Faculty of Science, Engineering and Built Environment

SIT215 Computational Intelligence

Deakin University Unit Guide

Trimester 1, 2025

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Welcome

The development of intelligent systems has been a central quest of computer scientists for more than fifty years, with the objective of creating artificial systems that can solve problems traditionally achievable only by humans. This field is underpinned by a range of computational patterns and methods that cover problems such as searching, problem solving, reasoning, knowledge representation and learning. In this unit students will investigate, through a range of problem-based learning activities, a range of artificial and computational intelligence techniques that underpin modern, advanced intelligent systems such as autonomous vehicles, robotics and game-playing agents.

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: Glory Lee
Campus: Melbourne Burwood
Email: glory.lee@deakin.edu.au
Phone: +61 3 924 45806
Other members of the team and how to contact them

There are no other staff involved in teaching this unit.
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:

- The approachability, responsiveness, and knowledge of the teaching team was appreciated.
- Informative lectures, practical (workshops), and assignments were highlighted as effective tools for understanding complex topics.
- The clear alignment between lectures, workshops, and learning materials was praised.

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:

- Additional assignment guidelines will be provided to better support students in navigating complex problem-solving processes.
- More frequent practical tasks will be implemented to help students consolidate their knowledge incrementally.
- Additional examples will be provided to help understand certain theoretical concepts.

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	Apply specific algorithms and data structures to model a range of problems arising in intelligent systems development.	GLO1: Discipline-specific knowledge and capabilities GLO5: Problem solving
ULO2	Design and implement software artefacts to demonstrate effectiveness and efficiency of solutions for intelligent systems development.	GLO1: Discipline-specific knowledge and capabilities GLO4: Critical thinking GLO7: Teamwork
ULO3	Apply theoretical concepts and models to explain and communicate the design of intelligent systems.	GLO1: Discipline-specific knowledge and capabilities GLO2: Communication GLO7: Teamwork

Assessing your achievement of the unit learning outcomes

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	Problem Solving Task
Brief description of assessment task	This assessment comprises written answers and programming tasks, and is based on topics presented during Weeks 1 to 6.
Detail of student output	This is a an individual task. Students will be required to submit written answers as well as the relevant practical programming source codes and outputs. Despite being an individual assessment, the work should also reflect the results of discussions held in a group setting with collaborative insights in the corresponding sections. Detailed instructions will be provided in the assessment instruction sheets, which will be released at the beginning of the trimester.
Grading and weighting (% total mark for unit)	The assessment item is marked and graded, and contributes **40%** to the final unit mark.

This task assesses your achievement of these Unit Learning Outcome(s)	ULO1 - Exhibiting proficiency in selecting and applying appropriate search algorithm(s) and data structures to act as an agent in problem resolution. ULO2 - Characterising and formulating navigation challenges utilising specific theoretical constructs and models. Developing, assessing, and critiquing the performance of various viable solutions to identify effective strategies. ULO3 - Communicating the design, methodology, and results of investigative and developmental efforts clearly and comprehensively.
This task assesses your achievement of these Graduate Learning Outcome(s)	Students must demonstrate and communicate an understanding of the key concepts (GLO1 and GLO2), ability to critically analyse and problem solve (GLO4 and GLO5) in a team environment (GLO7).
How and when you will receive feedback on your work	Students are actively encouraged to seek formative feedback from peers and teaching staff, on their work completed before the submission deadline, to ensure they are on track with this task. Feedback may be obtained during weekly scheduled practical classes upon request. Besides, marking feedback will be provided after the evaluation process within 15 business days after the submission due date.
When and how to submit your work	Due: Sunday 13 April 2025 by 8pm AEST (Week 6). You must submit your solution files via the unit site.

