

MSEAIA18- Master of Software Engineering (Artificial Intelligence, Advanced)

1. About the Master of Software Engineering (Artificial Intelligence, Advanced)

The Master of Software Engineering (Artificial Intelligence, Advanced) addresses industry demand for highly technical software engineers, developers & researchers with skills that encompass machine learning, computer vision, natural language processing and speech recognition. It offers professionals the opportunity to upskill in order to improve career prospects, provides recent graduates with the chance to continue and specialise in artificial intelligence. The course is anchored by machine learning to the field of artificial intelligence in the wider software engineering body of knowledge.

In addition to cementing their core software engineering knowledgebase, learners cover research methodologies in preparation for project work in the last trimester leading to well-rounded individuals who can not only self-direct a project, but also manage operational and development teams at scale. Quantitative and qualitative research practices and mixed approaches are covered as well as ethical issues stemming from the use of artificial intelligence and students endeavour to obtain ethical approval for their major research project.

The learning outcomes are classifiable in groups according to their focus; ethics and professional skills; research abilities; cognitive skills; Interpersonal skills and communication skills and are integrated throughout.

Graduates with a Master Advanced qualification will differentiate by means of research that contributes to the body of knowledge in their field whilst rationalising their work in a coherent and sustained manner as part of their project work. As well as solving highly technical problems in AI for their last subject (ATW606 – Advanced Technology Work Integrated Learning) where collaboration skills and the ability to work in commercial environments are highly attuned, students also master and synthesise technical and creative skills from the field of their specialisation.

Graduate employment opportunities

The Master of Software Engineering (Artificial Intelligence, Advanced) provides graduates with the capability to seek senior level employment in either generalist or niche roles found within the software development industry. The specialisation of artificial intelligence gives them a competitive advantage in what they can provide to an employer or client.

Examples include:

- Senior Software Engineer
- Senior Systems Engineer
- AI Researcher
- Research & Development Engineer
- Technical Director

- Development Director
 - Systems Architect
 - Data Scientist

Course Overview

Course Title	Master of Software Engineering (Artificial Intelligence, Advanced)		
Study Options – Domestic Australian students	Face to Face delivery Online delivery Full-time and part-time options available.	Study Options – International students	International students on a student visa must not enrol into any more than a third or 33% of online subjects over their course and must study at least one subject that is face to face in each trimester. International students on a student visa are required to study full time, i.e. the student must complete a minimum of 1.0 EFTSL of study per year.
Start Dates	February, June, September For specific dates visit the website	Course Length	Full-time: 2 years Part-time: 4 years
Payment Options - Domestic Australian students	Upfront payment This means tuition fees will be invoiced each trimester and payment is required on or before the due date. FEE-HELP FEE-HELP is Australian Government's loan scheme for higher education degree courses. It can assist you in paying for all, or part of, your course fees. Repayments commence via the tax system once your income rises above a minimum threshold. Just like with any other debt, a FEE-HELP debt is a real debt that impacts your credit rating.	Payment Options – International students	Upfront payment This means tuition fees will be invoiced each trimester and payment is required on or before the due date.

Course study requirements	Each subject involves 10 hours of study per week, comprising 3 hours of facilitated study and 7 hours self-directed study.	Assessment	Project/Application/Research Proposal, Process/Research Documentation, Application Outcome, Reflective Journal/Blog, Report/Essay, Presentation/Pitch, Examinations/Tests/Quizzes, Research, Collaboration, Individual self-directed major project, Work integrated learning project work, Software development for social enterprise
Locations	Sydney, Melbourne, Adelaide Online	Delivered by	Torrens University Australia
Provider	Torrens University Australia Ltd is registered as a self-accrediting Australian university by the Tertiary Education Quality and Standards Agency (TEQSA).	CRICOS Course Code	099353A
Provider obligations	Torrens University is responsible for all aspects of the student experience, including the quality of course delivery, in compliance with the Higher Education Standards 2015	Accrediting body	Torrens University Australia Ltd
Course Fees	For details, refer to the website . Hyperlink 'website' to Provider webpage re Fees	Any other fees	For details, refer to the website . Hyperlink 'website' to Provider webpage re Fees

2. Essential requirements for admission

The general admission criteria that apply to Torrens University Australia courses can be located by visiting the Torrens University Australia website - <https://www.torrens.edu.au/general-admission-information-for-torrens-university-australia-ltd>.

