

# COMPUTER SCIENCE (COMP)

## COMP 0001 Introductory Programming (WSTC Prep) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp0001/>) **Legacy Code:** 700204

The subject introduces students to computer programming as an essential tool for problem-solving and data analysis in engineering and science. The focus is on using an algorithmic approach to problem solving. Students will learn how to analyse and solve problems by designing an algorithm and implementing it in a high-level programming language. This subject includes extensive practical work and problem-solving activities. It prepares students for the first year subject, Engineering Computing, in the Bachelor programs in Engineering. Students will also be able to use their acquired programming skills to perform calculations, analyse data and create graphs for their projects and reports in other subjects.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** COMP 0002 - Introductory Programming (UWSC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## COMP 0002 Introductory Programming (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp0002/>) **Legacy Code:** 900084

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## COMP 0003 Programming Design (WSTC Prep) (5 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp0003/>) **Legacy Code:** 700047

This subject introduces students to the principles required for the effective design and development of solutions to computer program related problems. This subject has been developed to enhance a student's practical ability as well as build a solid theoretical foundation for further study in programming.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** LGYB 0451 - Programming Design (UWSCDip)

COMP 0004 - Programming Design (UWSC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## COMP 0004 Programming Design (WSTC) (5 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp0004/>) **Legacy Code:** 900009

Programming Design introduces students to the principles required for the effective design of solutions to computer program related problems. The course has been developed to enhance a student's practical ability as well as build a solid theoretical foundation for further study.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## COMP 1001 3D Modelling Fundamentals (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp1001/>) **Legacy Code:** 301164

This subject will introduce the fundamentals of 3D surface modelling. Students will learn the theory of 3D surface modelling and will gain practical skills in creating 3D assets using a popular software package from Autodesk. They will also learn how to design characters and how to integrate their assets with a purpose of producing complex 3D scenes and animated movies. This subject is aimed at students who have no prior knowledge of 3D modelling and are not familiar with associated software packages.

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## COMP 1002 Advanced Computer Science Activities 1 (0 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp1002/>) **Legacy Code:** 300586

This subject is only for Bachelor of Computer Science (Advanced) students in year one of their studies. Students will participate in industry and research based extension activities (non-assessable). These activities will be identified with the goal of exposing students early in their degree and integrating them into a culture of academic enquiry, problem solving, knowledge generation and scholarship and an awareness of the challenges and current issues confronting the computing/IT industry. The subject will be used to record student activities and a satisfactory/ unsatisfactory grade will be applied at the end of each semester.

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## COMP 1005 Programming Fundamentals (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp1005/>) **Legacy Code:** 300580

As a first subject in computer programming, Programming Fundamentals covers the basics of developing software with an emphasis on procedural programming. Students will learn about basic data structures, the concept of algorithms, fundamental programming constructs, common programming language features and functions, program design and good programming style. A high level programming language is combined with a highly visual framework to teach problem solving using software.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** COMP 1004 - Fundamentals of Programming

LGYA 5799 - Programming Principles 1 LGYA 4364 - Business

Application Development 1 COMP 1006 - Programming Fundamentals (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 1006 Programming Fundamentals (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp1006/>) **Legacy Code:** 700008

As a first subject in computer programming, Programming Fundamentals covers the basics of developing software with an emphasis on procedural programming. Students will learn about basic data structures, the concept of algorithms, fundamental programming constructs, common programming language features and functions, program design and good programming style. A high level programming language is combined with a highly visual framework to teach problem solving using software.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** Students enrolled in 7067 Diploma in Information and Communications Technology Extended must pass LANG 0002 Academic Communication 2 (WSTC Prep) or LANG 0032 English for Tertiary Study 2 (WSTC Prep) or LANG 0039 Introduction to Academic Communication 2 (WSTC Prep) and must pass INFO 0008 Computer Studies (WSTC Prep) and must pass COMP 0003 Programming Design (WSTC Prep) and must pass MATH 0008 Mathematics 2 (WSTC Prep) before enrolling in this unit

Students enrolled in 6035 Diploma Bachelor of Information and Communications Technology 6036 Diploma in Information and Communications Technology Bachelor of Information Systems and 7005 Diploma in Information and Communications Technology must pass COMP 0003 Programming Design (WSTC Prep) before enrolling in this unit

Students enrolled in 6038 Dip in Information and Communications Technology BICT(HIM) 6039 Diploma in Information and Communications Technology BICT 6040 Diploma in Information and Communications Technology BIS 7067 Diploma in Information and Communications Technology Extended 7134 Diploma in Information and Communications Technology Extended - ICT 7138 Diploma in Information and Communications Technology Extended-ICT 7139 Diploma in Information and Communications Technology Extended 7140 Diploma in Information and Communications Technology Extended-IS 7141 Diploma in Information and Communications Technology Extended-HIM 7163 Diploma in Information and Communications Technology(International) and 7164 Dip Information and Communications Technology (HIM) (International) must pass COMP 0003 Programming Design (WSTC Prep) and must pass MATH 0008 Mathematics 2 (WSTC Prep) before enrolling in this unit

**Equivalent Subjects:** COMP 1004 - Fundamentals of Programming LGYA 5799 - Programming Principles 1 LGYA 4364 - Business Application Development 1 COMP 1005 - Programming Fundamentals

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 1012 Programming Fundamentals (UG Cert) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp1012/>) **Legacy Code:** 500047

As a first subject in computer programming, Programming Fundamentals covers the basics of developing software with an emphasis on procedural programming. Students will learn about basic data structures, the concept of algorithms, fundamental programming constructs, common programming language features and functions, program design and good programming style. A high-level programming language is combined with a highly visual framework to teach problem solving using software.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** COMP 1004 Fundamentals of Programming LGYA 5799 Programming Principles 1

LGYA 4364 Business Application Development 1 COMP 1005 Programming Fundamentals

COMP 1006 Programming Fundamentals

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 1013 Analytics Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp1013/>) **Legacy Code:** 301487

This subject covers the use of computers and computer programming for Data Science. After briefly considering spreadsheet systems, the subject will consider programming in the statistical system "R" in depth. Finally, other special purpose languages will be touched briefly (eg. SQL).

