



Faculty of Science, Engineering and Built Environment

SIT307 Machine Learning

Deakin University Unit Guide

Trimester 1, 2025

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Welcome

Machine learning is an important tool in analytics, where algorithms iteratively learn from data to uncover hidden insights, without being directly programmed on where to find such information. This unit involves students exploring machine-learning techniques such as data representation, unsupervised learning (clustering and factor analysis) methods, supervised learning (linear and non-linear classification) methods, concepts of suitable model complexity for the problem and data at hand. Students will have the opportunity to apply these techniques in solving real-world problem scenarios presented to them in the unit.

This Unit Guide provides you with the key information about this unit. Please read it carefully and refer to it frequently throughout the study period. Your unit site also provides information about your rights and responsibilities. We will assume you have read this before the unit commences, and we expect you to refer to it throughout the study period.

To be successful in this unit, you must:

- read all materials in preparation for your learning activities and follow up each with further study and research on the topic
- start your assessment tasks well ahead of the due date
- read or listen to all feedback carefully and use it in your future work
- attend and engage in all educator facilitated (scheduled) learning activities and other learning experiences as part of the unit design

Who is the unit team?

Unit chair: leads the teaching team and is responsible for overall delivery of this unit

Unit chair details

Name: Bahareh Nakisa

Campus: Geelong Waurin Ponds

Email: bahar.nakisa@deakin.edu.au

Phone: +61 3 522 73816

Other members of the team and how to contact them

Melbourne Burwood and Online Campus Leader: contact the Campus Leader for assistance at your campus

Name: A/Prof Kewen Liao

Email: kewen.liao@deakin.edu.au

Phone: +61 3 924 46729

Throughout the unit you can post comments and questions. You are encouraged to do this including helping other students. You may want to contact the Unit Chair if you have any questions about the unit and especially if you need some assistance.

Administrative queries

- check-out the 'SEBE Student Hub' section on your unit site
- contact your Unit Chair or Campus Leader
- drop in or contact [Student Central](#) to speak with a Student Adviser

For additional support information, please see the Rights and Responsibilities section under 'Content' in your unit site.

About this unit

Unit development in response to student feedback

Every trimester, we ask students to tell us, through eVALUate, what helped and hindered their learning in each Unit. You are strongly encouraged to provide constructive feedback for this Unit when eVALUate opens (you will be emailed a link). In previous versions of this unit, students have told us that these aspects of the Unit have helped them to achieve the learning outcomes:

- Weekly activities and exposure to research experiments were useful components.

The following aspects of the unit have been introduced, enhanced or retained in response to feedback from students who have undertaken this unit in previous trimesters:

- Simplification of certain complex topics through illustration and other visual aids.

If you have any concerns about the Unit during the trimester, please contact the unit teaching team - preferably early in the trimester - so we can discuss your concerns, and make adjustments, if appropriate.

Learning Outcomes

Each Unit in your course is a building block towards Deakin's Graduate Learning Outcomes - not all Units develop and assess every Graduate Learning Outcome (GLO).

ULO	These are the Unit Learning Outcomes (ULOs) for this unit. At the completion of this unit, successful students can:	Alignment to Deakin Graduate Learning Outcomes (GLOs)
ULO1	Maintain knowledge of advances in machine learning, and use this knowledge to explain machine learning techniques and algorithms to a range of technical and non-technical audiences.	GLO1: Discipline-specific knowledge and capabilities GLO2: Communication
ULO2	Explore data using a range of machine learning techniques, evaluate resulting models, and extract and communicate insights from data in real-world scenarios.	GLO1: Discipline-specific knowledge and capabilities GLO3: Digital literacy GLO4: Critical thinking GLO5: Problem solving
ULO3	Design solutions to real-world problems and exploring data using machine learning techniques.	GLO1: Discipline-specific knowledge and capabilities GLO4: Critical thinking GLO5: Problem solving
ULO4	Create Python scripts to automate the evaluation and analysis of data using a range of machine learning libraries, techniques, and algorithms.	GLO1: Discipline-specific knowledge and capabilities

Assessing your achievement of the unit learning outcomes

Hurdle requirements

To be eligible to pass the unit, students must pass certain milestones in the portfolio.

