MONASH University
Information Technology

Unit Guide

FIT5047
Fundamentals of artificial intelligence

Semester 1 (Fully flex), 2020

We acknowledge and pay respects to the Traditional Owners and Elders - past, present and emerging - of the lands and waters on which Monash University operates.

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

Last updated: 04 Mar 2020

Status: Approved

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Unit handbook information

Synopsis

This unit introduces the main problems and approaches to designing intelligent software systems including automated search methods, knowledge representation and reasoning, planning, reasoning under uncertainty, machine learning paradigms, and evolutionary algorithms.

Location(s) and mode(s) of delivery

Clayton (Flexible)

Workload requirements

Minimum total expected workload equals 12 hours per week comprising:

(a.) Contact hours for on-campus students:

- Two hours of lectures
- One 2-hour laboratory

(b.) Additional requirements (all students):

- A minimum of 8 hours independent study per week for completing lab and project work, private study and revision.

See also Unit timetable information

Class Timetable

Follow this link to view the scheduled times for your unit's learning activities for this teaching period.

Unit relationships

Prerequisites

None

Prohibitions

None

Co-requisites

None

Enrolment rules

Prerequisite: (FIT9131 or FIT9133 or FIT9136) and Fundamental math with introductory knowledge of probability; or entry into C6007

From semester 2, 2020 onward: (FIT9131 or FIT9133 or FIT9136) and MAT9004; or entry into C6007.

Staff details

Chief Examiner

Associate Professor Chung-Hsing Yeh

Campus Lecturer(s)

Clayton

Name: Mr Bruce Chen
Email: Bruce.Ying.Chen@monash.edu

Academic overview

Learning outcomes

On successful completion of this unit, you should be able to:

1. Explain the theoretical foundations of Artificial Intelligence (AI) - such as the Turing test, Rational Agency and the Frame Problem - that underpin the application to information technology and society;

2. Critically explain, evaluate and apply appropriate AI theories, models and/or techniques in practice - including logical inference, heuristic search, genetic algorithms, supervised and unsupervised machine learning and Bayesian inference;

3. Utilise appropriate software tools to develop AI models or software;

4. Utilise and explain evaluation criteria to measure the correctness and/or suitability of models.

Teaching approach

Lectures and tutorials or problem classes
This teaching and learning approach provides facilitated learning, practical exploration and peer learning.

Live streaming

If you have been allocated to a lecture activity as a livestream, you will participate in this activity online. A link to the livestreams will be available in your Moodle unit.

- For information on how to participate in your lectures via live streaming, you can review this guide created by the library: https://guides.lib.monash.edu/learning-tools/video
- If you have any technical issues please contact the service desk: https://www.monash.edu/esolutions/contact
- If you need more information on timetabling you can visit their site: https://www.monash.edu/timetables/fix-problems

Assessment summary

Examination (2 hours and 10 minutes): 60%; In-semester assessment: 40%

This unit contains hurdle requirements which you must achieve to be able to pass the unit. The consequence of not achieving a hurdle requirement is a fail grade (NH) and a maximum mark of 45 for the unit.

Assessment task	Value	Due date
Assessment Task 1 - Tests	20%	Week 6, Week 9
Assessment Task 2 - Labs	20%	Week 10, Week 12
Examination 1	60%	To be advised

Unit schedule

For units with on-campus classes, teaching activities are normally scheduled to start on the hour (teaching will commence on the hour and conclude 10 minutes prior to the scheduled end time).

Week	Activities	Assessment
0		
1	Introduction to Artificial Intelligence	
2	Intelligent agents	
3	Problem solving as search	
4	Problem solving as search	
5	Knowledge representation (predicate calculus)	
6	Knowledge representation (predicate calculus)	Test 1a: Intelligent agents and problem solving as search
7	Reasoning under uncertainty (probabilistic models, Bayesian Networks)	
8	Reasoning under uncertainty (Bayesian Networks)	
9	Reasoning under uncertainty (Bayesian Networks)	Test 1b: Knowledge representation
10	Supervised Machine Learning	Lab 2a: Bayesian Networks
11	Supervised Machine Learning	
12	Unsupervised Machine Learning	Lab 2b: Supervised Machine Learning
	SWOT VAC	No formal assessment is undertaken in SWOT VAC
	Examination period	LINK to Assessment Policy: http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html

*Unit Schedule details will be maintained and communicated to you via Moodle.

