

# Computer Science

Undergraduate Handbook 2018



THE UNIVERSITY OF  
**AUCKLAND**  
Te Whare Wānanga o Tāmaki Makaurau  
NEW ZEALAND

**SCIENCE**  
DEPARTMENT OF  
COMPUTER SCIENCE

# Welcome to the Department of Computer Science

Congratulations on choosing to study Computer Science. Whether you are taking a complete programme in Computer Science, or a few courses to enhance your effectiveness in another discipline, you will be spoilt for choice in our department.



Computer scientists profoundly affect how our society advances by developing the systems which are fundamental to daily life, our work, learning and entertainment environments. As one of New Zealand's leading Computer Science departments we offer a great variety of topics for you to choose from. We have great strengths in algorithmic information theory, artificial intelligence, bioinformatics, combinatorics, computer vision, data communications and networks, data science, distributed computing, graphics, health informatics, human-computer interaction, logic, multimedia systems, robotics, software engineering, software security, theory of computation, visual programming, and computer science education.

Industry is keen to employ our graduates from the BSc as well as from our postgraduate and professional degrees. I look forward to celebrating your success in Computer Science.

PROFESSOR ROBERT AMOR  
Head of Department

**Our subject  
is ranked in  
the top 100  
worldwide**

QS World University  
Rankings by subject 2017



# Bachelor of Science in Computer Science

As the demand for new technology continues to grow and change, Computer Science is always at the forefront of developments in the field. Computer Science is the study of information and computation, and of practical techniques for using machines to process information and perform computation.



## Preparation for school leavers

Students are not required to have studied any sort of computing at high school. However, it would be beneficial to study NCEA Level 3 mathematics and physics (or equivalent). Students who study appropriate NCEA Level 3 Achievement Standards in digital technology can enter an accelerated pathway through Computer Science.

For course planning and enrolment, go to [www.science.auckland.ac.nz/student-centre](http://www.science.auckland.ac.nz/student-centre)

Thinking about postgraduate study options?  
[www.cs.auckland.ac.nz/pg](http://www.cs.auckland.ac.nz/pg)

## Complementary majors

You may wish to consider a double major to gain a broader base of skills and knowledge.

### COMPUTER SCIENCE +

Applied Mathematics

Information Systems

Logic and Computation

Mathematics

Physics

Statistics

[www.science.auckland.ac.nz/doublemajors](http://www.science.auckland.ac.nz/doublemajors)

# BSc degree planner – Computer Science

## BSc

Year 1

COMPSCI 101 (S1, S2 or SS)				COMPSCI 105 (S1, S2 or SS)			
----------------------------------	--	--	--	----------------------------------	--	--	--

COMPSCI 101 and 105 may be replaced with COMPSCI 107 if prerequisites are met.  
If appropriate prerequisites have been completed, these boxes can be filled by Stage II or III.

### Notes:

- MATHS 108, 110, or 150 are recommended courses as some Stage II COMPSCI courses require 15 points from either of these as a prerequisite.
- PHYSICS 140 and COMPSCI 111 are also recommended courses.

Year 2

COMPSCI 210-280	COMPSCI 210-280	COMPSCI 210-280	COMPSCI 210-280				GEN ED
--------------------	--------------------	--------------------	--------------------	--	--	--	--------

Any Stage      Any Stage

Year 3

COMPSCI 313-393	COMPSCI 313-393	COMPSCI 313-393	COMPSCI 313-393				GEN ED
--------------------	--------------------	--------------------	--------------------	--	--	--	--------