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 1014 Thinking About Data (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp1014/>) **Legacy Code:** 301488

This subject covers basic concepts of data centric thinking. The main areas discussed are; Populations and Samples; Sampling concepts; Types of Data; Descriptive Methods; Estimation and Inference; Modelling. The subject takes a computational and nonparametric approach, before briefly discussing theoretical concepts and distribution theory.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1033 Thinking About Data

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2001 Advanced Computer Science Activities 2 (0 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2001/>) **Legacy Code:** 300587

This subject is only for Bachelor of Computer Science (Advanced) students in year two of their studies. Students will participate in industry and research based extension activities (non-assessable). These activities will be identified with the goal of exposing students early in their degree and integrating them into a culture of academic enquiry, problem solving, knowledge generation and scholarship and an awareness of the challenges and current issues confronting the computing/IT industry. The subject will be used to record student activities and a satisfactory/ unsatisfactory grade will be applied at the end of each semester.

**Level:** Undergraduate Level 2 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2003 Computer Algebra (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2003/>) **Legacy Code:** 301031

This subject will introduce the popular computational software Mathematica, through which students will explore and investigate real-world mathematical problems. The subject promotes an experimental side of mathematics and will employ symbolic computation to gain insight and intuition into problems, to discover mathematical patterns and relationships, and create impressive graphics to expose mathematical structures.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** MATH 1014

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2004 Computer Networking (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2004/>) **Legacy Code:** 300565

Computer Networking is an introductory subject in computer systems networking. It covers basic networking technologies, Ethernet fundamentals, ISO OSI model, routing, switching and subnetting, the Internet architecture, networking protocols including TCP/IP, important OSI layer 2 and 3 networking device fundamentals, basic network management and security issues. This subject is also the first of three units, which will prepare students for industry based networking certification (CCNA).

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** COMP 2007 - Computer Networking Fundamentals LGYA 5739 - Applied Data Communications and Networking COMP 2006 - Computer Networking (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2005 Computer Networking (Advanced) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2005/>) **Legacy Code:** 300946

This subject introduces students to computer systems networking. It covers basic networking technologies, Ethernet fundamentals, ISO OSI model, routing, switching and subnetting, the Internet architecture, networking protocols including TCP/IP, important OSI layer 2 and 3 networking device fundamentals, basic network management and security issues. This subject is also the first of three units, which will prepare students for industry based networking certification (CCNA). Students in this advanced subject will be required to undertake individual assessment activities demonstrating a high level of technical and applied theoretical competency.

**Level:** Undergraduate Level 2 subject

**Incompatible Subjects:** COMP 2007 - Computer Networking Fundamentals LGYA 5739 - Applied Data Communications and Networking COMP 2004 - Computer Networking

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2006 Computer Networking (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2006/>) **Legacy Code:** 700012

This is an introductory subject in computer systems networking. It covers basic networking technologies, Ethernet fundamentals, ISO OSI model, routing, switching and sub-netting, the internet architecture, networking protocols, including TCP/IP, important OSI layer 2 and 3 networking device fundamentals, basic network management and security issues. This subject is also the first of three subjects which will prepare students for industry based networking certification (CCNA).

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** Students enrolled in 7067 Diploma in Information and Communications Technology Extended and 7134 Diploma in Information and Communications Technology Extended – ICT must pass LANG 0002 Academic Communication 2 (WSTC Prep) or LANG 0032 English for Tertiary Study 2 (WSTC Prep) or LANG 0039 Introduction to Academic Communication 2 (WSTC Prep) and must pass INFO 0008 Computer Studies (WSTC Prep) before enrolling in this unit

Students enrolled in 7138 Diploma in Information and Communications Technology Extended-ICT 7139 Diploma in Information and Communications Technology Extended 7140 Diploma in Information and Communications Technology Extended-IS and 7141 Diploma in Information and Communications Technology Extended-HIM must pass LANG 0012 Academic Professional Communication (WSTC Prep) and must pass INFO 0001 Academic Skills for ICT (WSTC Prep) before enrolling in this unit

**Equivalent Subjects:** COMP 2007 - Computer Networking Fundamentals LGYA 5739 - Applied Data Communications and Networking COMP 2004 - Computer Networking

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2008 Computer Organisation (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2008/>) **Legacy Code:** 300096

This subject is designed for computer science students, particularly those interested in systems programming and hardware development. The students will learn about the interface between the hardware and software of a computer system. This will involve study of some aspects of computer architecture and low level interfacing to gain an insight into central processing unit (CPU) organisation at the assembly language level. After completing this subject students will be able to write procedures in an assembly language, use their understanding of the relationship between the instruction set architecture and the implementation of high level languages to write efficient programs.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** The following pre-requisite unit applies to course 3771 only

ENGR 1045 Engineering Programming Fundamentals

The following pre-requisites apply to all courses except 3771

COMP 1005 Programming Fundamentals OR

ELEC 1006 Engineering Computing AND

MATH 1006 Discrete Mathematics OR

MATH 1016 Mathematics for Engineers 1

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2009 Data Structures and Algorithms (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2009/>) **Legacy Code:** 300103

This subject introduces students to fundamental data structures and algorithms used in computing. The material covered forms the basis for further studies in programming and software engineering in later subjects and for further training in programming skills. The subject focuses on the ideas of data abstraction and algorithm efficiency.

The issues of computational complexity of algorithms are addressed throughout the semester. The topics covered include the fundamental abstract data types (lists, stacks, queues, trees, hash tables, graphs), recursion, complexity of algorithms, sorting and searching algorithms, binary search trees and graphs.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** COMP 2014 OR

COMP 2015 OR

COMP 2016 OR

ENGR 1045

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2011 Games Technology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2011/>) **Legacy Code:** 300491

This subject provides an introduction to the game industry as well as introducing students to the techniques of game design and construction. Students will be exposed to the history of game development and the key aspects of different genres of computer games.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** LGYA 5804 - Client Server Applications

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2013 LAN Workshop (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2013/>) **Legacy Code:** 300138

This subject provides students with the knowledge and skills necessary to install, test, tune, customise, repair and maintain networking hardware and software necessary to create a Local Area Network (LAN). Students also learn how to administer a LAN by setting up user accounts, access privileges, security procedures and back-up/recovery procedures.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** LGYA 6157 Networking Workshop

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2014 Object Oriented Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2014/>) **Legacy Code:** 300147

This subject presents the concepts and principles of programming languages with the emphasis on object oriented paradigm. It addresses the importance of the separation of behaviour and implementation as well as effective use of encapsulation, inheritance and polymorphism. The students will gain intensive training in programming skills with supervised laboratory sessions and task oriented assignments.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** COMP 1005 OR

ENGR 1045

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2015 Programming Techniques (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2015/>) **Legacy Code:** 300581