3. Admission Criteria

Title of course of study	Master of Software Engineering (Artificial Intelligence, Advanced)
Applicants with higher education study	The standard entry requirement is a completed qualification at AQF Level 7 (Bachelor degree) or above from an Australian University in a relevant field of study or an equivalent overseas higher education qualification or equivalent.
Applicants with vocational education and training (VET) study	N/A
Applicants with work and life experience	Students without an undergraduate degree, may be admitted to the Graduate Certificate as a pathway with: <ul style="list-style-type: none"> at least 3 years professional experience in software development (documented e.g. CV), demonstrating a reasonable prospect of success; AND a discipline specific portfolio; AND a recommendation letter from 2 most recent employers
English Language Proficiency (applicable to international students, and in addition to academic or special entry requirements noted above)	IELTS level 6.5 required, with no element less than 6 (or equivalent TOEFL, CAE or PTE).

Other admission options

(For applicants who will be selected on a basis other than ATAR)

Special Entry	Applicants in any category whose study, work or life experiences have been impacted by disability, illness or family disruption will be given special consideration for admission. Each application will be considered on its merit, based on the evidence supplied by the applicant attesting to the circumstances of the applicant. Applicants for special entry may need to complete written or numerical tasks to assist with assessing eligibility for admission.
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4. How to apply

Via direct application to the institution

- <https://apply.torrens.edu.au/>

5. Advanced standing/academic credit/recognition of prior learning (RPL)

You may be entitled to credit for prior learning, whether formal or informal. Formal learning can include previous study in higher education, vocational education, or adult and community education. Informal learning can include on the job learning or various kinds of work and life experience. Credit can reduce the amount of study needed to complete a degree.

Applicants admitted based on prior higher education study may be eligible for Advanced Standing in the form of credit and/or recognition of prior learning (RPL) under the Torrens University Australia [Credit Policy - \(https://www.torrens.edu.au/policies-and-forms\)](https://www.torrens.edu.au/policies-and-forms).

- Students with completed subjects may be eligible for specified credit and/or elective exemptions
- Students who have completed a qualification at AQF level 5 (diploma) or above may be eligible for block credit (where a block credit agreement exists)
- Students with a mix of formal study and informal and/or non-formal learning may be eligible for recognition of prior learning in addition to any credit approved.

Credit will not be applied automatically. Applicants must apply for credit and/or RPL as early as possible prior to each study period, with applications not accepted after week 2.

For further information about credit and recognition of prior learning please see <http://www.torrens.edu.au/apply-online/course-credits>.

6. Where to get further information

- Torrens University Australia (TUA) Website
 - <https://www.torrens.edu.au/>
- Universities Admissions Centre (UAC) Website
 - <http://www.uac.edu.au/>
- Quality Indicators for Learning and Teaching (QILT) Website
 - <https://www.qilt.edu.au/>

7. Additional Information

Course Structure

The course structure comprises 7 Software Engineering (SE) core subjects, 4 specialised subjects and 2 elective subjects over levels 400, 500 and 600, as follows:

- Level 400: 4 SE core subjects
- Level 500: 1 SE core subject, 2 specialisation subjects and 1 elective.
- Level 600: 2 SE core subjects, 2 specialisation subjects and 1 elective.

Course Rules

To be awarded the Master of Software Engineering (Artificial Intelligence, Advanced), students must complete 160 credit points over 13 subjects as outlined in the course structure. Each subject has a value of 10 credit points, with one subject having a value of 20 credit points (TWL604 Technology – Work Integrated Learning) and one having the value of 30 credit points (ATW606 Advanced Technology – Work Integrated Learning).

Electives available to students may be chosen from the elective bank (please refer to the Course Structure on the Student HUB) or can be taken from any Torrens University course at the appropriate level with approval from the Program Director (or delegate).

Subjects

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
Level 400
<p>SEP401- Software Engineering Principles</p> <p>In this subject students are introduced to the current Software Engineering standards and processes, with the aim of enabling them to analyse, design, and implement software projects that follow certain quality measures at every stage of the Software Development Life Cycle. The subject covers requirements engineering, modelling and design of software, software architecture, verification and validation of software systems, and other topics that are related to software engineering practices.</p>
<p>HCD402- Human Centred Design</p> <p>This subject helps students explore several non-technical aspects of software development, especially pertaining to human behavior and interactions so that students can appreciate the human aspects of technology. Broadly, the subject covers the theory of knowledge, human cognition, ethical and moral values, analysis of human history, critical analysis, creative aspects of the human mind and social interaction among human beings through a technological context. Students will use the specialised skills that they gain in other subjects to help formulate and suggest innovative solutions to problems that affect diverse societies.</p>
<p>SBD403- Secure by Design</p> <p>This subject deals with integrating the entire development lifecycle of IT systems in a secure environment through secure design methodologies, software development models, architecture design and industry Secure by Design standards like OWASP (Open Web Application Security Project). This subject also deals with how to build adequate security into systems to maintain integrity and safety of the functionality of IT systems while being exposed to cyber threats.</p>
<p>SDM404- Software Development Management</p> <p>In this subject the students are introduced to the main project management principles and modern software project management practices. During the subject, the different methods for managing and optimising the</p>