Summative assessment task 2

Title	Quiz
Brief description of assessment task	Students will undertake an open book assessment under test conditions, to assess their conception of key topics covered in the unit.
Detail of student output	This individual assessment task must be completed within the time constraints of a 60-minute quiz.
Grading and weighting (% total mark for unit)	20% - marked The assessment item is marked and contributes **20%** to the final unit mark.
This task assesses your achievement of these Unit Learning Outcome(s)	ULO1 - Through applying fundamental knowledge of computational intelligence methods to answer specific questions. ULO2 - Demonstrating proficiency in designing and implementing software artefacts for intelligent systems development.
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1 – Through the assessment of students' ability to acquire, interpret and apply discipline specific knowledge.
How and when you will receive feedback on your work	The online quiz will be auto-marked and the results released upon the student's submission on the unit site. Aligned with Deakin University's assessment procedure, general feedback on the quiz will be provided on the unit site within 15 University working days after the quiz period concludes.
When and how to submit your work	The quiz will be undertaken through the unit site (Quiz tool). The quiz will be available for student response in Week 7 and is due for submission no later than 8pm (AEST) Sunday 11 May 2025 (Week 9).

Summative assessment task 3

Title	Project
Brief description of assessment task	Students will work individually to design, implement and verify an AI or CI system.

Detail of student output	Students will produce and submit annotated software source code and resource files. They will also submit a report alongside a recorded video presentation, documenting their solution design, development process, and justifications for the choices made during the creation of the software solution. Detailed instructions will be provided in the assessment instruction sheets, which will be released at the beginning of the trimester.
Grading and weighting (% total mark for unit)	This assessment item is marked and graded, and contributes **40%** to the final unit mark.
This task assesses your achievement of these Unit Learning Outcome(s)	ULO2 - Demonstrating proficiency in working with software systems and frameworks for automated planning. Implementing, evaluating, and analysing the performance of automated planning solutions. ULO3 - Describing and modelling planning problems using appropriate concepts and models. Effectively communicating the process and outcomes of research and developed project.
This task assesses your achievement of these Graduate Learning Outcome(s)	Students will use their understanding of key concepts (GLO1) to design and implement software solutions (GLO4) and communicate outcomes (GLO2).
How and when you will receive feedback on your work	Students are actively encouraged to seek formative feedback from peers and teaching staff on their work completed before the submission deadline, to ensure they are on track with this task. Feedback may be obtained during weekly scheduled practical classes upon request. Besides, marking feedback will be provided after the evaluation process within 15 Univeristy working days after the submission due date.
When and how to submit your work	Submission is via the via the unit site and all submission components must be submitted no later than Sunday 25 May 2025, 8pm AEST (Week 11).

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.

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 practical experience (workshop) per week.

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.

Student's study time will be divided between both formal (timetabled) and informal (self-directed) learning activities, which includes review and study of learning resources, and programming practice and skill development. Please refer to the unit site for more details.

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 SIT215 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

Learning resources for this unit will be available to students via the unit site. These will include:

- Audio-visual materials encompassing specific aspects of course content
- Readings from online resources and prescribed eBooks
- Software for download and use in learning and assessment tasks
- Documentation explaining assessment tasks, including how to complete them, submission requirements, deadlines, and how to obtain guidance and feedback.

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.

Recommended reference books:

- Stuart J. Russell and Peter Norvig, 4th edition 2021, Artificial Intelligence: A Modern Approach (both the hard copy and e-copy versions are available in Deakin Library, with the hard copy published in 2021 and the e-copy in 2022, ISBN: 9780134610993)
- Rishal Hurbans, Grokking Artificial Intelligence Algorithms, Publisher Simon and Schuster, 2020

Additional relevant resources will be advised via the unit site.
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 Computational Intelligence, AI and Agents	
2#	10 March 2025	Problem Solving Part 1	
3	17 March 2025	Problem Solving Part 2	
4	24 March 2025	Solution Quality and Evaluation	
5	31 March 2025	Knowledge and Reasoning Part 1	
6	7 April 2025	Knowledge and Reasoning Part 2	**Assessment 1: Problem solving task** due Sunday 13 April
7*~	14 April 2025	Planning and Action Part 1	
8	28 April 2025	Planning and Action Part 2	
9	5 May 2025	Performance Evaluation	**Assessment 2: Quiz** due Sunday 11 May
10	12 May 2025	Learning Paradigms	
11	19 May	Review and Conclusion	**Assessment 3: Project** due Sunday 25 May
12	26 May 2025		Study period
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