This subject is intended as a second subject of study in programming. It builds on a basic understanding of procedural programming as would be developed in a first subject. This subject continues the development of programming skills and methodologies required for professional programming and for further study in later computing subjects. Topics covered include multi-dimensional arrays, file I/O, searching and sorting, and an introduction to object-oriented programming involving classes and inheritance.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** COMP 1005

**Equivalent Subjects:** LGYA 5800

COMP 2017

**Incompatible Subjects:** COMP 2016 - Programming Techniques (Advanced)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2016 Programming Techniques (Advanced) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2016/>) **Legacy Code:** 300903

This subject builds on a basic understanding of procedural programming developed in previous subjects. Students continue to develop their programming skills and methodologies required for professional programming and for further study in later computing subjects. Topics covered include multi-dimensional arrays, file I/O, searching and sorting, and an introduction to object-oriented programming involving classes and inheritance. Students in this advanced subject will also investigate and apply advanced concepts such as function overloading and recursion.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** COMP 1005

**Incompatible Subjects:** COMP 2015 - Programming Techniques

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2017 Programming Techniques (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2017/>) **Legacy Code:** 700257

This subject is intended as a second subject of study in programming. It builds on a basic understanding of procedural programming as would be developed in a first subject. This subject continues the development of programming skills and methodologies required for professional programming and for further study in later computing subjects. Topics covered include multi-dimensional arrays, file I/O, searching and sorting, and an introduction to object-oriented programming involving classes and inheritance.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** COMP 1006

**Equivalent Subjects:** COMP 2015 - Programming Techniques LGYA 5800 - Programming Principles 2

**Incompatible Subjects:** COMP 2016 - Programming Techniques (Advanced)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2018 Simulation Fundamentals (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2018/>) **Legacy Code:** 301167

In the last couple of decades computer modelling and simulation has evolved into an important discipline used in nearly every aspect of life from computer games to banking. What was once a tool for training pilots is now a capability to better understand human behaviour, enterprise systems, disease proliferation, and much more. This is an introductory, problem-based unit, where students will learn by doing. Students will acquire ability to use different simulation methodologies and tools such as InsightMaker and AnyLogic to build new insights into the world around you and learn how to share these insights effectively with others.

**Level:** Undergraduate Level 2 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2019 Systems Programming 1 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2019/>) **Legacy Code:** 300167

This subject provides an introduction to the knowledge and skills required for the design, writing and support of technical software and other such functions normally falling within the role of the systems programmer. It provides for detailed study of a systems programming environment and its application to systems programming tasks.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** COMP 2015 OR

COMP 2016 OR

COMP 2020 OR

COMP 2014 OR

ELEC 1006 AND

ELEC 1001

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2020 Technologies for Web Applications (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2020/>) **Legacy Code:** 300582

Building on material covered in Programming Fundamentals this subject introduces students to some of the key technologies for developing interactive and dynamic web applications from both the client and server perspective. The subject covers web site design, web site development, web page accessibility and usability, HTML, CSS, client side and server side scripting, database interaction, web site promotion (Search Engine Optimisation) and web security.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** COMP 1005

**Equivalent Subjects:** COMP 2012 - Interactive Web Site Development

**Incompatible Subjects:** LGYA 5748 - Creating and Managing Web Sites

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2021 Software Engineering Fundamentals (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2021/>) **Legacy Code:** 301343

This subject introduces software engineering principles including basic software lifecycle concepts, modern development methodologies and version control, conceptual modelling and how these activities relate to programming. Students apply this knowledge together with essential team-based project management to design, build and deploy a simple web-based application. The subject provides students with the skills required in software design and development and prepares them to work in a team setting.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** ENGR 1045

OR

COMP 1005

**Incompatible Subjects:** INFS 1006

INFS 1007

INFS 1015

COMP 2020

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2023 Mathematical Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2023/>) **Legacy Code:** 301375

This subject will introduce the programming language Python, through which students will explore and investigate practical mathematical problems. Python is one of the most powerful versatile programming languages, and it is increasingly used by engineers and scientists as well as banks and financial institutions to tackle their computational problems. The subject promotes an experimental side of mathematics and will employ Python-based computational tools to gain insight and intuition into problems, to discover mathematical patterns and relationships, and to use visualisation techniques to expose mathematical structures.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** COMP 2003 Computer Algebra

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2024 Computer Networking (UG Cert) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2024/>) **Legacy Code:** 500049

This is an introductory subject in computer systems networking. It covers basic networking technologies, Ethernet fundamentals, ISO OSI model, routing, switching and sub-netting, the internet architecture, networking protocols, including TCP/IP, important OSI layer 2 and 3 networking device fundamentals, basic network management and security issues. This subject is also the first of three subjects which will prepare students for industry-based networking certification (CCNA).

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** COMP 2004 Computer Networking COMP 2007

Computer Networking Fundamentals

LGYA 5739 Applied Data Communications and Networking COMP 2006

Computer Networking

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2025 Introduction to Data Science (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2025/>) **Legacy Code:** 301486

Analysis of data is essential for scientific investigation, modelling processes and predicting future events. Data Science is the investigation of the tools required that allow us to perform this modelling and prediction. The increase in accessible data over the past few decades has promoted the use of Data Science, making it a desired skill in many professions. In this subject we further investigate the methods of regression, clustering and classification that form the basis of a data scientist's toolbox.

**Level:** Undergraduate Level 2 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2026 Visual Analytics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2026/>) **Legacy Code:** 301489

This subject introduces the fundamentals and technologies of visual analytics to understand big data. It covers major concepts of information visualisation, human computer perception and methods for visual data analysis. Students will learn knowledge and skills for identifying suitable visual analytics techniques, methods and tools for handling various data sets and applications. The subject provides students with opportunities to explore novel research in visual analytics and visualisation.

**Level:** Undergraduate Level 2 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 2029 DevOps (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp2029/>)

DevOps engineers build tools and pipelines for companies delivering software solutions, assuring the quality of their products. By utilising DevOps, companies limit the risk of introducing errors when updating their applications and experiences which allows them to better serve their customers and dynamically react to their needs. In this subject, students learn the principles and philosophy of DevOps and how to build DevOps tools. Students apply their knowledge in practical activities to create and maintain pipelines for continuous delivery. This involves calculating delivery metrics, estimating and evaluating measures of success. Based on the performance in the subject, a selected number of students will have the opportunity to undergo a week-long placement with a target industry partner. Students doing the placement will work on industry projects assessed by professional staff at their placement venue.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** INFO1003

**Co-requisite(s):** INFO 3019

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3001 Advanced Computer Science Activities 3 (0 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3001/>) **Legacy Code:** 300588

This subject is only for Bachelor of Computer Science (Advanced) students in year three of their studies. Students will participate in industry and research based extension activities (non-assessable). These activities will be identified with the goal of exposing students early in their degree and integrating them into a culture of academic enquiry, problem solving, knowledge generation and scholarship and an awareness of the challenges and current issues confronting the computing/IT industry. The subject will be used to record student activities and a satisfactory/ unsatisfactory grade will be applied at the end of each semester.