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software development process are discussed along with the different techniques for performing each phase of the software development life cycle.
LEVEL 500
<p>MFA501- Mathematical Foundations of Artificial Intelligence</p> <p>The purpose of this subject is to provide a solid mathematical background that students will encounter in studies of Artificial Intelligence, specifically in sub-areas such as machine learning, natural language processing, speech recognition, and computer vision. This subject will cover topics including linear algebra (equations, functions and graphs), differentiation and optimisation, vectors and matrices, statistics and probabilities. Thorough understanding of these mathematical concepts is necessary for understanding the inner workings of the algorithms in Artificial Intelligence.</p>
<p>REM502- Research Methodologies</p> <p>This subject introduces students to a framework for developing good scholarly inquiry skills and fundamental knowledge needed to make rational decisions about research strategies. Students will be presented with research strategies to critically investigate exemplar studies and examine the connection between a research question with appropriate research design and methodology. On completion of this subject, students should be able to develop researchable questions, and write research proposals and literature reviews. They will have a critical understanding of the strengths and limitations of the quantitative, qualitative and mixed method approaches to research. They will also learn about the ethical principles of research, challenges in getting approval and the approval processes.</p>
<p>ISY503- Intelligence Systems</p> <p>This subject aims to give a broad introduction of intelligent systems, that is, how technologically advanced machines perceive and respond to the world around them. Discussion will focus on how Artificial Intelligence (AI) concepts and classifications are used to design intelligent systems. Overview of AI topics such as representation, reasoning, search methods, intelligent agents, learning, uncertainties and probabilities, perception and action, and communication are presented. It also includes discussions of AI classifications such as Machine Learning, Robotic, Natural Language Processing, Speech Recognition, Expert Systems, Computer Vision, and how they are used to make intelligent systems. This subject also enables students to understand the particular ethical issues that AI presents and how it can be used to benefit society.</p>
LEVEL 600
<p>MLN601- Machine Learning</p> <p>This subject is designed to give a graduate-level student an in-depth understanding of the methodologies, technologies, mathematics and algorithms currently used in machine learning. Students will learn the theory behind a range of machine learning tools and practice applying the tools to different applications. It covers topics such as classification, linear models, learning theory, generative models, graphical models and learning paradigm. This subject covers theoretical concepts such as inductive bias, the PAC learning framework, Bayesian learning methods, margin-based learning, and Occam's Razor. Students are given short programming assignments that include hands-on experiments using machine learning algorithms and methods.</p>
<p>DLE602- Deep Learning</p> <p>This subject introduces the basics of deep learning and how to build neural networks. Students are presented with different methods and applications to different AI sub-areas such as natural language processing, speech recognition, and computer vision. The subject begins with the introduction of simple neural networks such as multi-layer perceptron, and to more complicated concepts such as recurrent neural networks, convolutional networks, and long short-term networks.</p>
<p>TWL604- Technology – Work Integrated Learning</p>

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR

This subject is designed to provide students an opportunity to pursue a significant project in a professional environment related to their specialisation. This enables students to develop skills that enhance their prospects of gaining meaningful employment and build their career for the future.

Work integrated learning broadens the students' learning environment while they are studying and allows them to see first-hand how their learnings in their degree translates in practice, as well as how 'real world' practice relates to what they are learning at University.

Students enrolled in Masters (Advanced) have an opportunity to avail one of the three options below simultaneously for this subject and "Advanced Technology – Work Integrated Learning".

There are three options available to students:

Option 1: Industry Placement

Students are offered the opportunity to work within a technology company as an intern or volunteer at a technology non-profit organisation. It encourages students to build long-term relationships with the tech industry and provides an opportunity for them to work with and learn from people who may end up becoming colleagues, managers or mentors. It also provides a context in which to enhance their communication skills and work collaboratively in a professional arena. Students will undertake a series of industry-led tasks that are relevant to their field of study in order to understand the key concepts of working in and managing a professional technology team with emphasis placed on the operation of the environment.

Option 2: Industry Live Brief

Industry live brief, also known as an industry project engages students in an activity where the parameters of success are set by the client. Academic staff and industry provide supervision for students, while industry provides, mentorship in addition. Numerous technology firms have ideas and opportunities they would like to explore and prototype; this is where students or student teams connect with industry to achieve scale with minimal risk.

An understanding of research methodologies appropriate to professional practice and the documentation of personal creative investigation is explored. Students also further investigate and examine entrepreneurial and commercial opportunities through collaborative work practice. The subject fosters a cross-specialisation perspective and draws on both specialised and common software engineering practices.

