

Postgraduate courses

Please note that all postgraduate courses require departmental approval prior to enrolment.

Before attempting to enrol, you should contact the Masters or Honours Coordinator if you are doing the Honours or the Masters programme, or the Diploma Coordinator if you are taking the Postgraduate Diploma.

Please see the course webpages for more information: www.cs.auckland.ac.nz/courses.

You must pass the practical (assignments) and the theory (test and exam) sections separately to pass the course as a whole for most COMPSCI courses. Please check the individual course webpages for assessment details.

Key to course code information	
COMPSCI	Computer Science course
601-799	Postgraduate course code
SS	Summer School
S1	Semester 1
S2	Semester 2
C	City Campus
T	Tāmaki Innovation Campus

COMPSCI 601/602

S1, S2 C, T

Special Topic Diploma Courses

These courses are offered to Postgraduate Diploma students to supplement their knowledge of Computer Science concepts introduced at Stage III. Students are required to attend lectures and complete the course-work for a Stage III COMPSCI course. They are additionally required to produce a substantial report in a topic proposed by the course coordinator of the Stage III course.

Prerequisite Departmental approval
Please see the Diploma Coordinator before enrolment
diplomas@cs.auckland.ac.nz

Assessment Stage III course (Exam and coursework) - 80%
Report - 20%

Important Students must pass the report component, as well as the Stage III exam and coursework, to pass the course as a whole.

Web www.cs.auckland.ac.nz/courses/compsci601

COMPSCI 691 A and B
Postgraduate Diploma Dissertation

S1, S2 C, T

This is a two-semester course for Postgraduate Diploma students only. Students should enrol in COMPSCI 691A and 691B.

This 30 point dissertation is an introduction to individual research and study within a specialised field of Computer Science. You will work closely with an academic member of staff, but your study will be self-directed.

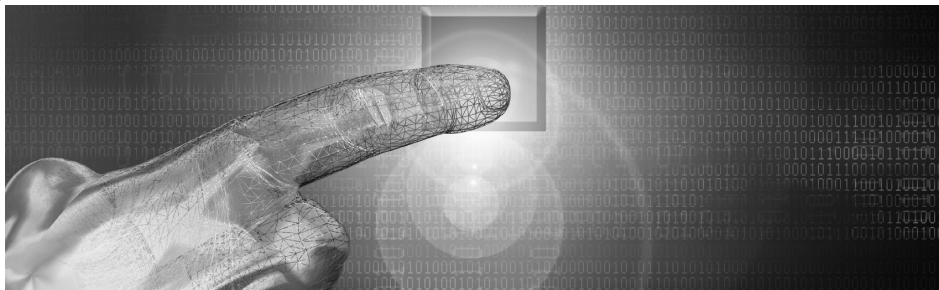
Prerequisite	Departmental approval Please see the Diploma Coordinator before enrolment diplomas@cs.auckland.ac.nz
Restriction	COMPSCI 780
Assessment	100% coursework
Supervisor	Students must find a staff member to supervise their dissertation.
Organisation	Students must make two oral presentations and deliver a final written report. Both will be assessed and contribute to the final grade for the course.
Web	www.cs.auckland.ac.nz/courses/compsci691

COMPSCI 705
Advanced Topics in Human Computer Interaction

S1 C

Careful consideration of the human aspects of computer systems is a major part of both commercial solution development and computer science research. This course investigates current topics in HCI research. Examples are: support of pen-based interaction on a range of devices such as digital whiteboards, tablet PCs and PDAs; technical infrastructure for pen-based interaction; trends with domain specific user interface design, such as interfaces for enterprise systems. Each student will do one project and one research seminar.

Recommended Preparation	COMPSCI 345 or SOFTENG 350
Assessment	40% Exam, 30% Project (25% for the project deliverables as agreed, 5% for presentation), 30% Seminar (20% for the report, 10% for presentation)
Coordinators	Dr Beryl Plimmer, Associate Professor Robert Amor
Restriction	Taught concurrently with SOFTENG 702
Important	You must pass the practical and the written sections separately to pass the course as a whole.
Web	www.cs.auckland.ac.nz/courses/compsci705s1c



COMPSCI 711

S2 C

Parallel and Distributed Computing

A distributed system is a collection of autonomous computers interconnected by a computer network and equipped with distributed system software to form an integrated computing facility. This course discusses several issues in distributed systems, e.g. distributed algorithms, security, etc.

Recommended preparation COMPSCI 335
Students are expected to have completed at least three Stage III COMPSCI courses. Those who have not done COMPSCI 335 are expected to self study C# and the Web service materials covered in COMPSCI 335.

Assessment 30% assignments, 70% examination

Coordinator Dr Xinfeng Ye

Required Text Most of the material will be available online.