**Level:** Undergraduate Level 3 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3002 Applications of Big Data (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3002/>) **Legacy Code:** 301110

Many techniques and tools have been developed over the past decade to cope with the ever-growing needs for the processing and analysis of big data. This subject will cover the key techniques that have been widely used in big data applications, such as relational and Not Only Structured Query Language (NoSQL) databases, Web Services, parallel and cloud computing, MapReduce, Hadoop and its eco-system. It aims to introduce the emerging technologies and applications in big data to students, and keep up with the latest trends in the industry.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 1013 OR COMP 1005

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3003 Cloud Computing Architecture (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3003/>) **Legacy Code:** 301204

This subject, the second part of the Amazon Web Services (AWS) Academy Cloud Computing Architecture curriculum, provides deeper understanding about advanced cloud computing services and how to architect cloud applications that are scalable, reliable, and efficient in terms of cost and performance. Students will learn advanced cloud computing concepts including notification and messaging, serverless computing, API gateways, NoSQL databases, content delivery networks, stream processing, and long-term storage. The subject also covers advanced cloud security and infrastructure automation. All these aspects are explored in practice with AWS services. Upon completion of this subject, students will be prepared for the AWS Certified Solutions Architect - Associate exam.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 3012 AND

COMP 1005

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3006 Computer Graphics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3006/>) **Legacy Code:** 300093

Computer Graphics will examine elementary graphics concepts, algorithms and programming skills for producing graphical applications, in both two-dimension (2D) and three-dimension (3D) using Open GL. Techniques and algorithms will be programmed in Processing, which is a very easy-to-learn programming language yet powerful and comprehensive.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2014 OR

COMP 2015 OR

COMP 2016 OR

COMP 2020

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3007 Computer Networks and Internets (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3007/>) **Legacy Code:** 300095

This subject extends on the work undertaken in the prerequisite unit, Computer Networking, and provides students with an in-depth understanding of the role of switching technologies and router operations that support small to medium business networks. It includes wireless local area networks (WLANs) and security concepts. Students will also learn key switching and routing concepts allowing them to perform basic network configuration and troubleshooting, identify and mitigate LAN security threats, and configure and secure a basic WLAN. This is the second of three subjects that prepares the student for industry-based networking certification (CCNA).

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2004 OR

COMP 2005

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3009 Distributed Systems and Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3009/>) **Legacy Code:** 300115

This subject covers the concepts, design, and programming of distributed systems. It builds on basic network communication protocols (specifically IP) to cover client server programming using both the system level socket interface and remote procedure calls. It also examines large scale distributed system architectures particularly those based on distributed objects and considers the complexities inherent in distributed transactions. Key concepts covered include data and algorithmic distribution, idempotent protocols, stateless and statefull servers, and distributed system transparency. Illustrative case studies are included.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** Successful completion of COMP 2004 Computer Networking and either COMP 2014 Object Oriented Programming or COMP 2015 Programming Techniques

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3011 Internet Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3011/>) **Legacy Code:** 300130

This subject offers students basic concepts and latest technologies of internet programming and web-based application development. Utilising one of the popular internet programming languages, such as Java, it aims to develop the programming skills and methodologies required for both client-side and server-side programming as well as general purpose programming. The range of topics covered by the subject includes HTML, XML, Java applets, desktop application in Java, servlets, JavaServer Pages and JDBC.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2014 OR

COMP 2015 OR

ELEC 1006 OR

COMP 2016

**Equivalent Subjects:** LGYA 5876 - Internet Computing

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3012 Introduction to Cloud Computing (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3012/>) **Legacy Code:** 301203

This unit, the first half of Amazon Web Services (AWS) Academy Cloud Computing Architecture curriculum, provides deep understanding of fundamental cloud computing concepts and how it can be applied to build cost-effective; highly available and fault tolerant systems. Students will learn concepts including system virtualisation; virtual machines; cloud networks; basic cloud storage and cloud databases; security in clouds; and auto-scaling, load balancing, and monitoring. All these aspects are explored in practice with AWS services.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2004 OR

COMP 2005

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3013 Mobile Applications Development (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3013/>) **Legacy Code:** 300960

This subject teaches technologies and programming languages for developing applications on common mobile platforms, such as Android and iOS. Students will learn skills for developing programs on the above platforms, along with in-class sample applications that highlight platform-specific implementation details.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** For students enrolled in 3687 Bachelor of Information Systems 3688 Bachelor of Information Systems Advanced 3744 Bachelor of Information Systems Bachelor of Business 3745 Bachelor of Information Systems Advanced Bachelor of Business 6036 Diploma in Information and Communications Technology Bachelor of Information Systems or 6040 Diploma in Information and Communications Technology Bachelor of Information Systems - COMP 2020 Technologies for Web Applications

For students enrolled in 3639 Bachelor of Information and Communications Technology - COMP 2015 Programming Techniques For students enrolled in 3684 Bachelor of Information and Communications Technology (Advanced)- COMP 2016 Programming Techniques (Advanced)

For students enrolled in 3506 Bachelor of Computer Science - COMP 2014 Object Oriented Programming OR COMP 2020 Technologies for Web Applications

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3014 Networked Systems Design (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3014/>) **Legacy Code:** 300575

This subject builds on and consolidates the skills and knowledge gained in Computer Networking and Computer Networks and Internets. Students successfully completing this subject will acquire the necessary design skills and knowledge required to build and configure enterprise scale networks. The subject provides students with an opportunity to develop problem-solving techniques and decision-making skills to resolve networking issues. Students completing this subject and its prerequisites should also now be prepared to attempt world recognized network industry certification (CCNA).