Brief summary of the hurdle requirements	Rationale
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<p>1. Pass tasks</p> <p>Students need to complete the units pass tasks to pass the unit.</p> <p>The portfolio requires students to work through a series of Tasks to produce a portfolio of evidence showing achievement of the unit learning outcomes. To achieve a passing grade, students must demonstrate adequate performance in the completion of the unit's pass tasks, which will show the required minimum standard.</p> <p>Credit, Distinction, and High Distinction tasks are used to determine higher grades, corresponding to achievement of the unit learning outcomes to a higher level.</p>	<p>The pass tasks in this unit provides students the opportunity to develop and demonstrate the achievement of Unit Learning Outcomes at the minimum expected standards. These tasks are included as hurdle requirements so that students are able to provide evidence of achievement of these ULOs through their portfolio. The portfolio artefact that they submit is used to measure their performance against the minimum standards as well as their ability to justify the outcomes that they have achieved through self-assessment and reflection.</p>
<p>2. Task Discussion</p> <p>Students are required to discuss their understanding of concepts, and demonstrate achievement of unit learning outcomes, with the teaching team. To receive a passing grade, students must clearly communicate appropriate understanding of the associated concepts and achievement of the associated unit learning outcomes in these task discussions. As part of this process, the teaching team may require students to answer follow up questions for clarifications, redo the task, and/or repeat the task discussion to satisfy this hurdle requirement.</p> <p>All task discussions need to occur within the teaching period. Task discussions must be conducted face-to-face (for campus students) or via online discussions through MS Teams/Zoom Meeting or another mechanism as determined by the Unit Chair (for online students only). Please ensure that you are enrolled in the correct mode of study.</p>	<p>Task discussions help students to demonstrate achievement of their unit learning outcomes, while also helping to authenticate student learning and improve academic integrity in the unit. The student-staff interaction during discussions will allow the teaching team to make judgements about student learning and progress in select tasks that are representative of high-order thinking and learning. Feedback resulting from this will help aid student learning and provide them with additional opportunities to demonstrate achievement of unit learning outcomes.</p>

<p>It is strongly recommended that tasks are submitted well ahead of the respective deadlines, because the completion of tasks involves submitting work for assessment, responding to feedback, and discussion of the tasks with the teaching staff. In many cases, your solutions will need to be corrected and resubmitted, potentially more than once, as part of this process.</p> <p>Students are required to respond to feedback via OnTrack comments, in a timely manner, and answer questions posed by the teaching team.</p> <p>For some tasks the teaching team may require an audio or video recording to be used to demonstrate understanding of the task and its associated concepts. In these cases, video recording must clearly show the student talking through the concepts and responding to the questions posed by the teaching team.</p>	
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Summative assessment (tasks that will be graded or marked)

NOTE: It is *your responsibility* to keep a backup copy of every assignment and the materials used to develop/complete it where possible (e.g. written/digital reports, essays, videos, images). In the unusual event that one of your submissions becomes corrupted, is incorrectly submitted or otherwise lost, you may be asked to submit the backup copy. Any work you submit may be checked by electronic or other means for the purposes of detecting breaches of academic integrity such as collusion, plagiarism and contract cheating. You must understand your responsibility to act with honesty and integrity in your studies as Deakin takes all breaches very seriously. Make sure you read [Your rights and responsibilities as a student in this unit](#) to find out more about academic integrity.

Deakin has a universal assessment submission time of 8 pm AEDT/AEST. A late penalty will apply to assessments submitted after 11.59 pm AEDT/AEST.

Summative assessment task 1

Title	Learning portfolio
Brief description of assessment task	This assessment task requires students to work through a series of Tasks to produce a portfolio of evidence showing their achievement of the unit learning outcomes. Teaching staff will provide formative feedback on the tasks submitted within the task's indicated due dates to help ensure that students are able to demonstrate all learning outcomes in their portfolio. Tasks submitted after the due date may not receive feedback, and it will be the student's responsibility to ensure this is at an adequate standard in the portfolio at the end of the unit.
	<p>Tasks in this unit will consist of the following kinds of activities:</p> <ul style="list-style-type: none"> • Quiz responses • Problem solving tasks • Data analysis project work • Creating python programs • Reporting insights gained
Detail of student output	The portfolio is an individual assessment consisting of a reflective self-assessment, and the work associated with the tasks submitted for feedback during the teaching period.