Assessment requirements

Faculty Unit Assessment Hurdles

To pass a unit which includes an examination as part of the assessment, a student must obtain, unless otherwise approved and published:

- 45% or more in the unit's examination, and
- 45% or more in the unit's total non-examination assessment, and
- an overall unit mark of 50% or more.

If a student does not achieve 45% or more in the unit examination or the unit non-examination total assessment, and the total mark for the unit is:

- equal to or greater than 50%, then a mark of 45-NH will be recorded for the unit.
- less than 50% then the actual mark for the unit will be recorded.

To pass a unit with 100% in-semester assessment, a student must obtain, unless otherwise approved and published:

- an overall unit mark equal to or greater than 50%.

Assessment tasks

Assessment title: Assessment Task 1 - Tests
Learning outcomes: 1, 2, 4
Type: Individual assessment task
Details of task: Test 1a: Intelligent agents and Problem solving

Test 1b: Knowledge representation

Conducted during the lab

Value: 20%
Criteria for marking: The criteria used to assess are correctness and completeness of your answers to questions.
Due date: Week 6, Week 9
Estimated return date: Week 8, Week 11

Assessment title: Assessment Task 2 - Labs
Learning outcomes: 2, 3, 4
Type: Individual and group assessment task
Details of task: Lab 2a: Assessment task in pairs of laboratory involving Bayesian Networks.

Lab 2b: Assessment task in pairs of laboratory involving Supervised Machine Learning.

Value: 20%
Criteria for marking: Correctness and completeness of submitted answers to Bayesian Networks and Supervised Machine Learning problems.
Due date: Week 10, Week 12
Estimated return date: Week 12, Week 14

Individual assessment in group tasks: Students will be interviewed as part of the assessment.

Examination

This unit may employ electronic assessment for the final exam. Further details will be provided to you by Week 4 of Semester.

Value: 60%
Length: 2 hours and 10 minutes
Type: Closed book
Electronic devices allowed: Scientific calculator (non-programmable)
Learning outcomes assessed: 1, 2, 4

Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit lecturer via the in-semester special consideration process: http://www.monash.edu.au/exams/special-consideration.html

If a documented application for special consideration (see, e.g., https://www.monash.edu/exams/changes/special-consideration [under in-semester]) for extraordinary circumstances (including documented illness) is completed and submitted in a timely manner within the deadlines specified by university policy, then an extension might be granted. Otherwise, point penalties are applied **of 10% per day** of late submissions (excluding weekends and public holidays). Your mark can not become lower than 0.

Please also understand that if work is submitted late then it can delay our ability to return your work.

See elsewhere for policies on hurdles. You will also be interviewed about your submissions - during lab/tute time or another time specified by your tutor.

Returning assignments

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Resubmission of assignments

No resubmissions.

Referencing requirements

To build your skills in citing and referencing, and using different referencing styles, see the online tutorial Academic Integrity: Demystifying Citing and Referencing at http://www.lib.monash.edu/tutorials/citing/

Additional information:
See Library Guides for Citing and Referencing at http://guides.lib.monash.edu/content.php?pid=88267&sid=656564

Assignment submission

It is a University requirement (http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-academic-integrity-managing-plagiarism-collusion-procedures.html) for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at https://www.monash.edu/it/current-students/resources-and-support/student-forms. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an electronic submission).

Please note:

1. **It is your responsibility to retain copies of your assessments.**
2. **Assessments submitted without an assignment coversheet will not be marked.**

Online submission: If Electronic Submission has been approved for your unit, please submit your work via the learning system for this unit, which you can access via links in the my.monash portal.

