



# BACHELOR OF INFORMATION TECHNOLOGY GAMES PROGRAMMING SUBJECT LIST



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<b>YEAR 1</b>			
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<b>TRIMESTER 2</b>	Programming I	Database Systems	Introduction to Software Engineering
<b>TRIMESTER 3</b>	Discrete Mathematics	Programming II	
<b>EXIT: DIPLOMA OF INFORMATION TECHNOLOGY</b>			
<b>YEAR 2</b>			
<b>TRIMESTER 4</b>	Basic Game Engine Programming	Java	Digital Project Management
<b>TRIMESTER 5</b>	Systems Analysis and Design	Interface & Experience Design	Artificial Intelligence
<b>TRIMESTER 6</b>	Advanced Game Engine Programming	Game Development	
<b>EXIT: ASSOCIATE DEGREE OF INFORMATION TECHNOLOGY (GAMES PROGRAMMING)</b>			
<b>YEAR 3</b>			
<b>TRIMESTER 7</b>	Elective 1	Augmented Reality	Advanced Game Development
<b>TRIMESTER 8</b>	Advanced Studio 1	Advanced Game Project	Advanced Game Project
<b>TRIMESTER 9</b>	Advanced Studio 2	Elective 2	
<b>EXIT: BACHELOR OF INFORMATION TECHNOLOGY (GAMES PROGRAMMING)</b>			

# YEAR 1

**START DATES:**  
February, May, or September

## TRIMESTER 1 – SUBJECTS

### Introduction to Web (INT1012)

This subject introduces HTML markup language, which is the essential language used in web development. It will focus on HTML, CSS and introduction to web scripting language libraries as they relate to modern practices in web development. Students will actively learn how to use these languages to facilitate the building of modern, attractive and reliable websites. This subject underpins each student's practical knowledge, as they progress with confidence into more complex web development. They will learn to build simple and responsive web pages with HTML, including basic page content structure, applying formatting styles using CSS, and understanding how web scripting libraries is used for basic interactivity. Throughout the semester and by the end of the subject, students will be on their way to becoming front-end developers, helping to build portfolios with a skill-set needed for many positions in this fast-developing area of IT.

### Information Systems (CMP1042)

The subject provides students with an overview of existing and emerging technologies that affect the operations and management of a business. Students will investigate the relationships businesses have with external entities, for example, customers, suppliers and regulators, and the products and services they offer. The first half of the subject is structured to help students understand why and how information systems are used by organisations. The subject covers how to develop the problem solving, interpersonal communication and analytical skills required for developing an information system for clients. Students learn the theories and applications of information systems. In the second half of the subject the focus is on the specific technologies comprising information systems and their development.

### Foundation Programming (CMP1041)

This subject provides essential skills in the conceptualisation and techniques of programming and software design. It introduces techniques for designing algorithms and implementing them as computer programs using a high-level programming language. Emphasis is placed on real world processing tasks, involving students in interactive program development, execution and verification. Students will learn techniques such as debugging and testing. Major areas that are covered will include OOP, data and controlling flow, and arrays. Students will also learn the basic design elements of programming and how to construct solutions using specifications. This subject is a part of system development management and system design that is a fundamental element of all information technologies programs. It builds on developed skills in development tools used and software development to focus on the creation of software projects.





## TRIMESTER 2 – SUBJECTS

### Programming 1 (PRG1002)

This subject contains the knowledge and skills required for understanding fundamental programming. During the subject, students will learn how to apply programming concepts, basic variables, constants and functions to build small programs. The information covered in this subject is essential for programmers at all levels.

### Database Systems (PRG1048)

This subject introduces basic concepts and principles of database systems, especially relational databases, to emphasise the importance of a well-designed database in practice. Students will learn how data is structured and managed within a relational database. This subject is structured to walk students through the necessary steps to design conceptual and relational models, and implement these using basic DDL-SQL commands. Basic and advanced DML-SQL commands are also presented to enable retrieving accurate information from the database. Students are also encouraged to further explore other aspects of database systems, such as security and future databases.

### Introduction to Software Engineering (CMP1043)

This subject provides students with the skills and knowledge to design sound structured computer programs and then moves into a detailed examination of object oriented analysis and design using the Unified Modelling Language (UML). Students will understand the concepts and application of UML to software development, and will have opportunities to use UML for software creation while developing further understanding of software concepts and problem solving approaches. The role of software engineer and the software development life cycle will also be covered.

## TRIMESTER 3 – SUBJECTS

### Discrete Mathematics (PRG1010)

Discrete Mathematics introduces students to a wide range of terminology and tools that have particular use in computer science. In this subject, emphasis is placed on mathematical and computational skills. Students will also focus on developing reasoned arguments and creating clarity through the exploration of number systems, matrix operations, algorithms, and discrete structures, such as sets, graphs, combinatorics and logic.