Restriction Taught concurrently with SOFTENG 710

Web www.cs.auckland.ac.nz/courses/compsci711s2c

COMPSCI 715

S2 C

Advanced Computer Graphics

An advanced course looking at the latest computer graphics technologies and their use in research and commercial applications. Typical topics are novel modelling and animation techniques, advanced user interfaces (sketch based interfaces, Augmented and Virtual Reality), advanced OpenGL (advanced shading, rendering, texturing, shadows) and GPU accelerated algorithms.

Recommended preparation COMPSCI 373 or equivalent and 15 points at Stage II Mathematics

Assessment 20% individual assignments, 20% group project, 60% exam

Coordinator Dr Burkhard Wuensche

Organisation The course has a fairly heavy practical component and involves research group work, reports and presentations.

Web www.cs.auckland.ac.nz/courses/compsci715s2c

COMPSCI 720**S1 C****Advanced Design and Analysis of Algorithms**

Selected advanced topics in design and analysis of algorithms, such as: combinatorial enumeration algorithms; advanced graph algorithms; analytic and probabilistic methods in the analysis of algorithms; randomized algorithms; methods for attacking NP-hard problems.

Recommended preparation COMPSCI 320 and a mathematics course, such as MATHS 260, that provides some background in integration and differential equations.

Assessment 40% assignments, 60% exam

Coordinators Dr Mark Wilson, Dr Michael Dinneen

Required Text Lecture notes and copies of relevant articles or book sections will be distributed during the course.

Web www.cs.auckland.ac.nz/courses/compsci720s1c

COMPSCI 725**S2 C****System Security**

Computer security is increasingly important, now that e-commerce is commonplace and e-government is starting to come online. Computer systems are susceptible to a variety of attacks including denial of service, unauthorised modifications, and unauthorised use. In this paper, we will briefly survey the field of computer security, then we will study some technical articles from the recent literature on specific topics in computer security.

Recommended preparation Two of the following courses: COMPSCI 313, 314, 320, 335, 340, 351, 734, 742

Assessment 25% individual or group work assignments, 15% individual assignments, 60% examination

Supervisor Professor Clark Thomborson

Organisation All students in this course will prepare and deliver an oral presentation, based on a published article in this field. Each student will write a 10-page term paper on some related topic.

COMPSCI 732**S1 C****Software Tools and Techniques**

An advanced course examining research issues related to tools and techniques for software design and development. Typical topics could include techniques for data mapping and data integration, software architectures for developing software tools, meta-tools, and issues in advanced database systems. The precise content may vary from year to year. Consult the website for details.

Recommended preparation COMPSCI 335

Assessment 50% assignments, 50% examination

Coordinator Dr Christof Lutteroth

Required Text Many of the materials will be available online. Supplementary reading lists will be provided in class.

Web www.cs.auckland.ac.nz/courses/compsci732s1c

COMPSCI 734**S1 T****Web, Mobile and Enterprise Computing**

This course looks at emerging mobile and distributed software architectures at the confluence of Web services, XML and databases. The course includes advanced topics in areas such as: mobile computing, Web architectures and performance, Web services routing and security, imperative/declarative/functional integration, XML/SQL/objects integration, services/messaging/objects interface integration, workflow orchestrations, and other techniques for enterprise distributed systems.

Recommended preparation COMPSCI 335

Assessment 30% assignments, 70% examination

Coordinator Dr S Manoharan

Required Text Many of the materials will be available online. Supplementary reading lists will be provided in class.

Web www.cs.auckland.ac.nz/courses/compsci734s1t

COMPSCI 742**S2 C****Advanced Internet: Global Data Communications**

This is a research-oriented course, covering selected topics relating to data communication, including but not limited to the internet, radio networks, high speed networks, and local loop technologies as well as their underlying physical layer and coding. Students are expected to learn how to present a good technical argument on these issues.

Assignments are generally aimed at fostering an understanding of protocols and infrastructure; some of them involve programming in various languages. Students are expected to have a good understanding of the Internet, TCP/IP and routing protocols. Recent topics have included:

- Basics of queueing theory, especially as applied to communications networks.
- Network congestion management, Quality of Service.
- Principles of radio communication, wireless LANs, wireless WANs, mobile digital communication, fixed links
- Networks of mobile nodes, ad hoc networks
- Internet Protocol (IPv4 and IPv6): addressing, Domain Name System, network security, traffic measurement
- Global routing in the Internet

Recommended preparation COMPSCI 314

Assessment 30% assignments, 70% exam

Coordinators Associate Professor Nevil Brownlee

Required Text J.F. Kurose & K.W. Ross (2010), Computer Networking (5th Edition), Pearson

Web www.cs.auckland.ac.nz/courses/compsci742s2c

COMPSCI 750
Computational Complexity

S2 C

This is a survey course of the popular computational complexity classes and measures including and beyond P and NP. Definitions of computational models and complexity classes: time complexity (e.g. P and NP), space complexity (e.g. L and PSPACE), circuit and parallel complexity (NC), polynomial-time hierarchy (PH), interactive complexity (IP), probabilistic complexity (BPP), alternating machines, and fixed-parameter complexity.