Students are required to work both independently and as part of a collaborative team that includes industry representatives to conduct research, analyse and define project parameters and deliver innovative solutions that expand the notion of an industry live brief.

Options 3: Capstone

Students execute, finalise and present their self-initiated project exhibiting a sophisticated understanding of software engineering, whilst addressing the university ethos. Central to the project will be evidence of critical analysis and reflexive and reflective practice, social engagement, in addition to the use of refined visual language in its execution with particular industry relevancy for which their project is intended. Students draw upon the philosophical, practical, methodological, theoretical and technical tools they have gathered over the duration of the degree to complete a successful project. Students are mentored through this research project by an industry supervisor with complementary practice-based research expertise. Projects must pertain to the field of software engineering and in particular to their specialisation.

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR

Students are required to work independently or as part of a collaborative team in order to conduct research, analyse and define project parameters and deliver innovative solutions.

ATW606- Advanced Technology – Work Integrated Learning

This subject builds upon Technology – Work Integrated Learning enabling students to further develop and apply strategic processes, creative tools & research for innovation in the field of software engineering. It extends the opportunity to pursue the significant project in a professional environment in an area related to their specialisation enabling students to develop skills that enhance their prospects of gaining meaningful employment and build their career for the future.

They continue with the same option as chosen previously:

Option 1: Industry Placement

Students are offered the opportunity to work within a technology company as an intern or volunteer at a technology non-profit organisation. It encourages students to build long-term relationships with the tech industry and provides an opportunity for them to work with and learn from people who may end up becoming colleagues, managers or mentors. It also provides a context in which to enhance their communication skills and work collaboratively in a professional arena. Students will undertake a series of industry-led tasks that are relevant to their field of study in order to understand the key concepts of working in and managing a professional technology team with emphasis placed on the operation of the environment.

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Students are required to work independently or as part of a collaborative team in order to conduct research, analyse and define project parameters and deliver innovative solutions.

Locations

The Master of Software Engineering (Artificial Intelligence, Advanced) can be studied fully online or at the below Torrens University Campuses:

- Sydney: Level 1, 46-52 Mountain Street, Ultimo NSW Australia 2007
- Melbourne: 196 Flinders St, Melbourne, VIC 3000
- Adelaide: 82-98 Wakefield Street, Adelaide, SA, 5000

Campus Facilities and Services

All campuses are designed to provide students with professional spaces in which to learn and work. They have been planned with student study needs in mind with well-equipped accessible learning spaces as well as student breakout areas for group work and spending time with friends.

Facilities and Services include:

- The Customer Service Hub – our friendly and experienced staff can give help and advice about courses, your enrolment and campus life, including all services and activities on campus.
- Counsellors are available for students to consult with on a range of personal issues
- Student wireless access throughout the Campus
- Student break-out and relaxed study spaces for group work
- Student lounge areas – most with microwaves, kitchenette facilities and vending machines
- The Learning Hub, home to the Learning Support Team, encompasses Learning Skills Advisors, Learning Technology Advisors, and Library & Learning Skills Officers. It provides an integrated, holistic support program for students throughout the study lifecycle within a library/collaborative study environment. The service includes:
 - Support and workshops with highly qualified staff in the areas of Academic skills, Library skills, and Technology skills, both on campus and online.
 - Physical and digital resources relevant to studies, such as books, journals, multimedia, databases
 - Self-check kiosks for library loans and print and copy facilities

A positive student experience

Torrens University Australia values the importance of a positive student experience, and therefore has robust processes to resolve student complaints. The Student Complaints Policy, and associated procedures, can be accessed from the [website](https://www.torrens.edu.au/policies-and-forms) (<https://www.torrens.edu.au/policies-and-forms>).

Paying for your qualification

We offer two payment options for this course:

- **Upfront payment**
If you want to complete your qualification debt-free you can choose to pay as you go. This means tuition fees will be invoiced each semester and payment is required on or before the due date using EFTPOS, credit card or direct transfer.
- **FEE-HELP**
FEE-HELP is Australian Government's loan scheme for higher education degree courses. It can assist you in paying for all, or part of, your course fees. Repayments commence via the tax system once your income rises above a minimum threshold. Just like with any other debt, a FEE-HELP debt is a real debt that impacts your credit rating.

Further information about FEE-HELP, including eligibility, is available at:

- FEE-HELP website:
<http://studyassist.gov.au/sites/studyassist/help-payingmyfees/fee-help/pages/fee-help->
- FEE-HELP booklets:
<http://studyassist.gov.au/sites/studyassist/helpfulresources/pages/publications>

Austudy and Abstudy

Students enrolled in this course may be eligible for government assistance, such as [Austudy](#) or [Abstudy](#).