### Programming II (PRG1006)

This subject builds on the knowledge and skills students obtain in an intermediate programming subject. Students learn how to create and use classes to build object-oriented programs. This subject covers the fundamental programming concepts that all object-oriented programmers require including object-orientation; classes, objects and interfaces; basic structures; special member functions; declarations and statements; standard libraries; and exception handling.



# YEAR 2

## START DATES:

February, May, or September

### TRIMESTER 4 – SUBJECTS

#### Basic Game Engine Programming

(INT2001)

In this subject, students will complete their coverage of the programming language C++ by examining templates, error handling, the standard template library and bitwise operations. Students will investigate and apply several useful STL data structures and algorithms and their underpinning concepts. The subject introduces Windows programming, animation and the rendering of 2D sprite images.

#### Java

(PRG1049)

This subject continues the examination of object-oriented programming using Java. It also introduces graphical user interface development using Java. Students learn the fundamental principles of interface development and are then required to apply these in the development of a program with a graphical interface. Students also examine database connectivity and network application development using Java.

#### Digital Project Management

(INT1050)

This subject covers the basic principles of project management. Students will learn the essential theory of managing projects and will work in small teams to produce proper and complete documentation for a small project of their choice. The emphasis is on the project management of typical tasks and on providing a thorough understanding of how formal project management can be vital for the successful completion of major tasks which may require many resources. The project management skills gained can be applied to a wide range of project types and contexts.

### TRIMESTER 5 – SUBJECTS

#### Systems Analysis and Design

(CMP3045)

This subject introduces basic principles of software requirements, analysis and design. The objectives are to establish a requirement analysis, and design templates for where more detailed material regarding specific aspects of requirements and design techniques and issues fit. In doing so students will apply their skills and knowledge of understanding requirements, a range of modelling techniques, methodologies and approaches.

#### Interface & Experience Design

(DES1060)

This subject teaches students how to design, implement and evaluate user interfaces to meet predefined quality characteristics of functionality. Students will also learn to create a user centric experience for web and application design. Concepts, theories and technologies underlying the methods and techniques are introduced and explained. Students will apply all that they have learned to develop and implement interactive user interfaces for systems, applications, products or services.

#### Artificial Intelligence

(PRG2006)

This subject will introduce students to the concept of artificial intelligence (AI), one of the critical components in a contemporary game development project. Students will develop a solid grasp on what the term "artificial" means. Artificial intelligence will be used to produce gaming problems and solutions and to construct player challenges. Through a personal research project, students will engage in scientific writing and experimental analysis investigating artificial intelligence both theoretically and technically.



## TRIMESTER 6 – SUBJECTS

### Advanced Game Engine Programming (INT2007)

This subject will introduce students to OpenGL and DirectX, a collection of application programming interfaces (APIs) for handling tasks related to multimedia, namely game programming and video. Students will learn elementary 3D techniques, including lighting, texturing, alpha blending and stenciling. Finally, students will learn how to use a graphic framework and the High-Level Shading Language, commonly used in 3D game programming.

### Game Development (INT1029)

This subject introduces students to using an industry standard 3D game engine. Students will use this software for developing future games and major projects. The subject involves learning object oriented programming to design and develop interactive games. On successful completion of this subject, students will be able to operate a game engine proficiently to develop simple 3D games, become familiar with programming fundamentals and most importantly develop their problem solving skills.





# YEAR 3

## START DATES:

February, May, or September

## TRIMESTER 7 – SUBJECTS

### Elective 1

Students may choose an elective from the approved elective subject list.

### Augmented Reality (PRG3220)

In this subject, students will be introduced to the theory and practice of Augmented Reality (AR). Students will study the history of Augmented Reality technology and consider its practical applications in a contemporary context. The subject will cover processes for Augmented Reality development for games programming and students will engage in practical exercises for developing their own working Augmented Reality applications.

### Advanced Game Development (INT3030)

In this subject, students learn advanced game development using a 3D game engine. The focus of this subject is on game development for a mobile platform, which involves optimisation of graphics and processor. Students will also learn game development practices for mobile games development, along with learning to create games at a higher audio/visual aesthetic for a commercial level product.

## TRIMESTER 8 – SUBJECTS

### Advanced Studio 1 (INT3506)

This subject is the first part of a two term project. This project aims to prepare students for career roles in a particular ICT discipline or focus area. Students will select a topic of interest and work closely with a supervisor throughout the project. Students can select to work individually (recommended) or within a team of two or three at most.

This project is strongly recommended to be taken only in final year, because students will be required to apply knowledge obtained from subjects delivered in the first two years in order to deliver satisfactory outcomes for this final Advanced Studio project. In Advanced Studio 1, students will consult with their

supervisor to finalise their topics, develop a methodology, plan their milestones for both trimesters, and complete their research, literature review, analysis, and high level design phases of the project.