Recommended preparation COMPSCI 320 or COMPSCI 350

Assessment 20% assignments, 30% test, 50% exam

Coordinators Dr Michael Dinneen, Associate Professor Andre Nies

Required Text Sipser, M. Introduction to the Theory of Computation. Boston: PWS Publishing Comp. (1st or 2nd edition)

Web www.cs.auckland.ac.nz/courses/compsci750s2c

COMPSCI 751
Advanced Topics in Database Systems

S1 C

This course builds on and explores the topics covered in COMPSCI 351. Students are required to attend lectures and complete the coursework for COMPSCI 351. They are additionally required to produce a substantial report in a topic proposed by the course coordinator.

Recommended preparation COMPSCI 220 and 225

Assessment 16% assignments, 16% test, 20% report, 48% exam

Coordinator Dr Gerald Weber

Prerequisite Departmental approval

Restriction COMPSCI 351, SOFTENG 351

Important Students must pass the report component, as well as the COMPSCI 351 exam and coursework, to pass the course as a whole.

Web www.cs.auckland.ac.nz/courses/compsci751

COMPSCI 760
Datamining and Machine Learning

S2 C

Machine learning techniques are widely used in many computing applications; for example, in web search engines, spam filtering, speech and image recognition, computer games, machine vision, credit card fraud detection, stock market analysis and product marketing applications. Machine learning implies that there is some improvement that results from the learning program having seen some data. The improvement can be in terms of some performance program (e.g., learning an expert system or improving the performance of a planning or scheduling program), in terms of finding an unknown relation in the data (e.g., data mining, pattern analysis), or in terms of customizing adaptive systems (e.g., adaptive user-interfaces or adaptive agents).

Recommended preparation COMPSCI 367

Assessment	60% assignments, 40% exam
Coordinator	Dr Pat Riddle
Required Text	Mitchell, T. (1997). Machine Learning. McGraw Hill
Recommended Reading	Bishop, C. M. (2006). Pattern Recognition and Machine Learning. Springer
Organisation	The marks for coursework will be allocated equally to assignments, a seminar, and a group project.
Web	www.cs.auckland.ac.nz/courses/compsci760s2c

COMPSCI 761 S2 C Advanced Topics in Artificial Intelligence

This course builds on and explores the topics covered in COMPSCI 367. Students are required to attend lectures and complete the coursework for COMPSCI 367. They are additionally required to produce a substantial report in a topic proposed by the course coordinator.

Recommended preparation	COMPSCI 220 and 225
Assessment	24% assignments, 8% test, 20% report, 48% exam
Coordinators	Dr Pat Riddle, Dr Mike Barley
Prerequisite	Departmental approval
Restriction	COMPSCI 365, 366,367
Important	Students must pass the report component, as well as the COMPSCI 367 exam and coursework, to pass the course as a whole.
Web	www.cs.auckland.ac.nz/courses/compsci761

COMPSCI 767 S1 C Intelligent Software Agents

One of the core abilities of an intelligent software agent is to be able to solve problems and to plan how to achieve goals. Search is a general purpose technique for finding solutions to problems. However, these search spaces may be quite large and planning is one technique for exploiting domain-specific knowledge to reduce the size of the space to be searched. Problems may include dealing with other agents who might be adversaries, or reasoning about scarce resources.

Recommended preparation	COMPSCI 367
Assessment	60% assignments, 40% exam
Coordinator	Dr Michael Barley
Required Text	Many of the materials will be available online. Supplementary reading lists will be provided in class.
Recommended Text	Russell, S.J. and P. Norvig (2003). Artificial Intelligence: A Modern Approach (2nd edition). Prentice Hall, Upper Saddle River, New Jersey.
Web	www.cs.auckland.ac.nz/courses/compsci767s1c



COMPSCI 771

S1 C

Advanced Topics in Computer Graphics and Image Processing

This course builds on and explores the topics covered in COMPSCI 373. Students are required to attend lectures and complete the coursework for COMPSCI 373. They are additionally required to produce a substantial report in a topic proposed by the course coordinator.

Recommended preparation COMPSCI 210 and 230

Assessment 20% assignments, 16% test, 20% report, 44% exam

Coordinator Dr Burkhard Wuensche

Prerequisite Departmental approval

Restriction COMPSCI 372, 373, 375

Important Students must pass the report component, as well as the COMPSCI 373 exam and coursework, to pass the course as a whole.

