, such as falsifying medical certificates for extension. More details can be found on the [Student Essentials Website](#) or on the [Academic Integrity Website](#).

Staff members are required to report suspected misconduct and an inquiry may take place. If misconduct is determined it will result in penalties, which may include a warning, a reduced or nil grade, a requirement to repeat the assessment, an annulled grade (ANN) or termination from the course. Some penalties may impact on future enrolment.

Academic work under inquiry will not be graded until the process has concluded. If your work is the subject of an inquiry you will be notified by email and Official Communication with an opportunity to respond. Appropriate support will be provided. For more information refer to [Statute No.10 Student Discipline and Academic Misconduct Rules](#).

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## Information and Communications Technology (ICT) Expectations

Curtin students are expected to have reliable internet access in order to connect to OASIS email and learning systems such as Blackboard and Library Services.

You may also require a computer or mobile device for preparing and submitting your work.

For general ICT assistance, in the first instance please contact OASIS Student Support:  
[oasisapps.curtin.edu.au/help/general/support.cfm](https://oasisapps.curtin.edu.au/help/general/support.cfm)

For specific assistance with any of the items listed below, please contact The Learning Centre:  
[life.curtin.edu.au/learning-support/learning\\_centre.htm](https://life.curtin.edu.au/learning-support/learning_centre.htm)

- Using Blackboard, the I Drive and Back-Up files
- Introduction to PowerPoint, Word and Excel

## Additional information

### Unit Assessment Outcomes and Competencies

Assessment Item	Unit learning outcomes assessed	EA Professional competencies assessed <sup>1</sup>	Level of thinking <sup>2</sup>
1.1 Laboratory Quiz	3, 4, 5	1.2	3, 4
1.2 Workshop Quiz	1, 2, 5	1.2	3,
2. Mid-Semester Test	1, 3, 5	1.2	3, 4
3. Examination	1, 2, 5	1.1, 1.2	3

### **ENGINEERS AUSTRALIA Stage 1 competencies** and elements of competency assessed in this unit <sup>1</sup>

#### 1. KNOWLEDGE AND SKILL BASE

- 1.1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
- 1.2. Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
- 1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.
- 1.4. Discernment of knowledge development and research directions within the engineering discipline.
- 1.5. Knowledge of contextual factors impacting the engineering discipline.
- 1.6. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline.

#### 2. ENGINEERING APPLICATION ABILITY

- 2.1. Application of established engineering methods to complex engineering problem solving.
- 2.2. Fluent application of engineering techniques, tools and resources.
- 2.3. Application of systematic engineering synthesis and design processes.
- 2.4. Application of systematic approaches to the conduct and management of engineering projects.

#### 3. PROFESSIONAL AND PERSONAL ATTRIBUTES

- 3.1. Ethical conduct and professional accountability
- 3.2. Effective oral and written communication in professional and lay domains.
- 3.3. Creative, innovative and pro-active demeanour.
- 3.4. Professional use and management of information.
- 3.5. Orderly management of self, and professional conduct.
- 3.6. Effective team membership and team leadership.

### **Levels of thinking** <sup>2</sup>

**1. Remembering**—observation and recall of information; knowledge of dates, events, places, materials, objects; knowledge of major processes; mastery of subject matter.

**2. Comprehending**—understand information, grasp meaning; translate knowledge into new contexts; compare and contrast; order, group, infer causes, predict consequences.

**3. Applying**—use information; use methods, concepts, theories in new situations; solve problems using required skills or knowledge; use equipment, tools.

**4. Analysing**—discern patterns; organise parts; recognise hidden meanings; identify components, simplify complex information; metacognition.

**5. Evaluating**—compare and discriminate between ideas; think critically, make judgments about worth (based on stated premises); assess the value of theories, make choices based on reasoned. argument; verify or question the value of evidence

**6. Creating**—combining ideas to develop an original idea or product, engage in creative thinking.

## Enrolment

It is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, where you can also print an Enrolment Advice.