Grading and weighting (% total mark for unit)	100% - graded To achieve at least a pass grade, students need to complete all pass tasks. To achieve at least a credit grade, students need to complete all pass and credit tasks. To achieve at least a distinction grade, students need to complete all pass, credit, and distinction tasks. To achieve a high distinction grade, students need to complete all tasks.
This task assesses your achievement of these Unit Learning Outcome(s)	ULO1 – through problem solving tasks, quiz responses, and explanation of concepts ULO2 – through applying a range of techniques in problem solving tasks and projects ULO3 – through project work and resulting reports ULO4 – through building python programs in project work and related tasks
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1 – through engaging with and developing skills in machine learning for data analysis GLO2 – through communicating findings to a range of audiences GLO3 – through using digital tools to perform data analysis and report results GLO4 – through evaluating and presenting results obtained GLO5 – through exploring and evaluating data as part of an authentic project
How and when you will receive feedback on your work	You will be required to work on and submit tasks for formative feedback regularly throughout the unit. The teaching team will review your progress and provide you with individual feedback to assist you in completing the tasks and achieving your target grade for the unit.
When and how to submit your work	At the end of the unit you will use OnTrack to combine together the artefacts you have created and a learning summary report into a single portfolio for assessment. This will be due 8pm (AEST) Friday 30 May 2025 (Week 12).

Your learning experiences in this unit

Educator-facilitated (scheduled) learning activities - on-campus unit enrolment

1 x 2 hour online lecture per week, 1 x 2 hour practical experience (workshop) per week. Weekly meetings.

Educator-facilitated (scheduled) learning activities - online unit enrolment

Online independent and collaborative learning including 1 x 2 hour online lecture per week (recordings provided), 1 x 2 hour online practical experience (workshop) per week, weekly meetings.

Typical study commitment

Students will on average spend 150 hours over the teaching period undertaking the teaching, learning and assessment activities for this unit.

This will include educator guided online learning activities within the unit site.

For campus students the learning and assessment activities include online lecture time, designated activities in the workshops, weekly meetings, assessment tasks, readings and study time. For online students the activities include online lecture time, designated activities in the online workshops, weekly meetings, discussion boards, assessment tasks, readings and study time.

There are many resources available to you undertaking a study in this unit. Learning opportunities in this unit are offered via lectures, workshops and the unit site. Students should begin by reading the unit information, intended unit learning outcomes and assessment activities. Lecture notes and reading materials provide an overview of the content for each week. Students should review this information for engaging in discussions during lectures, workshops and consultation sessions. Students should also conduct further research by examining information on the web, supplementary material in recommended reading and textbooks.

Attending lectures and designated consultation sessions regularly will enable students to focus on key concepts and engage in discussions with the teaching staff.

Lecture recordings will also be available for review via the unit site. Students must participate in unit site discussion forums and engage in learning with other students, monitor the forum and respond regularly and appropriately.

Note

At Deakin, courses are delivered within a learning environment that provides all students with equitable and consistent access to facilities, infrastructure, resources, and support to assist student progress and achievement of learning outcomes.

We have introduced new terms to reflect learning activities to enhance your learning experience, aligning with our innovative [DeakinDesign learning principles and practices](#). The new terms better reflect how teaching teams will guide you through your learning journey and the types of learning experiences you will have.

‘Lectures’ are the activities where teaching staff engage you through presentations with student participation.

In **‘seminars’**, an educator will guide you in a smaller group of students through highly interactive discussions and activities.

Your units may also include **‘practical experiences’** such as **‘laboratory’**, **‘workshops’**, **‘clinical skills’** and more. These hands-on activities typically take place in specialised facilities with industry tools, equipment or technology to allow you to apply your knowledge practically.

