

BSEG19- Bachelor of Software Engineering (Game Programming)

1. About the Bachelor of Software Engineering (Game Programming)

Ready to become the games industry rock star?

When becoming a Game Programmer, you'll learn best while doing. You'll code, you'll craft and, in the end, you'll graduate with a portfolio like no other.

Thanks to the partnership with Sony Computer Entertainment Europe (SCEE), you will develop games for PlayStation® platform through the PlayStation® First Academic Development Program. You will learn C++ and other coding languages and work with Unity and Unreal – the two main engines for game development. By the time you are ready to graduate, you will have collaborated with fellow programmers and game artists to create a commercially viable game.

A game programmer is a specialist software engineer who develops solutions and computer programs to activate computer game interaction. In essence, programming is the math and logic that makes the game happen. This may include Artificial Intelligence programming, engine programming, tools programming, mathematics and physics programming, and network programming or graphics programming.

The **Bachelor of Software Engineering (Game Programming)** blends academic theory, research, and practice with advanced programming skills as applied in the game development industry. Throughout the course the integration of theory and hands-on practice through to industry-standard productions will complement the development of investigative skills, and analytical, creative and critical approaches to problem solving. In addition to practical skills, knowledge and design capability, the Bachelor of Software Engineering (Game Programming) also has a holistic approach to developing your individual attributes and abilities in 'soft skills' such as communication, commercial acumen, and understanding of business realities.

This course was designed collaboratively with subject matter experts from Media Design School (Auckland, New Zealand), one of the top 3 digital design schools in the world.

Graduate employment opportunities:

On successfully completing Bachelor of Software Engineering (Game Programming) qualification, students will have specific skills, knowledge and experiences to gain employment in the game development industry in a variety of roles, such as:

- Gameplay Programmer
- Game Programmer
- Generalist C++ Programmer
- Graphics Programmer
- Junior/Associate Software Engineer
- Software Developer

Course Overview

Course Title	Bachelor of Software Engineering (Game Programming)		
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: 3 years Part-time: 6 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. 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	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. Further information within this Course Information Sheet

	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.		
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.
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	093341J
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

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_ Bachelor of Software Engineering (Game Programming)

4. Admission Criteria

Title of course of study	Bachelor of Software Engineering (Game Programming)
Applicants with higher education study	<ul style="list-style-type: none"> • A completed higher education qualification at AQF level 5 (diploma) or above, or equivalent, from an Australian University or another accredited higher education provider <p>OR</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • A completed vocational education qualification at AQF level 4 (Certificate IV) or above, or equivalent, from a registered training organisation (RTO) <p>OR</p> <ul style="list-style-type: none"> • 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	<p>Demonstrated ability to undertake study at the required level:</p> <ul style="list-style-type: none"> • broadly relevant work experience (documented e.g. CV), demonstrating a reasonable prospect of success; <p>OR</p> <ul style="list-style-type: none"> • formal, informal or non-formal study, completed or partially completed, demonstrating a reasonable prospect of success; <p>OR</p> <ul style="list-style-type: none"> • written submission to demonstrate reasonable prospect of success; <p>OR</p> <p>discipline specific portfolio (art and/or design).</p>

Title of course of study	Bachelor of Software Engineering (Game Programming)
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

**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	<5
Median rank to receive an offer	<5
Lowest rank to receive an offer	<5

*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.
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5. How to apply

Via direct application to the institution

- <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) - (<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 22 subjects over levels 100, 200 and 300. A total of 240 credit points is required to satisfactorily complete the course. The course is made up of:

- 9 core subjects,
- 10 specialisation subjects and
- 3 elective subjects.

Electives available to students in this course require approval by the Program Director (or delegate) and can be taken from any Torrens University course.

Course Rules

To be awarded the Bachelor of Software Engineering (Game Programming), students must complete 240 credit points over 22 subjects. Each subject has a value of 10 credit points, with one subject having a value of 30 credit points (PRD302 Production Capstone).

Students must complete a minimum of 80 credits points at level 100, 80 credit points at level 200 and 70 credit points at level 300. The remaining 10 credit points can be completed at levels 100, 200 or 300.