### Advanced Game Project (INT1035)

In this subject, students form and work amongst a team to develop a game from start to finish, with the aim of publishing. This subject emphasises working as a team in using Agile game development methodologies to meet constant deadlines. A substantial part of the subject will be to make effective game design decisions and iterations through regular player testing and feedback gathering. The aim is to develop a fun and entertaining and, most importantly, complete product by the end of the subject.

## TRIMESTER 9 – SUBJECTS

### Advanced Studio 2 (INT3516)

This subject is the second part of a two term project. Students must successfully complete Advanced Studio 1 in order to enrol in this subject. In Advanced Studio 1, students would have already selected their topics, completed the research and analysis parts of the project.

In Advanced Studio 2, students will continue their projects from Advanced Studio 1, and complete their projects with low level design, implementation, prototype and final presentation according to a timeline and plan as set in Advanced Studio 1. The whole project encourages students to properly complete a project of their own, following industry processes, standards and disciplines in order to prepare students for career roles in their focus area.

### Elective 2

Students may choose an elective from the approved elective subject list.



# ELECTIVES

Electives are subject to availability and certain electives have prerequisites.

## PROGRAMMING RELATED

### Enterprise Systems

CMP1046

This subject introduces current enterprise computing concepts, challenges and opportunities. Students will learn the main components of the enterprise computing environment and its component-based and service-based oriented architectures, and will develop an understanding of the differences between various cloud platforms. Students will study the complexity of enterprise computing environments and their new evolving technologies, and will learn development techniques for implementing enterprise applications. The subject focuses on basic standards, architectures and technologies used in enterprise computing, the key components of enterprise applications and their implementation in .NET technology.

### Mobile App Android

PRG1050

This subject extends knowledge on mobile device application development. It covers advanced technologies for mobile device applications. This subject addresses Android for mobile devices and how to implement an effective user interface for a mobile application by applying software engineering techniques and an advanced software development methodology in practice. Topics include the mobile application framework, pattern and human interface design, as well as app design and store.

### Mobile App iOS

PRG3051

This subject extends knowledge on mobile device application development. It covers advanced technologies for mobile device applications. This subject addresses iOS for mobile devices. Students will learn how to implement an effective user interface for mobile applications by applying a software engineering technique and advanced software development methodology in practice. Topics include mobile application framework, pattern and human interface design, as well as the app design and store.

### Data-Driven Apps Development

INT3053

In this subject, students will expand on the backend development that has been gained in previous subjects, and extend and apply these skills. Students will develop the ability to create and maintain systems that collect and utilise information. A key learning outcome will be the ability for students to create a simple API and a data-driven mobile application.

### Advanced Web

INT1059

In this subject, students advance their skills in web design. Drawing on theories and research on advanced web development, students engage with complex information and complete practical tasks, including developing dynamic web pages. Using JavaScript and PHP together, students create functions for e-commerce and content management. Methods for ensuring web security comprise an important topic in this subject, and successful students will obtain a strong theoretical and practical foundation before moving onto more advanced web projects.

### Cross-Platform Apps Development

INT3052

The field of mobile development is divided into a range of different programming languages, frameworks and environments. In this subject, students learn to identify the options that are available for developers and will develop a cross platform application of their own. Students will draw on skills and knowledge from previous subjects and apply them to the development of an application that can be deployed on a range of devices and platforms.

## COMP SCIENCE RELATED

### Foundation Networks

CMP3044

This introductory networking subject is designed to orient students in the basics of how data is exchanged and how small networks are designed and implemented. It will give students an understanding of the basic concepts and operations of networks, such as the internet and data networks (LANs and WANs). Topics will include TCP/ IP and OSI network layers, transmission, error detection and correction, and an overview of network security and management.

# ELECTIVES

Electives are subject to availability and certain electives have prerequisites.

## DESIGN RELATED

### Digital Images DES1013

In this subject, students will learn the basic skills and knowledge needed to create digital graphics. They will learn to use industry-standard pixel, vector and layout-based tools, and also learn how these tools are integrated into wider digital practice. Students apply theory and evidence-based practice when creating and enhancing images.

## INDUSTRY PREPARATION

### Professional Internship Program SPC3038

AIT's Professional Internship Program (PIP) aligns students with professional industry organisations where they will work to develop relevant skills oriented to their chosen Careers. The program aims to enhance the contextual capabilities, skills and knowledge students have developed throughout their course. It will provide an opportunity for students to apply what they know, be mentored, receive feedback and seek opportunities for development in a real-world setting, as well as be exposed to emerging trends and technology that impact their industry. This program can only be undertaken in the final term of the associated qualification. Prior to commencement, AIT will determine a suitable placement company based on the student's individual needs, to ensure their supervision, safety and wellbeing are adequate.







# ACADEMIC CALENDAR



# VISIT OUR WEBSITE



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