Some other terms

If you see a **‘meeting’** in your timetable, this is an optional drop-in session.

‘Assessments’ or **‘team-based learning’** indicate an in-class evaluation of your skills or knowledge. A **‘pre-assessment practice’** could be scheduled to prepare you for these assessments.

Find out more

Take a look at the [Learning activities webpage](#) for a full list of the terminology changes and reasons they were changed.

Unit learning resources

Your unit learning resources can be accessed from your unit site.

The texts and reading list for [SIT307](#) can be found via the University Library.

Note: Select the relevant trimester reading list. Please note that a future teaching period's reading list may not be available until a month prior to the start of that teaching period so you may wish to use the relevant trimester's prior year reading list as a guide only.

Essential learning resources

There is no prescribed textbook. However the recommended resources below will be utilised to support learning materials provided in the unit site, which will include written notes, audio-visual recordings, task statements and links to external resources.

Recommended learning resources

The [Deakin Software Library](#) provides students with access to software that you may need or find useful for your study at Deakin.

Due to the interdisciplinary nature of data science, the following books are highly recommended for additional reading:

1. **The elements of statistical learning.** Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. Vol. 1. Springer, Berlin: Springer series in statistics, 2009.
2. **Pattern Recognition and Machine Learning.** Bishop, Christopher M. Springer, 2006.
3. **Introduction to Algorithms for Data Mining and Machine Learning.** Yang, Xin-She. Elsevier Science & Technology, **2019**. ISBN number:9780128172162.
4. **Machine Learning and Its Applications.** Wlodarczak, Peter. Taylor & Francis Group, **2020**. ISBN number:9781138328228.
5. **Practical Machine Learning for Data Analysis Using Python.** Subasi, Abdulhamit. Elsevier Science & Technology, **2020**.

ISBN number:9780128213797.

6. **Applied Machine Learning for Smart Data Analysis.** Dey, Nilanjan; Wagh, Sanjeev. Taylor & Francis Group, **2019**. ISBN number:9781138339798, SERIES: Computational Intelligence in Engineering Problem Solving Ser.

Where to access unit resources

Textbooks can be sourced from various outlets including direct from the publisher, online bookshops, or retailers. Limited copies of textbooks are also available on loan from the University Library.

Key dates for this study period

Trimester 1 teaching period begins	Monday 3 March 2025
Census date	Monday 31 March 2025
Easter/intra-trimester break	Friday 18 April - Sunday 27 April 2025
Trimester 1 teaching period ends	Friday 23 May 2025
Study period (end-of-unit assessment /examination preparation period)	Monday 26 May - Friday 30 May 2025
End-of-unit assessment and examination period	Monday 2 June - Friday 13 June 2025
Inter-trimester break (the period between trimesters)	Monday 16 June - Friday 4 July 2025
Unit results released	Thursday 3 July 2025 (10.30 am)

Unit weekly activities

Week	Commencing	Topic	Assessment due date
1	3 March 2025	Introduction to ML	
2#	10 March 2025	Data Wrangling Basics	OnTrack tasks
3	17 March 2025	Unsupervised Learning: Clustering	
4	24 March 2025	Unsupervised Learning: Dimensionality Reduction	OnTrack tasks
5	31 March 2025	Supervised Learning: Basics and Model Selection	
6	7 April 2025	Linear Regression and Logistic Regression	OnTrack tasks
7*~	14 April 2025	Support Vector Machine	
8	28 April 2025	KNN, Decision Tree	OnTrack tasks
9	5 May 2025	Ensemble Approach	
10	12 May 2025	Deep Learning Basics	OnTrack tasks
11	19 May 2025	Revision	
12	26 May 2025		Study period Learning portfolio due 30 May
13-14^	2 June 2025		End-of-unit assessment and exam period

Labour Day public holiday: **Monday 10 March 2025** - University closed

* Easter/Intra-trimester break: **Friday 18 April - Sunday 27 April 2025** (between weeks 7 and 8)

~ ANZAC Day public holiday: **Friday 25 April 2025** - University closed

^ King's Birthday public holiday: **Monday 9 June 2025** - University closed