Subjects

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
LEVEL 100
<p>MAT101 Maths 1</p> <p>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.</p>
<p>ISE102 Introduction to Software Engineering</p> <p>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.</p>
<p>GDP102 Game Design Principles</p> <p>Game Design Principles introduces students to game design foundations, techniques and paradigms through a series of lecture-led and student-led activities. Students will explore game design principles through the analysis of existing game artefacts, applying those findings to the development of their own games. Students are introduced to a variety of analysis, development and presentation techniques encouraging discussion, creation and dissemination of their design choices through prototyping and documentation.</p>

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
<p>ADS103 Algorithms and Data Structures</p> <p>Students learn the fundamental data structures and algorithms that are needed to solve common software engineering problems. Lecturers show examples of data structures and algorithms, and use analogies to explain. 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.</p>
<p>MAT102 Maths 2</p> <p>Students learn how to construct mathematical solutions to common gaming problems. They design, develop, test, and enhance a game that requires a significant degree of mathematics. Analytic geometry, matrices, transformations, quaternions, fractals, curves and splines as taught to cover the entire spectrum for 3D games. Software engineering models and notations are used to represent mathematical problems and students learn to write these for all mathematical code. Mathematics used in 3D games are introduced (vectors and matrices) and the more challenging mathematical problems are solved as a team. Lecturers encourage in-class discussions to assist students in their understanding of the concepts.</p>
<p>GPR103 2D Game Programming</p> <p>In this subject, introductory programming concepts and software engineering management methods are introduced within the context of game development. Through practical project-based learning and a foundational introduction to development through industry standard video game engine tools and associated programming languages, students will explore how to break complex development problems down into smaller tasks that can be planned, managed and implemented. This process will enable them to respond to game design briefs with appropriate programming and development solutions.</p>
<p>CAO107 Computer Architecture and Operating Systems</p> <p>This subject examines the design, organisation, and operation of modern computer systems from both a hardware and software perspective.</p> <p>The first half of this subject explores the five classic components of a computer system; input, output, memory, datapath, and control, with the last two making up the processor. We explore the history of computer systems, highlighting the recent change in trend from increasing clock speeds to increasing processor/core counts. We describe how the performance of a computer system can be evaluated, how it has been the driving factor behind progress and why this recent change in trend was necessary. Each of the five classic components are examined in both an abstract sense and by looking at specific real-world examples. We put particular emphasis on the structure, design and operation of modern CPUs, how CPUs differ in design and operation from GPUs, and how memory hierarchies are used to improve performance.</p> <p>The second half of this subject examines how operating systems bring all of these computer system components together in a cohesive way, to allow user programs to interact with these components without needing to know about the low-level details. Students will learn about the structure of a modern operating system, with particular emphasis on processes & threads, memory management, file systems and I/O.</p>
LEVEL 200
<p>ICG202 Introduction to Computer Graphics</p> <p>Students are introduced to the fundamental topics of core computer graphics, 3D graphics programming and the rendering pipeline. Topics included are the transformation pipeline, device states, primitive rendering, basic camera systems, lighting, texturing, alpha techniques as well as software engineering</p>

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
<p>design principles and testing strategies. By the end of the subject, students create a game utilizing 3D graphics concepts as introduced in the class.</p>
<p>AIP201 Artificial Intelligence and Physics for Games</p> <p>AIP201 introduces students to the fields of Physics & Artificial Intelligence (AI) within the context of software development for digital games. Students will learn to build simple physics & artificial intelligence systems for games. These systems will extend the students' knowledge in software engineering process skills, modelling techniques and validation by applying these concepts to games physics & AI development.</p> <p>AIP201 will explore modern techniques and theory for making efficient interactive agents and intelligent systems by exploring the concepts of game theory, path-finding, state driven design and autonomous decision making. Students will also understand the application of Newtonian mechanics in game engines through the use of physics programming, middleware and mathematics.</p>
<p>PBT205 Project Based Learning Studio: Technology</p> <p>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.</p>
<p>GPR202 3D Graphics Programming</p> <p>Complex graphical programming topics are explored, and tool construction is introduced. The analysis requirements for tools are discussed to increase the likelihood of designing a useful tool. Students expand on already existing libraries and create plug-ins for pre-existing technologies. Additionally, students will design, construct, test, and evaluate a 3D scene - drawing on a collection of human-computer interaction, visual design, and game design elements to enhance it. Visual and non-visual elements that enable the creation of the 3D scene are evaluated.</p>
<p>NDS203 Networking and Database Systems</p> <p>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.</p>
<p>GDP204 Game Development PlayStation®</p> <p>Students specialise in developing games for the Sony PlayStation® platform utilising available game engines for input, graphics, sound and physics. Topics covered include the theory of PlayStation® architecture including SDK installation and network neighbourhood. Students will also learn how to port a project to the platform.</p>
<p>RGP204 Rapid Game Prototype</p> <p>The goal of this subject is to provide the students with an opportunity to collaborate on a series of projects, enhance collaborative skills working within a team of people across multiple disciplines. Additionally, the assignments in this subject will challenge the student in finding creative solutions to</p>

