COMP8420

Advanced Natural Language Processing

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Computing

Contents

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General Information

Unit convenor and teaching staff
Convenor & Lecturer
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Lecturer
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Credit points
10

Prerequisites
COMP6420

Corequisites

Co-badged status

Unit description
Human communication, with humans and virtual agents alike, is done in a natural language such as English. Humans have the amazing ability to learn, process and use natural languages. However, for machines it is difficult. This unit aims to familiarise students with the fundamental concepts and ideas in natural language processing (NLP) and Natural Language Understanding (NLU). It will help students develop a deeper appreciation of both algorithms for processing linguistic information and the underlying computational properties of natural languages, as well as their applications.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Industry, Innovation and Infrastructure

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

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

ULO1: Compare and evaluate the key natural language processing applications that

meet the current and emerging industry needs.

ULO2: Explain the main techniques that are used to develop and implement natural language processing applications.

ULO3: Implement natural language processing applications using common tools and libraries used in industry.

ULO4: Design natural language processing applications using advanced deep learning techniques.

ULO5: Apply natural language processing methods and techniques to industry applications using real data.

ULO6: Apply good practice in the development, monitoring, and deployment of natural language processing systems

General Assessment Information

Requirement to Pass this Unit

To pass this unit, you must achieve a total mark equal to or greater than 50%.

Release Dates

Assignment 1: To be released during week 1 of the lecture.

Assignment 2: To be released during week 3 of the lecture.

Major Project: To be released during week 8 of the lecture. Form groups during week 10 of the workshop.

Late Submission Policy:

For both assignments and the major project, NO late submission policy applies, unless Special Consideration has been submitted and approved.

Special Consideration Policy:

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Details for each assignment will be available via iLearn

You are encouraged to:

- Set your personal deadline earlier than the actual one

- Keep backups of all your important files

- Identify the partner or prepare earlier for your major project

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	30%	No	18th March 2025
Assignment 2	30%	No	22nd April 2025
Main project	40%	No	presentation (6th June 2025) and report (17th June 2025)

Assignment 1

Assessment Type [1]: Programming Task
Indicative Time on Task [2]: 25 hours
Due: **18th March 2025**
Weighting: **30%**

Implement a natural language processing application using industry tools.

On successful completion you will be able to:

• Explain the main techniques that are used to develop and implement natural language processing applications.

• Implement natural language processing applications using common tools and libraries used in industry.

Assignment 2

Assessment Type [1]: Programming Task
Indicative Time on Task [2]: 25 hours
Due: **22nd April 2025**
Weighting: **30%**

Implement a practical natural language processing application using deep learning techniques.

On successful completion you will be able to:

- Explain the main techniques that are used to develop and implement natural language processing applications.
- Implement natural language processing applications using common tools and libraries used in industry.
- Apply natural language processing methods and techniques to industry applications using real data.

Main project

Assessment Type [1]: Project
Indicative Time on Task [2]: 35 hours
Due: **presentation (6th June 2025) and report (17th June 2025)**
Weighting: **40%**

Design, implement, deploy, evaluate and monitor an industrial grade natural language processing application that uses realistic data and requires advanced deep learning techniques.

On successful completion you will be able to:
- Compare and evaluate the key natural language processing applications that meet the current and emerging industry needs.
- Explain the main techniques that are used to develop and implement natural language processing applications.
- Implement natural language processing applications using common tools and libraries used in industry.
- Design natural language processing applications using advanced deep learning techniques.
- Apply natural language processing methods and techniques to industry applications using real data.
- Apply good practice in the development, monitoring, and deployment of natural language processing systems

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Delivery Schedule:

- **Lectures:** One 2-hour lecture per week for 13 weeks.
- **Workshops:** One 2-hour workshop per week for 13 weeks.

Assessment Components:

- **Assignments:** Students must complete two assignments focusing on NLP applications.
- **Final Major Project:** Students will develop their application in a group, culminating in a presentation and a technical report.

Text Book:

- **Natural Language Processing with Transformers, Revised Edition** by Lewis Tunstall, Leandro von Werra, Thomas Wolf. Publisher: O'Reilly Media, Inc. ISBN: 9781098136796 https://www.oreilly.com/library/view/natural-language-processing/9781098136789/

- **Hands-On Large Language Models**, by Jay Alammar, Maarten Grootendorst, O'Reilly Media, Inc. ISBN 9781098150969 https://learning.oreilly.com/library/view/hands-on-large-language/9781098150952/

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support

- Accessibility and disability support with study

- Mental health support

- Safety support to respond to bullying, harassment, sexual harassment and sexual assault

- Social support including information about finances, tenancy and legal issues

- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the Service Connect Portal, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Unit information based on version 2025.03 of the Handbook