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 3007

**Equivalent Subjects:** LGYA 5741 - Broadband Networking

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3015 Operating Systems Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3015/>) **Legacy Code:** 300698

This subject provides the knowledge of the internal structure and functionality of Operating Systems. An operating system defines an abstraction of hardware behavior and provides a range of services more suitable for ICT application development than what raw hardware could deliver, in terms of convenience, efficiency and security. It is important that ICT Professionals have some understanding of how these services are realized. For ICT Professionals whose role includes supporting the operating system this subject provides the introduction to the relevant theory and practice.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2015 OR

COMP 2016 OR

COMP 2014

**Equivalent Subjects:** INFS 3014 - Operating Systems

**Incompatible Subjects:** COMP 3016 - Operating Systems Programming (Advanced)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3016 Operating Systems Programming (Advanced) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3016/>) **Legacy Code:** 300943

This subject provides the knowledge of the internal structure and functionality of Operating Systems. Through the use of case studies the abstraction that Operating Systems provide will be investigated, and techniques for programming with these abstractions will be developed.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2016 OR

COMP 2015

**Incompatible Subjects:** LGYA 6233 - Operating Systems Programming  
INFS 3014 - Operating Systems

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3018 Professional Experience (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3018/>) **Legacy Code:** 300579

Professional Experience is a final year 'capstone' project subject.

This subject provides opportunities for students to gain hands-on experience in software systems requirements definition, analysis, design and implementation, in a real-world setting. Students work in groups, guided by an academic supervisor or an industry mentor, in achieving the goals set by the client that provides the project. Suitable projects are sourced from external organisations or within Western Sydney University by way of giving the students professional experience in independent learning and reflective practice.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** Students in the Bachelor of Information and Communications Technology and associated double degrees with BICT are required to complete the following subjects  
INFS 2001 Database Design and Development AND  
COMP 3028 Software Construction AND

INFO 3019 Project Management

Students in the Bachelor of Computer Science are required to complete the following subjects

COMP 2009 Data Structures and Algorithms AND

INFS 2001 Database Design and Development AND

INFO 3019 Project Management

Students in the Bachelor of Information Systems and associated double degrees are required to complete the following subjects

INFS 2001 Database Design and Development OR

INFS 2002 Database Design and Development (Advanced)  
AND

COMP 2020 Technologies for Web Applications OR

COMP 2019 Systems Programming 1

AND

INFO 3008 Professional Development

**Equivalent Subjects:** INFS 3004

**Incompatible Subjects:** INFO 3005

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3019 Professional Experience (Advanced) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3019/>) **Legacy Code:** 300900

Professional Experience (Advanced) is a final year 'capstone' work-placement subject. This advanced subject provides the opportunity for students to gain hands-on experience in software systems requirements definition, analysis, design, implementation and project management, in an external organisation under the supervision of industry experts. During the work placement students work in a real-life project applying the theories and technical skills learned in previous subjects in an industry setting. Students are allowed to propose a work-placement of their choice within an external organisation. School will assess the suggested work-placement for its suitability in meeting the set subject outcomes, prior to approval.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** INFS 2001 OR

INFS 2002 AND

COMP 2020 AND

INFO 3008

**Incompatible Subjects:** LGYA 5744 Computing Project 2 INFO 3005 IT Support Practicum

**Restrictions:** Please see the Subject Details page for any restrictions for this subject



**COMP 3020 Social Web Analytics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3020/>) **Legacy Code:** 300958

The Social Web provides everyone with a voice; information from Facebook, Twitter and other social networks allows us to identify trends and relationships in society. Whilst this has interest on a personal level, the killer-apps will be in analysing social Web data for business, such as tracking the buzz around a new product, and understanding the relationships between customers and products. This subject will introduce its students to the Social Web data that is available, and blend data science and machine learning concepts to allow extraction and analysis of such data.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** Students who are NOT enrolled in 1837 Bachelor of Cyber Security and Behaviour 3769 Bachelor of Data Science or 3770 Bachelor of Applied Data Science must have successfully completed one the following three units

MATH 1003 Biometry

MATH 1028 Statistical Decision Making

MATH 1030 Statistics for Business

Students enrolled in 1837 Bachelor of Cyber Security and Behaviour must have successfully completed the following two units

MATH 2006 Experimental Design and Analysis AND

MATH 1002 Analytics Programming

**Co-requisite(s):** For students enrolled in courses 3769 Bachelor of Data Science or 3770 Bachelor of Applied Data Science

MATH 1033 Thinking About Data

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3021 Special Effects Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3021/>) **Legacy Code:** 301173

This subject will focus on develop programming code to write shaders to create special effects, such as fog, shadows, fire, water, clouds, lightning, motion blur and reflections. These type of shaders are often seen in games and movies. Students will also learn about generic programming algorithms involved in building special effects.

**Level:** Undergraduate Level 3 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3022 Systems Administration Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3022/>) **Legacy Code:** 300165

This subject covers programming techniques and tools used to administer standalone and networked computer systems. The subject focuses on the use of high level interpretive scripting languages to automate everyday administrative tasks, and to monitor and control running systems. Techniques to extend scripting language capabilities by dynamic linking to compiled code are examined, particularly in terms of access to operating system level functions. The subject also examines the use of administrative programs and tools to monitor and adjust system performance and capacity.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2019

**Incompatible Subjects:** LGYA 6160 - Script programming

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3023 Systems and Network Management (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3023/>) **Legacy Code:** 300166

With the advent of the era of Internet of Things, the Internet has become a huge infrastructure in which various kinds of systems are running to deliver a plethora of network services. To ensure the efficient utilization of network resources (e.g., bandwidth) and the convenient access to network services, systems and networks must be managed in a proper way. Facing this demand, this subject covers the standards, protocols and skills pertinent to the management of systems and networks. Moreover, this subject introduces Software Defined Networking (SDN), a new paradigm for conducting network management with programmability, flexibility and scalability.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 3007 OR COMP 3025

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3024 Video Games Development (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3024/>) **Legacy Code:** 300862

This subject provides students with an in-depth understanding of the development and structure of game engines. It provides the student with a unifying overview of the many modules that are incorporated in a game engine as well as a detailed examination of game-play and engine programming.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 1005

**Equivalent Subjects:** LGYA 6086 - Games Theory and Design

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3025 Wireless and Mobile Networks (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3025/>) **Legacy Code:** 300952

This subject helps the students gain in depth knowledge in the core concepts and principles in the areas of wireless and cellular networks. It provides them with the technical skills needed to do requirement analysis and evaluate a range of wireless networked systems to plan their institution or expansion. The subject covers the communication characteristics and architecture of wireless systems along with various types of wireless networks, including wireless LANs, personal area networks, sensor networks, mesh networks, and broadband wireless networks. Given the widespread use of mobile phones and devices, a substantial part of the subject is devoted to the study of cellular networks. The subject also covers mobility management and wireless security issues and solutions. Upon completion of this subject, the students will have the capabilities needed for long term and independent learning in the rapidly evolving area of wireless and mobile networking.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2004 OR COMP 2005

**Equivalent Subjects:** LGYA 5741 - Broadband Networking

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3027 Robotic Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3027/>) **Legacy Code:** 301205

Robot Operating System (ROS) is a software integration system that is now widely used for robotics software deployment. The philosophy behind ROS is to modularise software that can work for other robots through small changes in the code. This subject focuses on the main concepts of software development under ROS by looking at the file hierarchical systems (e.g. Packages, Stacks, Messages, Services and others), module communication types through Nodes, Topics, Services, Messages, Bags, Master and how they integrate to operate robot sensors and actuators. This subject also looks at actual AI software examples using C++/Python and Answer Set Programming (ASP).