Web www.cs.auckland.ac.nz/courses/compsci771

COMPSCI 773

S1 C

Intelligent Vision Systems

This course introduces computational methods and techniques for computer vision, extended towards real-world problems such as 2/3D face biometrics, 2/3D hand tracking, 2/3D hand signs recognition, and vision-guided robotics based on 3D scene description. The students will interact with 3D vision equipments based in the city campus 3D vision lab. A particular feature of the course work is the emphasis on complete system design.

Recommended preparation COMPSCI 373 and 15 points at Stage II Mathematics
Students should have active knowledge of C/C++/C# programming.

Assessment 60% assignments, 40% exam

Coordinator Associate Professor Georgy Gimel'farb

Required Texts The lecture notes on the course website cover the full extent of the lecturing material.

Organisation The course has a strong practical component and involves individual as well as group research reports (assignments) and project demonstration.

Note Cameras for the course can be borrowed on the payment of a bond.

Web www.cs.auckland.ac.nz/courses/compsci773s1c

COMPSCI 775

S2 T

Advanced Multimedia Imaging

Introduction to digital imaging and OpenCV, static and dynamic imaging, camera calibration, image sequence analysis, selected computer vision techniques, 3D visualization, ground truth for image sequence analysis, performance evaluation (noise, accuracy and speed). Applications in vision-based driver assistance, panoramic or 3D visualisation using recorded images, or image and video retrieval.

Recommended preparation

COMPSCI 373 and (MATHS 208 or 250)

Students should have a good knowledge of mathematics and programming. Prior knowledge of OpenCV, C/C++ and digital imaging is useful, but there are also introductory lectures and tutorials

Assessment

30% assignments, 70% exam

Coordinator

Professor Reinhard Klette

Required Text

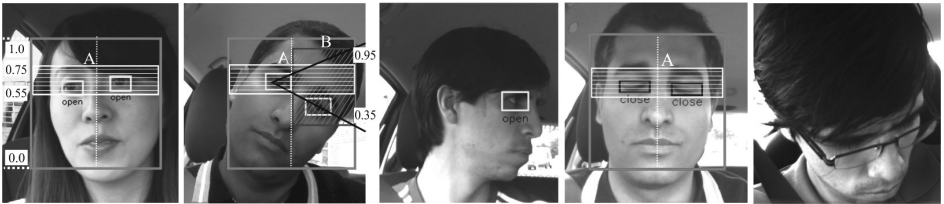
Online lecture notes (www.cs.auckland.ac.nz/~rklette/TeachAuckland.html/mm/) cover the complete course.

Recommended texts

The online lecture notes have links to recommended (but not required) readings.

Web

www.cs.auckland.ac.nz/courses/compsci775s2t

**COMPSCI 780**

SS, S1, S2 C, T

Postgraduate Project in Computer Science

This 15-point project is supervised, independent research or development work on a topic related to Computer Science.

Prerequisites

Departmental approval required. See the Project Coordinator before enrolment.

Restriction

COMPSCI 691

Assessment

100% course work

Supervisor

Students must find a staff member to supervise the project before enrolling in this course.

Note

This course is available only to PGDipSci students with excellent academic records.

Web

www.cs.auckland.ac.nz/courses/compsci780s1ct

COMPSCI 789 A and B
BSc (Hons) Dissertation

S1, S2 C, T

All students completing a Bachelor of Science (Honours) in Computer Science are expected to complete this 30-point dissertation. Students are expected to find a staff member to supervise the dissertation and will work closely with them on the agreed topic. The form of study undertaken will vary widely, depending upon the chosen topic.

- Prerequisite** Departmental approval required.
Contact the Honours Coordinator before enrolment.
- Assessment** 100% course work
- Supervisor** Students must find a staff member to supervise the dissertation before enrolling in this course.
- Organisation** Students must select a topic from those being offered by the Department for honours dissertations, or organise a topic in discussion with an academic member of staff. Students must make two oral presentations, one after three weeks and one towards the end of the final semester.

COMPSCI 796 A and B
MSc Thesis in Computer Science

S1, S2 C, T

This course is a full-time 120-point course lasting two semesters. To complete this course, students must enrol in both COMPSCI 796A and B.

- Required** Departmental approval essential.
Contact the Masters Coordinator before enrolment.
- Assessment** 100% course work
- Supervisor** Students must find a staff member to supervise the thesis before enrolling in this course.

COMPSCI 799 A and B
Part-time MSc Thesis in Computer Science

S1, S2 C, T

This course is a part-time 120-point course lasting four semesters. To complete this course, students must enrol in both COMPSCI 799 A and B.

- Required** Departmental approval essential.
Contact the Masters Coordinator before enrolment.
- Assessment** 100% course work
- Supervisor** Students must find a staff member to supervise the thesis before enrolling in this course.