AMSI Online: Honours and Masters Subject Guide

SUBJECT NAME: Advanced Statistical Machine Learning

Semester 01, 2026

Administration and contact details

Host department	School of Mathematical Sciences
Host institution	Queensland University of Technology
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Subject details

Handbook entry URL	**https://qutvirtual4.qut.edu.au/group/student/enrolment/units/unit?unitCode=MXN441&year=2026**
Subject homepage URL	**https://qutvirtual4.qut.edu.au/group/student/enrolment/units/unit?unitCode=MXN441&year=2026**
Honours student hand-out URL	**NA**
Teaching period (start and end date):	**23/02/2026-19/06/2026**
Exam period (start and end date):	**NA**

Contact hours per week:	**4 hours per week (2 hours lecture; 2 hours workshop)**
ACE enrolment closure date:	
Lecture day(s) and time(s):	**Thursdays 9am-11am. Workshops 11am-1pm (Brisbane Time)**
Description of electronic access arrangements for students (for example, LMS)	**Electronic access will be via Zoom (for lectures and workshops).** **Lectures and workshops will be recorded, and videos will be circulated.**

Subject content

1. **Subject content description**

   You will explore both supervised and unsupervised learning techniques, inlcuding linear regression and advancing to methods like decision trees, support vector machines, neural networks, logistic regression and several clustering methods.

2. **Week-by-week topic overview**

Week 1	Foundations of statistical learning	
Week 2	Linear regression	
Week 3	Resampling and model selection	
Week 4	Classification	
Week 5	Tree-based Models	
Week 6	Support Vector Machines	**Assessment 1 Due**
Week 7	Neural Networks- 1	
Week 8	Neural Networks- 2	
Week 9	Unsupervised learning	
Week 10	Guest Lecture (TBC)	

Week 11	Projects Review – No Lecture	
Week 12	Projects presentation-1	
Week 13	Projects presentation-2	**Assessment 2 Due**

3. Assumed prerequisite knowledge and capabilities

Linear algebra, Basic Concepts in Statistics, Familiarity with coding in Python, R, or Julia.

4. Learning outcomes and objectives

Learning Objective 1: Explain key concepts in statistical machine learning including supervised and unsupervised learning, classification, and regression

Learning Objective 2: Formulate and implement various statistical machine learning algorithms in Python or R programming language and apply them to solve data science problems.

Learning Objective 3: Work both independently and/or in collaboration with others to apply problem-solving skills and develop practical solutions.

Learning Objective 4: Summarise and explain in written and/or oral form, the motivation, details and results of a statistical analysis of a data set.

AQF specific Program Learning Outcomes and Learning Outcome Descriptors (if available):

AQF Program Learning Outcomes addressed in this subject	**Associated AQF Learning Outcome Descriptors for this subject**
Insert Program Learning Outcome here	Choose from list below

Learning Outcome Descriptors at AQF Level 8
Knowledge
K1: coherent and advanced knowledge of the underlying principles and concepts in one or more disciplines
K2: knowledge of research principles and methods
Skills
S1: cognitive skills to review, analyse, consolidate and synthesise knowledge to identify and provide solutions to complex problem with intellectual independence
S2: cognitive and technical skills to demonstrate a broad understanding of a body of knowledge and theoretical concepts with advanced understanding in some areas
S3: cognitive skills to exercise critical thinking and judgement in developing new understanding

S4: technical skills to design and use in a research project
S5: communication skills to present clear and coherent exposition of knowledge and ideas to a variety of audiences

Application of Knowledge and Skills

A1: with initiative and judgement in professional practice and/or scholarship
A2: to adapt knowledge and skills in diverse contexts
A3: with responsibility and accountability for own learning and practice and in collaboration with others within broad parameters
A4: to plan and execute project work and/or a piece of research and scholarship with some independence

5. Learning resources

The Elements of Statistical Learning, by Jerome H. Friedman, Robert Tibshirani, and Trevor Hastie

6. Assessment breakdown

Exam	Weight
Assignment 1 – Problem Solving	**50%**
Assignment 2 – Project (presentation and final report)	**50%**

Assignment due dates	Exam date (approximate)
Assignment 1: April 2nd, 2026	NA
Assignment 2: May 29th, 2026	

Institution honours program details

Weight of subject in total honours assessment at host department	**12.5%**
Thesis/subject split at host department	**37.5% thesis 50% coursework 12.5% research training**
Honours grade ranges at host department	
H1	6.20 to 7.00 (**85-100%**)
H2a	5.65 to 6.199 (**75-84%**)
H2b	5.00 to 5.649 (**65-74%**)
H3	Less than 5.00 (**50-64%**)

Institution masters program details

Weight of subject in total masters assessment at host department	**NA- (Pass/Fail)**
Thesis/subject split at host department	
Masters grade ranges at host department	
H1	**85-100%**
H2a	**75-84%**
H2b	**65-74%**
H3	**50-64%**