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 2014 Object Oriented Programming and COMP 2019 Systems Programming 1

OR

COMP 2014 Object Oriented Programming and COMP 3015 Operating Systems Programming

OR

MECH 4003 Mobile Robotics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3028 Software Construction (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3028/>) **Legacy Code:** 301348

This subject will be offered at Engineering Innovation Hub - Hassall St, Parramatta campus. This subject focuses on building students' knowledge in software design and construction. Students learn programming skills in several different languages, including JavaScript, shell programming, as well as the processes involved in software development. Students discover tools for version control, performance improvement, configuration and debugging with opportunities to apply their skills to a range of practical tasks. The subject provides students the necessary skills for different software development tools and environments.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** ENGR 1045 OR COMP 1005

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3029 Software Engineering Industry Project (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3029/>) **Legacy Code:** 301349

This subject will be offered at Engineering Innovation Hub - Hassall St, Parramatta campus. This subject enables students to experience real-life involvement in designing and implementing a quality software system that conforms to stakeholder requirements in the domain of data analytics. It builds on the skills developed in previous project subjects in specifying requirements, managing projects, communicating, working in teams to achieve a completed system, and reinforces skills in software design, coding, testing, reporting and the use of support tools. Students integrate these skills while learning about the domain and professional ways to liaise with the stakeholder to develop appropriate requirements, documentation and a final product.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** ELEC 2017 AND ELEC 2019

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3032 Machine Learning (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3032/>) **Legacy Code:** 301435

Machine Learning is one of the most important technologies in the fields of Artificial Intelligence and Data Science used to explain large datasets, inform decisions and highlight risks. Machine Learning is relevant for solving a range of problems in many industries dealing with significant amounts of information and the structure of that information. In this unit, students put Machine Learning theory into action through widely used algorithms and practical applications for designing, training, and evaluating common learning models and systems. Students use Python programming and, as a result, learn about its important machine learning libraries and packages, such as Scikit-Learn, Keras and TensorFlow for solving practical problems and tasks.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 1028 OR MATH 1033 OR COMP 1014 OR MATH 1003 OR MATH 1030

AND

COMP 1005 OR MATH 1002 OR COMP 3002

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3033 Quantum Computing and Communication (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3033/>) **Legacy Code:** 301437

This subject introduces how computing and communication can be performed by harnessing quantum phenomena such as superposition and entanglement. From a computer science perspective, this subject directly starts with the mathematical models delivered by those quantum phenomena while skipping the details of Quantum Mechanics. Based on these mathematical models, this subject introduces the concept of qubits and quantum circuits, and then discusses the design of quantum algorithms and communication protocols. This subject is highly practical: quantum programming will be done weekly with a user-friendly quantum simulator. Students completing this subject will develop skills for designing quantum algorithms and protocols which are highly needed in job markets.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP2014 OR

COMP2015 OR

COMP2016 OR

COMP2023

AND

MATH1028 OR

MATH1030 OR

COMP1014

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3034 Multimodal Interaction (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3034/>) **Legacy Code:** 301468

A key aspect within the field of Human Computer Interaction is capturing user input to a system or device. Called Multimodal Interaction, students learn about the variations of such inputs including how speech, vision, gesture and touch are used to interact with computing devices. Through a mixture of theoretical, research-oriented and practical concepts students will be introduced to novel techniques of interacting with computing devices and interfaces and discuss applications of them, across industrial and research applications, including digital assistants such as Siri, Alexa, facial recognition and surveillance systems.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** COMP 1005 AND INFO 3003

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 3035 Discovery Project (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp3035/>) **Legacy Code:** 301490

In this subject students will gain experience in applying data science skills and using knowledge gained during their bachelor's course of their primary discipline. Students will carry out a real life project transforming data to knowledge under the supervision of an academic mentor. Students will develop a knowledge discovery project proposal and carry out a literature review highlighting the current status of the problem. Assisted by a mentor they will apply the data science skills learned through-out the degree and produce a final discovery project report and/or interactive project tool and give an oral presentation.

**Level:** Undergraduate Level 3 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 6001 Neuromorphic Algorithms and Computation (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp6001/>) **Legacy Code:** 800232

Designing and implementing processing pipelines for event-based sensory data is a crucial skill for neuromorphic engineers to test novel hardware platforms or to develop new algorithms and learning mechanisms. This project-based subject focuses on principles of neuromorphic algorithm design and hardware-friendly neural architecture design for neuromorphic information processors. This subject consists of two streams of research: applied event-based algorithms and bio-inspired spiking networks. Through solving increasingly challenging tasks using distributed, event-based competitive processing elements, students will learn the differences between conventional and neuromorphic algorithm design, critically assessing real-world problems in a structured manner.

**Level:** Postgraduate Coursework Level 6 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 6002 Neuromorphic Sensing (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp6002/>) **Legacy Code:** 800233

Neuromorphic sensors offer a new way to electronically sense and process data that have a unique structure based on principles found in biology. Understanding how they operate is integral to their effective use in practical situations, to the development of algorithms, process their data, and to the optimisation of their electronic designs. This subject focuses primarily on neuromorphic vision sensors, which are rapidly being adopted by multiple industries, including exciting applications in automotive and space. Students will develop an in-depth understanding of neuromorphic sensors and the skills to operate a neuromorphic sensor for acquiring data and solving real-world problems. This practical experience is in high demand from both research labs and the industry.

**Level:** Postgraduate Coursework Level 6 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 6003 Computer Vision (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp6003/>)

Computer vision uses artificial intelligence to train computers to interpret and understand visual images. Through the information that is derived, computer systems can make decisions and take actions. The amount of visual information today from digital devices and cameras along with improved technology has enabled considerable advances in automated image interpretation. In this subject students learn the state-of-the-art technologies of image processing and computer vision through practical activities. Computer vision is used, and has the potential to be used, in a range of industries, in novel ways. This presents a unique opportunity to students completing this subject.