Please keep a copy of tasks completed for your records.

Feedback to you

☑ Test results and feedback
☑ Examination feedback after results publication
☑ Informal feedback on progress in labs/tutes
☑ Other

- Solutions to tuts and labs
- Graded tests and labs with comments

Learning resources

Monash Library Unit Reading List (if applicable to the unit): http://monash.rl.talis.com/index.html
Research and Learning Online: www.monash.edu/rlo

Required resources

Students generally must be able to complete the requirements of their course without the imposition of fees that are additional to the student contribution amount or tuition fees. However, students may be charged certain incidental fees or be expected to make certain purchases to support their study. For more information about this, refer to the Higher Education Administrative Information for Providers, Chapter 18, Incidental Fees at http://education.gov.au/help-resources-providers.

Please check with your lecturer before purchasing any required resources. Limited copies of prescribed texts are available for you to borrow in the library, and prescribed software is available in student labs.

Prescribed text(s)

Limited copies of prescribed texts are available for you to borrow in the library.

Russell, S and Norvig, P. (2010). *Artificial Intelligence - A Modern Approach*. (3rd Edition) Prentice-Hall.

Technological requirements

Netica (free)

Weka Data Mining Toolkit (free)

Web access and internet access

Recommended resources

Witten, I. and Frank, E. (2005). *Data Mining - Practical Machine Learning Tools and Techniques*. (3rd Edition) Elsevier.

J. Hernandez-Orallo (2017), *The measure of all minds.* Cambridge University Press (http://AllMinds.org).

Jensen, F. V. (2007). *Bayesian Networks and Decision Graphs*. Springer-Verlag.

Korb, K and Nicholson, A. (2011). *Bayesian Artificial Intelligence*. (2nd Edition) CRC Press.

Examination material or equipment

Calculator (non-programmable)

Previous student evaluations of unit

One of the formal ways students have to provide feedback on teaching and their learning experience is through the Student Evaluation of Teaching and Units (SETU) survey. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied with and areas for improvement.

Previous student evaluations of this unit
In response to previous SETU results of this unit, the following changes have been made:

The format of the unit will be the same as that of 2017, which received good student feedback.

If you wish to view how previous students rated this unit, please go to https://www.monash.edu/ups/setu/about/setu-results/unit-evaluation-reports.

If you would like to know more about SETU, please go to www.monash.edu/ups/setu.

Other information

Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at: http://www.policy.monash.edu/policy-bank/academic/education/index.html

Student Academic Integrity Policy

https://www.monash.edu/__data/assets/pdf_file/0008/801845/Student-Academic-Integrity_Managing-Plagiarism-and-Collusion-Procedures.pdf

Special Consideration

For information on applying for special consideration, please visit: http://www.monash.edu/exams/changes/special-consideration

Graduate Attributes Policy

http://www.monash.edu/__data/assets/pdf_file/0009/786969/Course-Design-Policy.pdf

Student Charter

http://www.monash.edu/students/policies/student-charter.html

Student Services

The University provides many different kinds of services to help you gain the most from your studies. Further information is available at http://www.monash.edu/students.

For Malaysia see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/.

Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research.
Go to http://www.monash.edu/library or the library tab in my.monash portal for more information.

At Malaysia visit the Library and Learning Commons at http://www.lib.monash.edu.my/.

At South Africa visit http://www.lib.monash.ac.za/.

Disability Support Services

Students who have a disability, ongoing medical or mental health condition are welcome to contact Disability Support Services.

Disability Support Services also support students who are carers of a person who is aged and frail or has a disability, medical condition or mental health condition.

Disability Advisers visit all Victorian campuses on a regular basis.

- Website: monash.edu/disability
- Telephone: 03 9905 5704 to book an appointment with an Adviser, or contact the Student Advisor, Student Community Services at 03 55146018 at Malaysia
- Email: disabilitysupportservices@monash.edu
- Drop In: Level 1, Western Annexe, 21 Chancellors Walk (Campus Centre) Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Malaysia Campus