School of Information and Physical Sciences

INFT2060: Applied Artificial Intelligence

Callaghan
Semester 2 - 2023

COURSE OUTLINE

OVERVIEW

Course Description

If data is the oil of the 21st Century, then artificial intelligence (AI) is its engine. Across a wide range of application areas, system designers leverage the advances in machine learning to process large volumes of data (e.g. audio, image, video) in an attempt to extract meaningful information from data, automate complex tasks, and support human decision making. This course equips students with the practical skills to apply existing AI tools and libraries to practical application areas such as business, education, and health.

Assumed Knowledge

INFT1004 Introduction to Programming OR SENG1110 Object Oriented Programming

Contact Hours

Computer Lab
Face to Face On Campus
2 hour(s) per Week for 12 Weeks

Lecture
Face to Face On Campus
2 hour(s) per Week for 12 Weeks

Unit Weighting
10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Callaghan
Dr Philipp Rouast
Philipp.Rouast@newcastle.edu.au
Consultation: See the course Canvas site

Teaching Staff

Other teaching staff will be advised on the course Canvas site.

School Office

School of Information and Physical Sciences
SR233, Social Sciences Building
Callaghan
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9am-5pm (Mon-Fri)

SYLLABUS

Course Content

- Overview and History of Artificial Intelligence
- Conventional Machine Learning
- Deep Learning
- The Workflow of Machine Learning in Practice
- AI for Computer Vision
- AI for Natural Language Processing
- Advanced Applications of AI (e.g., Autonomous Systems, Generative AI)
- Health, Ethics and Societal Issues of AI applications

Course Learning Outcomes

On successful completion of this course, students will be able to:
1. Define principles of artificial intelligence and machine learning.

2. Use AI tools and libraries to extract information from data (e.g. audio, image, text, video).

3. Interpret, validate, and integrate AI outputs.

4. Explain the application of AI tools and libraries to practical application areas (e.g. business, education, health).

5. Critically explain the limitations and issues of applying AI in practice.

Course Materials

Recommended Reading:

- Chollet, F. (2021). Deep Learning with Python, Second Edition. Manning 2021.

- An extended list of recommended texts is provided on Canvas.

Required Reading:

- Lecture slides will be provided on Canvas.

COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

Course Assessment Requirements:

- Assessment 3 – Formal Examination: Minimum Grade / Mark Requirement - Students must obtain a specified minimum grade / mark in this assessment item to pass the course. Students whose overall mark in the course is 50% or more, but who score less than 40% in the compulsory item and thus fail to demonstrate the required proficiency, will be awarded a Criterion Fail grade, which will show as FF on their formal transcript. However, students in this position who have scored at least 25% in the compulsory assessment item will be allowed to undertake a supplementary 'capped' assessment in which they can score at most 50% of the possible mark for that item.

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Presentation	Weeks 4-10 (Lab timeslots)	Individual	20%	1, 2, 4, 5
2	AI Project	Friday, 20 October 2023 (5 pm)	Group	30%	2, 3, 4, 5
3	Formal Examination*	Exam period	Individual	50%	1, 2, 3, 4, 5

* This assessment has a compulsory requirement.

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Presentation

Assessment Type Presentation
Purpose Develop students' understanding of real-world AI applications and critical analysis skills by researching and presenting on a specific AI company or startup, focusing on their AI-related product, ethical considerations, challenges, and future directions.
Description Students deliver a 10-minute presentation outlining a chosen AI company or startup, exploring their AI-related product, discussing ethical considerations, challenges, and future directions, thereby enhancing their knowledge of AI applications and presentation skills. Details will be provided on Canvas.
Weighting 20%
Length 10 minutes
Due Date Weeks 4-10 (Lab timeslots)
Submission Method In Class
Assessment Criteria See Canvas
Return Method In Class
Feedback Provided In Class - .

Assessment 2 - AI Project

Assessment Type Report
Purpose Develop students' research, analysis, and collaborative skills by investigating and documenting findings on a specific AI model, including its applications, experimental evaluation, advantages and limitations, and ethical considerations.
Description Student groups will conduct research on a specific AI model, providing a comprehensive written report that explores its background, applications, experimental evaluation, ethical considerations, and future directions, thereby fostering critical thinking and knowledge of AI models. It is expected that students work in groups of 4-5 students formed during the lab. Details will be provided on Canvas.
Weighting 30%
Length 20-25 pages

Due Date	Friday, 20 October 2023 (5 pm)
Submission Method	Online
Assessment Criteria	See Canvas
Return Method	Not Returned
Feedback Provided	Online - .

Assessment 3 - Formal Examination

Assessment Type	Formal Examination
Description	The final formal examination is designed to test the individual student's knowledge of the course material and their ability to describe, analyse, and hypothesise from this material.
Weighting	50%
Due Date	Exam period
Submission Method	Formal Exam
Assessment Criteria	See Canvas
Return Method	Not Returned
Feedback Provided	No Feedback - .

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure.

	In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.
Academic Misconduct	All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.
Adverse Circumstances	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where: 1. the assessment item is a major assessment item; or 2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system; 3. you are requesting a change of placement; or 4. the course has a compulsory attendance requirement. Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: https://policies.newcastle.edu.au/document/view-current.php?id=236
Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures that support a safe and respectful environment at the University.

GRADUATE PROFILE STATEMENTS

The following table illustrates how this course contributes towards building the skills students will need to work in their profession.

Level of capability

- Level 1 indicates an introduction to a topic at a university level
- Levels 2 and 3 indicate progressive reinforcement of that topic
- Level 4 indicates skills commensurate with a graduate – entry to professional practice
- Level 5 indicates highly specialist or professional ability

Bachelor of Information Technology

	University of Newcastle Bachelor of Information Technology Graduate Profile Statement	Taught	Practised	Assessed	Level of capability
1	Demonstrate a comprehensive understanding of the discipline of information technologies with an emphasis on net-centric applications, information management, and user requirements for ethical professional practice.	x		x	2
2	Apply critical reasoning and systems thinking to understand and support the operation and constraints of contemporary enterprises and their dynamic environment.	x	x		2
3	Work independently and collaboratively to locate, manage and organise information and resources	x	x	x	3

	and apply evidence-based methodologies to create, modify and maintain designs and design solutions.				
4	Use creativity, problem solving skills, project management skills and technical expertise to analyse, interpret, evaluate and generate solutions to complex technical and organisational problems.	x			2
5	Demonstrate professional judgement and responsibility by communicating information technology principles, practices, standards to specialist and non-specialist audience clearly and persuasively.	x	x	x	2

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.