**Level:** Postgraduate Coursework Level 6 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7001 Advanced Routing (20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7001/>) **Legacy Code:** 301065

As a Cisco Academy, Western Sydney University can offer students the opportunity to study the Cisco Certified Network Professional course Implementing Cisco IP Routing (ROUTE). This online subject will provide the knowledge, understanding and skills to deploy and manage a range of internal and external routing protocols for a large scale internetwork using Cisco equipment. Students will be expected to undertake individual research to contextualise Cisco in the broader networking environment. The subject provides hands-on lab experience via Netlabs?. If students successfully complete this subject they can progress to CCNP ROUTE certification.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7002 Advanced Topics in Networking (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7002/>) **Legacy Code:** 300252

This subject focuses on the advanced features of networked systems and the emerging network technologies and services. The subject provides students with an in-depth understanding of relevant protocols, the emerging standards, and standards organisations. The emphasis of the subject is on development of the student skills to enable them to do proficient research and development works and studies in the computer networking discipline.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7003 Big Data (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7003/>) **Legacy Code:** 301046

"Big data" is the label for the ever-increasing gigantic amount of data with which humanity has to cope. The availability of data and the development of cloud computing architectures to process and analyse these data have made data analytics a central tool in our endeavours. This subject will introduce students to the realm of "big data", covering the important principles and technologies of retrieving, processing and managing massive real-world data sets. It is designed to provide the basic techniques required by any discipline that needs to make sense out of the growing amount of data, and to equip students with the knowledge and key set of skills set to be competitive in the growing job market in the analytics field.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7004 Cloud Computing (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7004/>) **Legacy Code:** 301042

Cloud computing has become a driving force for information technology over the past several years, and it is moving towards a future in which we won't rely on local computers, but on centralised facilities operated by third-party compute and storage utilities.

Governments, research institutes, and industry leaders are rushing to adopt Cloud Computing to solve their ever-increasing computing and storage problems arising in the Internet Age. This subject offers "Academy Cloud Foundations" (ACF) curriculum as part of Amazon Web Services (AWS) Academy. Students will develop knowledge and skills in the areas of virtualization technologies, cloud architecture, AWS core services and their pricing, security, architecture, and support.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7006 Data Science (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7006/>) **Legacy Code:** 301044

The explosion of data in the internet age opens up new possibilities for agencies and business to better serve and market to its customers. To take full advantage of these opportunities requires the ability to consolidate, manage and extract information from very large diverse data sets. In science, data sets are growing rapidly, with projects routinely generating terabytes of data. In this subject we examine the software tools and analytic methods that underpin a successful Data Science Project and gain experience in big data analytics.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7007 Information Security Management (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7007/>) **Legacy Code:** 301162

Cyber Crime costs are increasing at an alarming speed. Security management skills are now essential for IT management. This subject provides the knowledge, skills, techniques and mechanisms on information security management for postgraduate students. It covers topics on management aspects of information security such as business and Cybercrime, security awareness, security risks, security fundamentals, risk assessment and security system design, planning and regulatory issues for information system security.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7008 Internet of Things (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7008/>) **Legacy Code:** 301175

The Internet of Things (IoT) is drastically changing the way organisations operate and how individuals interact with the world. IoT is an infrastructure consisting of fairly constantly communicating objects, or things, that may be smart and process or act on data. The IoT facilitates detailed and meaningful interactions between humans, digital devices, and many other industrial and household equipment, appliances, and things. The IoT is also the enabler of smart environments, including smart homes, buildings, cities, transport, and healthcare, among many others. This subject discusses IoT technologies and applications in detail. It also introduces the students to trends, challenges, and key research topics in relevant areas.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7009 Mobile Computing (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7009/>) **Legacy Code:** 301043

This subject teaches technologies and programming languages for developing applications on common mobile platforms, such as Android and iOS. Students will learn skills for developing programs on the above platforms, along with in-class sample applications that highlight platform - specific implementation details.

**Level:** Postgraduate Coursework Level 7 subject

**Pre-requisite(s):** Students enrolled in 2761 Master of Business Administration Information and Communication Technology specialisation must have successfully completed COMP 7015 Programming Proficiency and INFS 7007 Systems Analysis and Database Management Systems  
Students enrolled in all other courses must have successfully completed INFS 7009 Web Technologies

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7011 Multimedia Communication Systems (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7011/>) **Legacy Code:** 300256

This subject covers advanced concepts and technologies used in emerging multimedia communication systems. Theory, practice and standards for IT professionals endeavouring to build data compression systems for multimedia applications are emphasised.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7012 Network Management (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7012/>) **Legacy Code:** 300255

The performance of any modern organization is heavily dependent on their networked systems and how these systems are managed. The increasing demand for ICT services and the huge growth of the Internet have resulted in large heterogeneous networks. This subject addresses the issues relevant to management of such networks and the services that run on them. It covers the principles and current practices pertinent to integrated management of networks, systems, and services. The subject helps the students to understand relevant protocols, standards, and standards organizations. It also introduces them to trends and key research areas in management of networked systems.

**Level:** Postgraduate Coursework Level 7 subject

**Equivalent Subjects:** LGYA 9360 - Management of Networked Systems  
**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7013 Network Technologies (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7013/>) **Legacy Code:** 300695

Computer networking is one of the fastest growing technologies of our time. The Internet interconnects billions of computers providing many new exciting opportunities and challenges. The Internet and the World Wide Web have provided the communication and infrastructure needed for global collaboration and information exchange. As a result of the rapid growth of networked systems and the diverse applications that run on them, success in many professions depends on a sound understanding of the technologies underlying these systems and applications. This subject explores these issues and provides the students with such an understanding. It covers the principles and current practices pertinent to computer networking and communications. It describes some of the important technologies and devices used in modern networks for information distribution and data sharing. The subject helps the students to understand important models, protocols and standards in networking and internetworking.

**Level:** Postgraduate Coursework Level 7 subject

**Equivalent Subjects:** LGYA 5883 - Network Technology and Data Communications

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7014 Optimising Networks (20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7014/>) **Legacy Code:** 301067

As a Cisco Academy, Western Sydney University can offer this Cisco Certified Network Professional course, 'Troubleshooting and Maintaining Cisco IP Networks' (TSHOOT). Cisco Systems are worldwide leaders in networking technologies, for telecommunication, corporate and private networking. This online subject will be provide the knowledge, understanding and skills to troubleshoot communication on large-scale data networks using Cisco equipment and extend your research skills. Students will be provided with hands-on lab experience via Netlabs?. Students who successfully complete this module can progress and complete the CCNP TSHOOT certification with Cisco.