Stage III Science

Stage II or III Science

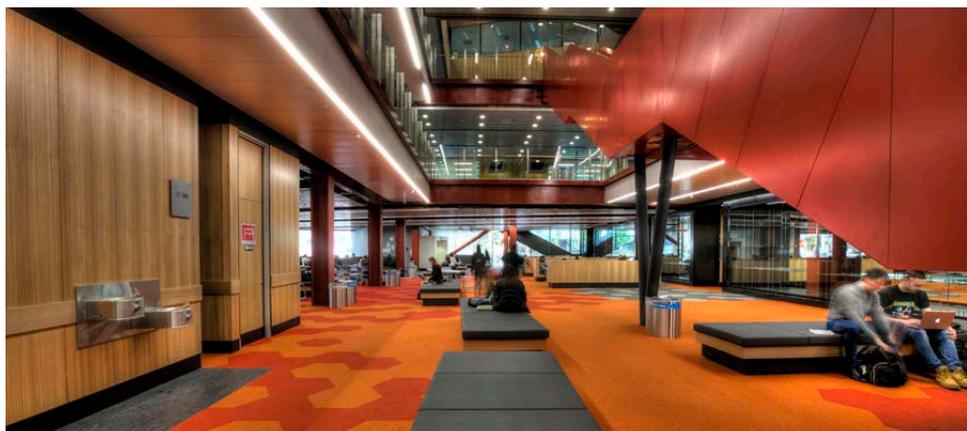
S1: Semester One  
S2: Semester Two  
SS: Summer School

- Courses in a minimum of three subjects listed in the BSc Schedule
- At least 180 points (12 courses) must be above Stage I
- Up to 30 points (two courses) may be taken from outside the faculty
- 30 points (two courses) must be taken from the appropriate General Education Schedules for BSc students
- At least 75 points must be at Stage III, of which 60 points must be in the majoring subject

It is the student's responsibility to check that the final programme complies with University Regulations.  
The Faculty of Science is the final authority on all BSc regulations.

To view regulations for majors, and course descriptions, see [www.calendar.auckland.ac.nz](http://www.calendar.auckland.ac.nz)  
BSc degree requires: 360 points (24 x 15-point courses). Each box represents one 15-point course.  
We recommend that students enrol in eight courses each year.

Degree Planners for double majors can be found at [www.science.auckland.ac.nz/course-planning](http://www.science.auckland.ac.nz/course-planning)



## Undergraduate Computer Science courses

Course code	Title	Semester
<b>Stage I</b>		
COMPSCI 111	An Introduction to Practical Computing	SS, S1, S2
COMPSCI 101	Principles of Programming	SS, S1, S2
COMPSCI 105	Principles of Computer Science	SS, S1, S2
COMPSCI 107	Computer Science Fundamentals	S1
<b>Stage II</b>		
COMPSCI 210	Computer Systems 1	S1, S2
COMPSCI 215	Computer Systems 2	S1
COMPSCI 220	Algorithms and Data Structures	S1, S2
COMPSCI 225	Discrete Structures in Mathematics and Computer Science	S1, S2
COMPSCI 230	Programming Techniques	S1, S2
COMPSCI 280	Introduction to Software Development	S2
<b>Stage III</b>		
COMPSCI 313	Computer Organisation	S2
COMPSCI 314	Modern Data Communications	S2
COMPSCI 320	Applied Algorithmics	S2
COMPSCI 335	Distributed Objects, Services and Programming	S2
COMPSCI 340	Operating Systems	S2
COMPSCI 345	Human-Computer Interaction	S1
COMPSCI 350	Mathematical Foundations of Computer Science	S1
COMPSCI 351	Fundamentals of Database Systems	S1
COMPSCI 367	Artificial Intelligence	S2
COMPSCI 369	Computational Science	S1
COMPSCI 373	Computer Graphics and Image Processing	S1
COMPSCI 380	Undergraduate Project in Computer Science	SS, S1, S2

For course descriptions and prerequisite information: [www.cs.auckland.ac.nz/courses](http://www.cs.auckland.ac.nz/courses)

# Careers in Computer Science

Computer Science graduates can find careers in an ever-widening variety of industries and roles.