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
<p>project management and small scale rapid game creation. Students will be asked to create various 3D game prototypes over the duration of the subject and present their work. They will work within a group that will involve Bachelor of Software Engineering students. This will introduce team dynamics where multiple disciplines are involved.</p>
LEVEL 300
<p>DMV302 Data Mining & Visualisation</p> <p>The aim of this subject is to teach students data mining techniques for both structured and unstructured data. Students will be able to analyse moderate-to-large sized datasets, data preparation, handling missing data, modelling, prediction and classification. Students will also be able to communicate complex information in results of data analytics through effective visualisation techniques.</p>
<p>WIL302 Work Integrated Learning</p> <p>This subject is designed to provide students with professional experience in an area related to their field of study or the career they are working towards. The aim of providing industry-specific opportunities is to enable students to develop skills that will enhance their prospects of gaining meaningful employment and building their career for the future.</p> <p>Much of the benefit of work integrated learning comes from observation, practicing under supervision and reflection. Work Integrated Learning is an excellent way to broaden the students learning environment while they are studying. It allows them to see first-hand how what they are learning in their degree translates into practice, as well as how 'real world' practice relates to what they are learning at University.</p> <p>This subject will develop work ready skills and boost students' employability while they are studying. There are two work integrated learning options available to students:</p> <p>Option 1: Internship</p> <p>Students are offered the opportunity to work within a professional design environment for an extended period of time. It encourages students to build long-term relationships with the design industry and exposes them to the rigour of applied design practice while building their confidence in adapting to new environments. 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 research tasks, conducting interviews and gathering data in order to understand the key concepts in managing a professional design practice with emphasis placed on the operation of the professional design environment.</p> <p>Option 2: Industry Live Brief</p> <p>This subject requires students to respond to criteria set within the context of an Industry Live Project. An understanding of research methodologies appropriate to professional practice and the documentation of personal creative investigation will be explored. Students will also further investigate and examine entrepreneurial and commercial opportunities through collaborative work practice. The subject is delivered from a cross discipline perspective and draws on both discipline specific and common design practices.</p> <p>Students are required to work both independently or as part of a collaborative team in order to conduct research, analyse and define project parameters and deliver innovative solutions that expand the notion of an industry live brief.</p>
Level 300 Specialisation
<p>PPR301 Pre-Production Capstone 1</p>

SUBJECT DETAILS
SUBJECT TITLE, DESCRIPTOR
<p>Students develop game project documentation to be used in the development of a game, enhancing their skills in the areas of industry procedures and game design principles. Students draw on learning from previous materials to debate and justify the contents of their design. Teams need to communicate the project, ideas and scope through presentation, documentation, and playable prototypes. During this preproduction period, the environment is studio based, helping students prepare for industry realities.</p>
<p>PRD302 Production Capstone 2</p> <p>This subject focusses on developing and producing an industry-ready creative technology project. In the pre-requisite subject (PPR301 Pre-Production Capstone 1), students addressed the pre-production components of a digital game. During this subject, students move from pre-production planning, to product development.</p> <p>Students will work collaboratively to manage the processes surrounding production, design and development of their projects. They will formulate strategies that can be used to solve problems and adapt to changes and modifications so that the final product aligns with agreed outcomes. Additionally, students will be required to explore developing technologies that can be incorporated into a digital project, and to reflect on, communicate and document their experiences.</p>

Campus Locations

The Bachelor of Software Engineering (Game Programming) 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

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 trimester 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/help-payingmyfees/fee-help/pages/fee-help-](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](#).