

# COMP 3032 MACHINE LEARNING

**Credit Points** 10

**Legacy Code** 301435

**Coordinator** Yi Guo ([https://directory.westernsydney.edu.au/search/name/Yi Guo/](https://directory.westernsydney.edu.au/search/name/Yi%20Guo/))

**Description** Machine Learning is one of the most important technologies in the fields of Artificial Intelligence and Data Science used to explain large datasets, inform decisions and highlight risks. Machine Learning is relevant for solving a range of problems in many industries dealing with significant amounts of information and the structure of that information. In this unit, students put Machine Learning theory into action through widely used algorithms and practical applications for designing, training, and evaluating common learning models and systems. Students use Python programming and, as a result, learn about its important machine learning libraries and packages, such as Scikit-Learn, Keras and TensorFlow for solving practical problems and tasks.

**School** Computer, Data & Math Sciences

**Discipline** Artificial Intelligence

**Student Contribution Band** HECS Band 2 10cp

Check your fees via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Undergraduate Level 3 subject

**Pre-requisite(s)** MATH 1028 OR MATH 1033 OR COMP 1014 OR MATH 1003 OR MATH 1030 AND COMP 1005 OR MATH 1002 OR COMP 3002

## Learning Outcomes

On successful completion of this subject, students should be able to:

1. Apply machine learning tasks such as clustering, dimensionality reduction, regression and classification.
2. Apply machine learning workflow when evaluating learning systems for given tasks.
3. Determine appropriate machine learning models and algorithms in various scenarios.
4. Apply Python programming skills and tools for solving common machine learning application problems.

## Subject Content

1. Introduction to Machine Learning
2. Supervised Learning: Regression and Classification
3. Model Selection
4. Unsupervised Learning: Clustering, Dimensionality Reduction and Manifold Learning
5. Non-parametric methods, Tree based Methods, and Support Vector Machines
6. Deep Learning: Foundations of Neural Networks, Autoencoder, CNNs, GANs
7. Reinforcement Learning
8. Python based machine learning libraries, packages and applications

## Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

| Type               | Length                  | Percent | Threshold | Individual/<br>Group Task |
|--------------------|-------------------------|---------|-----------|---------------------------|
| Intra-session Exam | 2 hours                 | 40      | Y         | Individual                |
| Quiz               | 30 - 60 minutes         | 15      | N         | Individual                |
| Practical          | 4 hours (per practical) | 45      | N         | Individual                |

Prescribed Texts

- Alpaydin, E. (2020). Introduction to machine learning (4th ed.). MIT Press.

Teaching Periods

## Spring (2023)

### Campbelltown

#### On-site

**Subject Contact** Yi Guo ([https://directory.westernsydney.edu.au/search/name/Yi Guo/](https://directory.westernsydney.edu.au/search/name/Yi%20Guo/))

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=COMP3032\\_23-SPR\\_CA\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=COMP3032_23-SPR_CA_1#subjects))

### Penrith (Kingswood)

#### On-site

**Subject Contact** Yi Guo ([https://directory.westernsydney.edu.au/search/name/Yi Guo/](https://directory.westernsydney.edu.au/search/name/Yi%20Guo/))

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### Parramatta - Victoria Rd

#### On-site

**Subject Contact** Yi Guo ([https://directory.westernsydney.edu.au/search/name/Yi Guo/](https://directory.westernsydney.edu.au/search/name/Yi%20Guo/))

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## Vietnam Session 1 (2024)

### Vietnam

#### On-site

**Subject Contact** Yi Guo ([https://directory.westernsydney.edu.au/search/name/Yi Guo/](https://directory.westernsydney.edu.au/search/name/Yi%20Guo/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=COMP3032\\_24-UT1\\_UE\\_1#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=COMP3032_24-UT1_UE_1#subjects))

## Vietnam Session 2 (2024)

### Vietnam

#### On-site

**Subject Contact** Yi Guo ([https://directory.westernsydney.edu.au/search/name/Yi Guo/](https://directory.westernsydney.edu.au/search/name/Yi%20Guo/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=COMP3032\\_24-UT2\\_UE\\_1#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=COMP3032_24-UT2_UE_1#subjects))

## Spring (2024)

### Campbelltown

#### On-site

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### Penrith (Kingswood)

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## Vietnam Session 3 (2024)

### Vietnam

#### On-site

**Subject Contact** Yi Guo ([https://directory.westernsydney.edu.au/search/name/Yi Guo/](https://directory.westernsydney.edu.au/search/name/Yi%20Guo/))

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