Business analyst	Information architect	Security engineer
Cloud systems engineer	Information and communication technology manager	Software architect
Computer consultant	Information systems manager	Software engineer
Data architect	Multimedia programmer	Systems analyst
Database developer	Network engineer	Systems developer
Database/systems administrator	Programmer	Technical consultant
Digital designer	Program manager	Telecommunications engineer
E-commerce solutions architect	Project manager	Test analyst
Educational software developer	Robotics engineer	UX developer
Front end developer	Security analyst	Web and webscripting developer
Game developer		

**Gina Holden** studying part-time for a Bachelor of Science, majoring in Computer Science.

*"I can't remember a time when I haven't wanted to study at the University of Auckland.*

*"I took a gap year after high school. During that year I took an interest in programming, started playing about with free online courses, and I gained a Level 4 Certificate in Computing. From the moment I ran my first program without it crashing, I knew it was something I wanted to pursue further.*

*"I like the hands-on approach – the assignments have been my favourite thing so far; they're a chance to put into practise what we've learnt in lectures and labs.*

*"Right now I'm working on a program that works as a KPI Speedometer. It uses tkinter (a graphical user interface package that we learned about in COMPSCI 101) to 'draw' the images and bars, to show how an employee is tracking, and how this correlates to their potential bonus. I'm looking forward to using it at work soon.*

*"I'm aiming to get work as a programmer or software analyst; testing new programs for companies, as well as implementing and designing new ones.*

*"I've made friends with people inclass tutorials, and through the Tuākana in Science programme. Everyone has been so helpful and friendly – I'm really lucky to have met them."*



# Helpful information

## Academic dates

[www.auckland.ac.nz/dates](http://www.auckland.ac.nz/dates)

## Academic Integrity Course

[www.auckland.ac.nz/academic-integrity](http://www.auckland.ac.nz/academic-integrity)

## Accommodation

[www.accommodation.auckland.ac.nz](http://www.accommodation.auckland.ac.nz)

## Buy coursebooks

[www.science.auckland.ac.nz/resource-centre](http://www.science.auckland.ac.nz/resource-centre)

## Career Development and Employment Services

[www.auckland.ac.nz/careers](http://www.auckland.ac.nz/careers)

## Course advice and degree planning in Science

[www.science.auckland.ac.nz/student-centre](http://www.science.auckland.ac.nz/student-centre)

## General education

[www.auckland.ac.nz/generaleducation](http://www.auckland.ac.nz/generaleducation)

## How to apply

[www.apply.auckland.ac.nz](http://www.apply.auckland.ac.nz)

## How to enrol

[www.auckland.ac.nz/enrolment](http://www.auckland.ac.nz/enrolment)

## International students

[www.international.auckland.ac.nz](http://www.international.auckland.ac.nz)

## Māori and Pacific students

[www.science.auckland.ac.nz/tuakana](http://www.science.auckland.ac.nz/tuakana)

## Need help?

[www.askauckland.ac.nz](http://www.askauckland.ac.nz)

## Rainbow Science Network for LGBTI students

[www.science.auckland.ac.nz/rainbowsience](http://www.science.auckland.ac.nz/rainbowsience)

## Scholarships and awards

[www.scholarships.auckland.ac.nz](http://www.scholarships.auckland.ac.nz)

## Support for students

[www.science.auckland.ac.nz/support](http://www.science.auckland.ac.nz/support)



**APPLICATIONS CLOSE ON 8 DECEMBER**  
**Questions about computer science?**  
**[office@cs.auckland.ac.nz](mailto:office@cs.auckland.ac.nz)**

## Disclaimer

*Although every reasonable effort is made to ensure accuracy, the information in this document is provided as a general guide only for students and is subject to alteration. All students enrolling at the University of Auckland must consult its official document, the University of Auckland Calendar, to ensure that they are aware of and comply with all regulations, requirements and policies.*



**THE UNIVERSITY OF  
AUCKLAND**  
Te Whare Wānanga o Tāmaki Makaurau  
NEW ZEALAND

## Connect with us

Faculty of Science, The University of Auckland  
Private Bag 92019, Auckland 1142, New Zealand

Phone: 0800 61 62 63 | Email: [scifac@auckland.ac.nz](mailto:scifac@auckland.ac.nz)

Web: [www.cs.auckland.ac.nz](http://www.cs.auckland.ac.nz)



[twitter.com/ScienceUoA](https://twitter.com/ScienceUoA)



[www.facebook.com/science.uoa](https://www.facebook.com/science.uoa)