## Student Rights and Responsibilities

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter
- Values and Signature Behaviours
- the University's policy and statements on plagiarism and academic integrity
- copyright principles and responsibilities
- the University's policies on appropriate use of software and computer facilities

Information on all of the above is available through the University's "Student Rights and Responsibilities" website at: [students.curtin.edu.au/rights](https://students.curtin.edu.au/rights).

## Student Equity

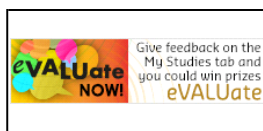
There are a number of factors that might disadvantage some students from participating in their studies or assessments to the best of their ability, under standard conditions. These factors may include a disability or medical condition (e.g. mental illness, chronic illness, physical or sensory disability, learning disability), significant caring responsibilities, pregnancy, religious practices, living in a remote location, or another reason. If you believe you may be unfairly disadvantaged on these or other grounds please contact the appropriate service below. It is important to note that the staff of the University may not be able to meet your needs if they are not informed of your individual circumstances, so please get in touch with the appropriate service if you require assistance.

To discuss your needs in relation to:

- Disability or medical conditions, contact AccessAbility Services: <https://students.curtin.edu.au/personal-support/disability/>
- Elite athletes, contact Elite Athlete Coordinator: <https://stadium.curtin.edu.au/sport/academy/elite-athlete-program/>
- All other grounds, contact the Student Wellbeing Advisory Service: <https://students.curtin.edu.au/personal-support/counselling-guidance/wellbeing/>

## Recent unit changes

Students are encouraged to provide unit feedback through **eVALUate**, Curtin's online student feedback system. For more information about **eVALUate**, please refer to [evaluate.curtin.edu.au/info/](https://evaluate.curtin.edu.au/info/).



To view previous student feedback about this unit, search for the Unit Summary Report at [https://evaluate.curtin.edu.au/student/unit\\_search.cfm](https://evaluate.curtin.edu.au/student/unit_search.cfm). See <https://evaluate.curtin.edu.au/info/dates.cfm> to find out when you can **eVALUate** this unit.

Recent changes to this unit include:

Matlab was introduced into this unit in 2019 to be used in the laboratories for the linear algebra component, previously Maple was used.

## Program calendar

## Semester 2, 2020

Week	Begin Date	Lecture/Workshop	Assessment Due
Orientation	27 July	Orientation Week	
1.	3 Aug	Statistics – Data handling, Population vs Sample, Statistical parameters	
2.	10 Aug	Statistics – Probability distributions: Binomial, Poisson and Normal distributions	
3.	17 Aug	Statistics – Confidence intervals, Hypothesis tests; Level of significance, p-value, power of test	
4.	24 Aug	Statistics – Hypothesis tests (continued)	
5.	31 Aug	Tuition Free Week	
6.	7 Sept	Vectors – Operations, Standard unit basis vectors, Dot product, Scalar and vector projections	Laboratory Quiz Mid-Semester Test
7.	14 Sept	Vectors & Matrices – Cross product and applications, Matrix operations, Inverse matrices	
8.	21 Sept	Application of Matrices – Linear equations, Row echelon form, Gaussian elimination	
9.	28 Sept	Tuition Free Week	
10.	5 Oct	Application of Matrices – Homogeneous systems, Gauss Jordan method, Solutions using inverse matrix	
11.	12 Oct	Determinants – Cofactor expansion, Evaluating determinants, Cramer's rule, Applications of determinants	
12.	19 Oct	Lines and Planes – Equations of lines, Equation of planes, Intersection of planes, Determining distances	Workshop Quiz
13.	26 Oct	Vector Spaces – Euclidean vector space, vector subspaces, linear dependence and independence	
14.	2 Nov	Applications of Vectors and Matrices – Plane Transformations, Least squares	
15.	9 Nov	Study Week	
16.	16 Nov	Examinations	
17.	23 Nov	Examinations	