**Level:** Postgraduate Coursework Level 7 subject

**Pre-requisite(s):** COMP 7001 AND COMP 7010

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7015 Programming Proficiency (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7015/>) **Legacy Code:** 301038

This subject is aimed at the students whose undergraduate study is in a discipline other than computing or information technology. This subject first covers the programming fundamentals on data types, conditional selections and loop structures, and then further develops the problem solving skills through the use of user-defined functions, records, files, as well as the basic concept and techniques of object-oriented programming. A high level programming language is employed to implement all the problem solutions.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7016 Visualisation (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7016/>) **Legacy Code:** 301112

This subject introduces the fundamentals and technologies of information visualisation. It covers the major concepts of information visualisation, human-computer perception and methods for visual data analysis. Students will learn the knowledge and skills required for identifying suitable visualisation techniques and tools appropriate for various data types and applications. The subject provides students with opportunities to explore recent research in the visualisation field.

**Level:** Postgraduate Coursework Level 7 subject

**Incompatible Subjects:** MATH 2014 Visual Analytics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7017 Wireless Networking (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7017/>) **Legacy Code:** 300389

Wireless technologies are amongst the most exciting and rapidly growing areas in computing and information technology. They implement applications that profoundly impact our personal way of communication, as well as how business in a variety of industries and organisations are conducted. This subject goes into details of such issues. It discusses wireless networking technologies and their related applications. The main features of wireless and mobile communication systems and the networked services that are based on these systems are also presented. The subject provides students with an in-depth understanding of relevant protocols, the emerging standards and standard organisations. The students are also introduced to some of the relevant current key research issues of the field.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7018 Advanced Cloud Computing (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7018/>) **Legacy Code:** 301363

This subject offers the Amazon Web Services (AWS) Academy "Academy Cloud Architecting" (ACA) curriculum and provides deeper understanding of advanced cloud computing services and how to architect cloud solutions. Students will learn advanced cloud computing concepts including notification and messaging, serverless computing, API gateways, NoSQL databases, and content delivery networks. The subject also explores strategies to enable high scalability, reliability, cost-efficiency, performance, and operational excellence in a cloud-based system. All these aspects are explored in practice with AWS services. Upon completion of this subject, students will be prepared for the AWS Certified Solutions Architect - Associate exam.

**Level:** Postgraduate Coursework Level 7 subject

**Pre-requisite(s):** COMP 7004

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7019 Applied Machine Learning (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7019/>) **Legacy Code:** 301312

This subject introduces the foundation and concepts underpinning Machine Learning (ML) at a more abstract level, and provides more focus on its practical applications in areas such as: the classification and extraction of text data from various documents and web pages, image processing, Google's PageRank algorithm and relational data mining (RDM). These learning objectives are achieved through various ML software and a series of practicals and projects. The subject covers the concepts and notions of supervised, unsupervised and reinforcement learning, perceptron, neural networks, support vector machines (SVM), knowledge representation (KR) based RDM, and a comprehensive introduction to the Scikit-learn ML Python libraries.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7020 Artificial Intelligence Ethics and Organisations (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7020/>) **Legacy Code:** 301314

Artificial Intelligence Ethics and Organisations provides students with a comprehensive grounding in the ethical issues of general ICT and AI technologies. Students will learn the general ICT professionalism, the relevant laws, regulations and policies with respect to ICT and AI ethics, and the existing framework and research trend in the field. With a series of case studies, students will learn how to apply general principles and guidelines in practice. They will also learn to identify potential risks and impacts, to ensure AI ethics are followed in different circumstances regarding data governance, automatic decisions, predictive analytics, autonomous system design and deployment, and structure changes of labour markets.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7021 Knowledge Representation and Reasoning (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7021/>) **Legacy Code:** 301315

Knowledge representation and reasoning is one of the fundamental components of Artificial Intelligence. It studies ways to represent and reason about human knowledge effectively in formal computational models, and eventually to solve complex tasks using computer systems. This unit covers logic foundations of knowledge representation and reasoning, Answer Set Programming approaches for declarative problem solving, intelligent agent modelling, diagnostic and probabilistic reasoning. This unit is part of the important preparations for career paths to AI engineers, robotics engineers and intelligent software engineers.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7022 Natural Language Understanding (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7022/>) **Legacy Code:** 301313

Natural Language Understanding involves machine reading comprehension and the technologies using it are becoming increasingly widespread. This subject provides a foundation in using the Natural Language Toolkit, which is a leading platform for building Python programs working with 'human language' data, as well as an introduction to Python for Natural Language Processing. Students will use algorithms and explore accessing text corpora and processing raw text; categorising words and classifying text; understanding information from text and analysing sentence structures; and understanding semantic meanings of sentences. Students also gain real-world hands-on experience with Natural Language Understanding through the practical tasks and assignments.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7023 Predictive Analytics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7023/>) **Legacy Code:** 301495

The information age has allowed business and science to take advantage of the vast amount of available data for predicting outcomes and estimating trends, to make informed decisions. Machine learning is the process of allowing a computer to learn from data, which at its heart is used in making these important decisions. This subject provides students with the knowledge and practice required to implement and effectively use these predictive models such as Neural Networks and Support Vector Machines, and provides opportunity for students to investigate state-of-the-art. Students will use the Python programming language throughout this subject.

**Level:** Postgraduate Coursework Level 7 subject

**Equivalent Subjects:** MATH 7011 Predictive Analytics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7024 Programming for Data Science (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7024/>) **Legacy Code:** 301493

The use of computers and computer programming for Data Science is fundamental to the discipline. This introductory subject will briefly cover the use of spreadsheet systems and then will consider programming in the statistical system "R" in detail. Other special purpose languages will also be touched on briefly including SQL (Structured Query Language).

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 7025 Social Media Intelligence (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp7025/>) **Legacy Code:** 301494

Social Media Intelligence presents the theory and practice of extracting and analysing information from social media networks. The aims are to identify properties of social networks, and to make predictions about future events. Topics included will cover areas such as Graph theory, Game theory and Network dynamics and we will identify how these can be used to model and extract information from Facebook and Twitter.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 9001 Higher Degree Research Thesis - Computing and Information Technology (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp9001/>) **Legacy Code:** 800049

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 9002 Higher Degree Research Thesis - Computer Science (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp9002/>) **Legacy Code:** 800221

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**COMP 9003 Higher Degree Research Thesis - Artificial Intelligence (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/comp9003/>)

This is a 80 credit point year-long subject.

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject