ADSEAI19 Associate Degree of Software Engineering (Artificial Intelligence)

1. About the Associate Degree of Software Engineering (Artificial Intelligence)

The Associate Degree of Software Engineering Artificial Intelligence (AI) is a qualification addressing industry demand for developers with skills that encompass data science, artificial intelligence, statistical methods, networking and human centred design. Although the course is founded on strong traditional software engineering skills such as programming, maths and statistical knowledge it also embeds Ethics, Social Responsibility and Cognitive Psychology throughout the learning, adding desired skills to the profession of software engineering, which are increasingly the mainstay in the profession. In addition, subjects of artificial intelligence, programming and data science are subsets to the skills and knowledge development empowering graduates to enter confidently into professions relevant to an increasingly computerised automated and machine-like world whilst operating a variety of expert computer systems.

Due to the approach of the course, founded on extensive industry consultation, students are equipped with a mixture of creative application skills, cognitive and technical abilities. They can consolidate and synthesise artificial intelligence software engineering problems, in particular artificial intelligence, with contemporary solutions based on the vital understanding of the ethics, social responsibility and the psychological impacts. Embedded collaboration, negotiation and research skills lead to graduates that are accustomed to professional environments where teamwork enhances prosperous career trajectories.

The Associate degree of Software Engineering, Artificial Intelligence is developed to address the needs of a rapidly evolving industry. Graduates will have a combination of skills and knowledge additional to software engineering fundamentals enabling them to work in areas across the broad spectrum of the field of Artificial Intelligence. The specialised topics in AI are a branch of artificial intelligence based on the idea that systems can learn from data to identify patterns and make decisions with minimal human intervention. AI is used as a confluence in Natural Language Processing (with linguistics), speech recognition (also linguistics), computer vision (graphics & image processing), data mining and visualisation (graphics & image processing). All these applications require aptitude in research leading to a comprehensive understanding of the ethical implications of AI in a social context, emerging technologies and their impact on society. The course learning outcomes aim to develop graduates who can participate in and sometimes lead teams and manage traditional as well as creative projects in AI.

The associate degree was formulated specifically to develop software engineers with knowledge and expertise in the following core areas of artificial intelligence, data science & software engineering:

- Algorithms and Data Structures
- Artificial Intelligence
- C++, python, etc.
- Graphics Programming
- Communication Networks
- Data Science
- Human Centred Design

- Probability and statistics

Graduate employment opportunities

To be employed in the industry, a job candidate requires high-level proof of their skills. The international measure of proof is benchmarked as a bachelor or postgraduate level qualification. In addition, a software engineer with major in artificial intelligence often needs to demonstrate their applied research and programming skills or a high-quality understanding of data if they are to focus on a data science field to be employed. The Bachelor of Software Engineering (Artificial intelligence) provides sufficient time for the learners to create a significant body of projects to demonstrate relevant expertise.

On successfully completing this qualification, students will have specific skills, knowledge and experiences to potentially gain employment in the artificial intelligence and wider software engineering industry in a variety of roles, such as (not limited to):

- Junior Data Scientist/ Analyst
- Generalist C++ Programmer
- Junior/Associate Software Engineer
- Junior Software Developer
- Junior Computer Vision Engineer
- Software Developer
- Software Tester

Course Overview

Course Title	Associate Degree of Software Engineering (Artificial Intelligence)		
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 maximum

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. *Further information within this Course Information Sheet* 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	This means tuition fees will be invoiced each trimester and payment is required on or before the due date. *Further information within this Course Information Sheet*
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	Practical assignments, research projects, presentations and reports
Locations	Sydney Campus Melbourne Campus 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	102267B
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.	Any other fees	For details, refer to the website.

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. Student Profile

The table below gives an indication of the likely peer cohort for new students in this course. It provides data on students who commenced in this course in the most relevant recent intake period, including those admitted through all offer rounds and international students studying in Australia.

Applicant background	Trimester one / Full year intake [2020]	
	Number of students	Percentage of all students
(A) Higher education study (includes a bridging or enabling course)	N/A	N/A
(B) Vocational education and training (VET) study	N/A	N/A
(C) Work and life experience (Admitted on the basis of previous achievement not in the other three categories)	N/A	N/A
(D) Recent secondary education: • Admitted solely on the basis of ATAR (regardless of whether this includes the consideration of adjustment factors such as equity or subject bonus points)	N/A	N/A
• Admitted where both ATAR and additional criteria were considered (e.g. portfolio, audition, extra test, early offer conditional on minimum ATAR)	N/A	N/A
• Admitted on the basis of other criteria only and ATAR was _**not**_ a factor (e.g. special consideration, audition alone, schools recommendation scheme with no minimum ATAR requirement)	N/A	N/A
International students	N/A	N/A
**All students**	N/A	N/A

Notes: "<5" – the number of students is less than 5.
          N/A – Students not accepted in this category.
          N/P – Not published: the number is hidden to prevent calculation of numbers in cells with less than 5 students.

4. Admission Criteria

Title of course of study	Associate Degree of Software Engineering (Artificial Intelligence)
Applicants with higher education study	• A completed higher education qualification at AQF level 5 (diploma) or above, or equivalent,

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	from an Australian University or another accredited higher education provider OR • Successful completion of at least 1 EFTSL (equivalent full time student load, or one full year) of an AQF level 6 (Associate Degree) or above, or equivalent, from an Australian University or another accredited higher education provider
Applicants with vocational education and training (VET) study	• A completed vocational education qualification at AQF level 4 (Certificate IV) or above, or equivalent, from a registered training organisation (RTO) OR • Successful completion of at least 1 EFTSL (equivalent full time student load, or one full year) of an AQF level 5 (Diploma) or above, or equivalent, at a registered training organisation (RTO)
Applicants with work and life experience	Demonstrated ability to undertake study at the required level: • broadly relevant work experience (documented e.g. CV), demonstrating a reasonable prospect of success; OR • formal, informal or non-formal study, completed or partially completed, demonstrating a reasonable prospect of success; OR • written submission to demonstrate reasonable prospect of success; OR • discipline specific portfolio (art and/or design).
English Language Proficiency (applicable to international students, and in addition to academic or special entry requirements noted above)	Equivalent IELTS 6.0 (Academic) with no skills band less than 5.5
Applicants with recent secondary education (within the past two years) with ATAR or equivalent* (for applicants who will be selected wholly or partly on the basis of ATAR)	Completed year 12 or equivalent

Title of course of study	Associate Degree of Software Engineering (Artificial Intelligence)

ATAR profile for those offered places wholly or partly on the basis of ATAR in T1 2020:

(ATAR-based offers only, **across all offer rounds**)	ATAR (OP in QLD) (Excluding adjustment factors) *
Highest rank to receive an offer	N/A
Median rank to receive an offer	N/A
Lowest rank to receive an offer	N/A

*Notes: * "<5" – indicates less than 5 ATAR-based offers were made*

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.

5. How to apply

Via direct application to the institution

- o https://apply.torrens.edu.au/b2b/fcta/

6. 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).

- 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.

7. 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/

8. Additional Information

Course Structure
The course structure comprises 16 subjects over levels 100 and 200. A total of 160 credit points is required to satisfactorily complete the course.
- 8 core subjects
- 6 specialisation subjects
- 2 elective subjects.

*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).

Course Rules
To be awarded the Associate Degree of Software Engineering (Artificial intelligence), students must satisfactorily complete the course consisting of 16 subjects with a total of 160 credit points. Each subject has a value of 10 credit points

Subjects

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
LEVEL 100

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR

MAT101 Maths 1

This subject introduces students to foundational mathematical concepts necessary for specialisation subjects in their degree. Main topics covered are – Linear Algebra, Discrete Maths and Geometry. The delivery consists of theoretical elements, a demonstration, and then the lecturers allow students to put these skills into practice. The students collaborate and share mathematical problem-solving approaches during frequent in-class discussions and are expected to provide these solutions for class reviews.

ISE102 Introduction to Software Engineering

This subject provides an introduction to the information and skills needed to begin working in software engineering. This subject will cover the concepts of object-oriented programming with a particular focus on learning to use the C++ programming language. An understanding of C++ will form the basis of the necessary skills needed for developing professional and complex software packages such as video games.

CAI104 Concepts in Artificial Intelligence

The goal of this subject is to familiarise the student with the basic concepts of artificial intelligence and the problems AI is used to solve. The course content is organised around the three main areas of AI: Search, Logic and Learning. Topics covered include basic search, heuristic search, adversarial search, constraint satisfaction, logical agents, logic and inference, knowledge representation, probabilistic reasoning, knowledge in learning, learning probabilistic models, reinforcement learning and ethics of AI.

ADS103 Algorithms & Data Structures

Students learn the fundamental data structures and algorithms that are needed to solve common software engineering problems. Students improve their learning throughout this subject by working on a large number of projects. They solve common problems by designing, developing, implementing, testing, and enhancing a collection of data structures and algorithms.

ICG202 Introduction to Computer Graphics

Students are introduced to the fundamental theory of core computer graphics, 3D graphics programming and the rendering pipeline. Topics included are the graphics pipeline, primitive rendering, basic camera systems, lighting, texturing, software engineering design principles and testing strategies. Students will complete practical tasks utilising 3D graphics concepts as introduced by the content.

MSA106 Microservices Architecture

In this subject students learn the fundamentals and core concepts of Service Oriented Architecture and characteristics of microservices. They compare microservice architecture with monolithic style, emphasising why the former is better for continuous delivery. They also deal with operational complexities that are created while managing, monitoring, logging and updating microservices, and learn about the tools used to successfully manage, deploy and monitor applications based on microservice.

PST107 Probabilities and Statistics

This subject provides an elementary introduction to probability and statistics with applications.

In probability, students will learn about probability and distribution theory by defining probability and then studying its key properties. The subject will also introduce concepts of random variables, outcomes of random experiments and data analysis techniques using the statistical computing package R or SPSS.

In statistics, students will study data and uncertainty. Students will learn how to use statistics in the design of effective experiments and in determining the type of data collected. Underlying these techniques is the assumption that these data are samples of a random variable that follows a probability distribution describing

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
their behaviour.
LEVEL 200

IDS201 Introduction to Data Science

The aim of this subject is to provide students with fundamental knowledge of data, questions, and tools that a data scientist deals with. Students will not only be introduced to the ideas behind turning data into information but will also be introduced to the data scientist's toolbox. Topics include: data scientist skills and responsibilities in a business including planning, performing and presenting projects; data science code of ethics; data manipulation tools and techniques.

AAI202 Applications of Artificial Intelligence

This subject builds on the skills and knowledge students acquired from Concepts of Artificial Intelligence (AI). The subject begins by exploring different classifications of AI (e.g. Expert Systems, Planning and Robotics, Natural Language Processing (NLP) and Speech Recognition, Machine Learning, and Computer Vision) and their current applications. Students will be presented with case studies focusing on the overview of the development of NLP, Speech Recognition and Computer Vision (most commonly used applications of AI and Machine Learning). This subject also covers the AI for Good movement and how AI is being used to address economic and socially relevant problems.

NDS203 Networking & Database Systems

This subject introduces students to core concepts of Networking and Database Systems. Students learn fundamentals of Database Management Systems and network topology including network architecture. They are introduced to relational database models and learn fundamentals of structured query language (SQL). Students will apply these concepts through completing multiple software engineering projects.

CLR204 Classification & Regression

This subject introduces students to the statistical models for regression and classification necessary for more specialised subjects in this degree. The main topics covered are Classification Algorithms and Regression Algorithms; the practical use of both methods, how to evaluate the proposed models and how to choose between the different available methods.

Theoretical lectures about the main concepts to be studied are followed by demonstrations of the different applications. Then the students are asked to apply the learned concepts on different classification and regression problems.

PBT205 Project Based Learning Studio: Technology

This subject provides students with an opportunity to work collaboratively on a series of projects, enhancing skills such as project management, time management, prioritisation, resilience and a gamut of interpersonal skills within a team of people across multiple specialisations. Additionally, students will be challenged to find creative solutions to product development and small-scale rapid prototypes. Students will engage in peer learning through agile development and processes. This learning experience will enhance self-development and enable continuous learning.

HCD206 Human Centred Design

This subject helps students explore several important fields of general inquiry pertaining to significant intellectual issues related to human beings so they can view everyday problems and formulate solutions in new ways. Broadly, the subject covers the theory of knowledge, human cognition, ethical and moral values, analysis of human history, critical analysis, appreciation of literature and arts and social interaction among human beings through a technological context. Human Centred Design is to give students an appreciation of

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Course Information Set_ ADSEAI19_20210222   Page **9** of **11**

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
the factors that influence human behaviour and interactions so that they can apply specialised skills to help solve problems that affect diverse societies.
CEN207 Creative Enterprises This subject introduces students to the fundamentals of entrepreneurship and the concept of entrepreneurial mindset in the technology sector. It stimulates new ways of thinking about enterprising behaviour in a multi-disciplinary manner. Students will learn to identify opportunities, creatively solve problems, network, communicate persuasively and work effectively in a team. In addition, this subject will empower students to propose new ventures that focus on social change for good.

Locations

The Associate Degree of Software Engineering (Artificial Intelligence) 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 Street, Melbourne, VIC 3000

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).

Torrens University Australia Ltd, ABN 99 154 937 005, RTO 41343, CRICOS 03389E. Information provided in this document is current at the time of publishing (Feb 2021).

Course Information Set_ ADSEAI19_20210222   Page **10** of **11**

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 ($45, 881 in 2019-20). 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/helppayingmyfees/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.