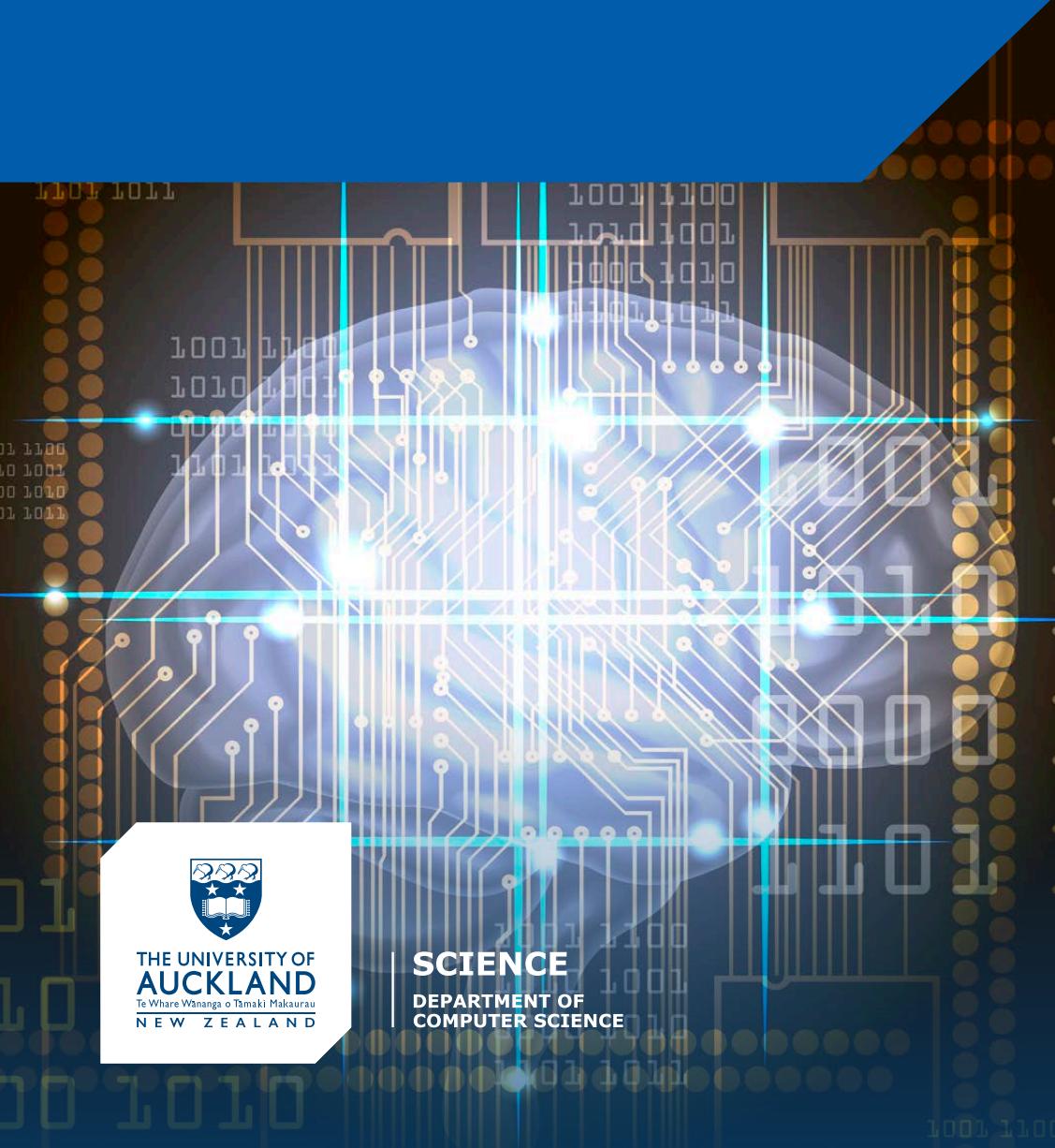


# Logic and Computation

Undergraduate Handbook 2018



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

**SCIENCE**  
DEPARTMENT OF  
COMPUTER SCIENCE

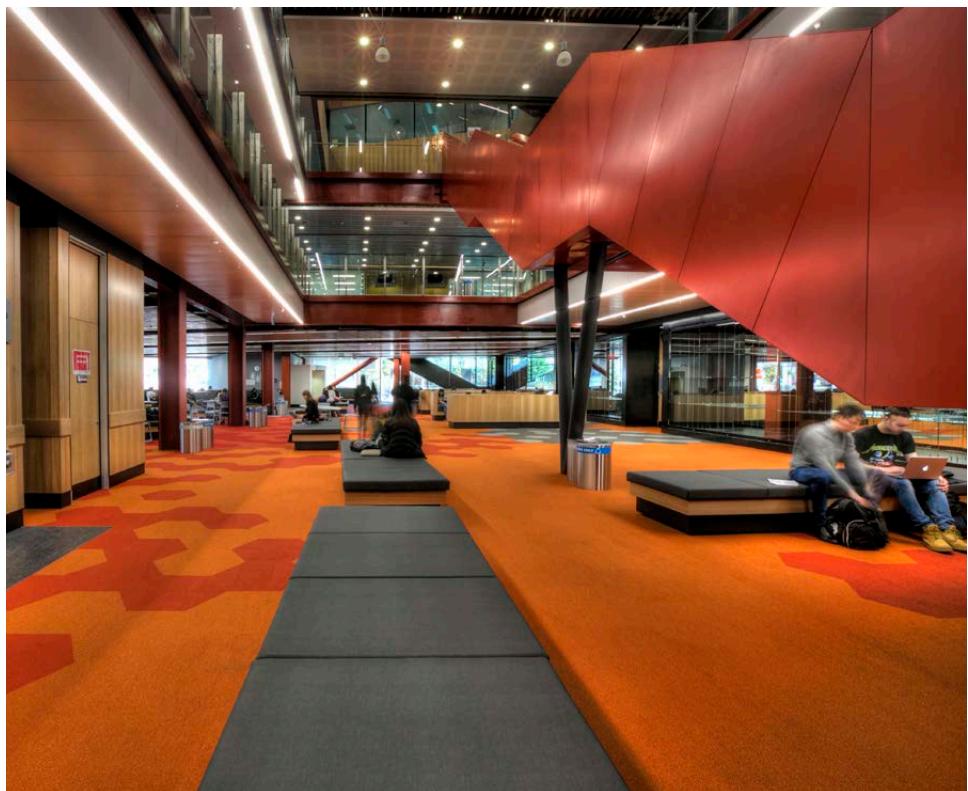
# Welcome to Logic and Computation

Studying a major in Logic and Computation means learning from multi-disciplinary experts in the Faculty of Arts and Faculty of Science. Logic is the focal point that allows you to investigate philosophical concepts and theoretical mathematics while learning concrete applications in computer science and linguistics.

Logic and Computation provides the link between theoretical thinking and real-world problems. You will acquire analytic and critical tools to investigate complex problems. Depending on the career you choose, you will learn the practical and theoretical skills that employers value, and gain a strong foundation for further multi-disciplinary research in Arts or Science.

We are very proud that you're interested in joining our programme, and we are excited to welcome you to the team.

PATRICK GIRARD, Senior Lecturer,  
JEREMY SELIGMAN, Senior Lecturer and  
ANDRÉ NIES, Professor



# Bachelor of Science in Logic and Computation

Logic and Computation is about symbolic systems used by humans and computers. It applies ideas and techniques from Computer Science, Philosophy, Mathematics and Linguistics to relate the structure of symbolic representation in human thought and computer software.

Logic and Computation is offered as a major of both the Bachelor of Science degree and the Bachelor of Arts degree. It is possible to take this specialisation to honours, postgraduate diploma and masters levels in both Science and Arts.

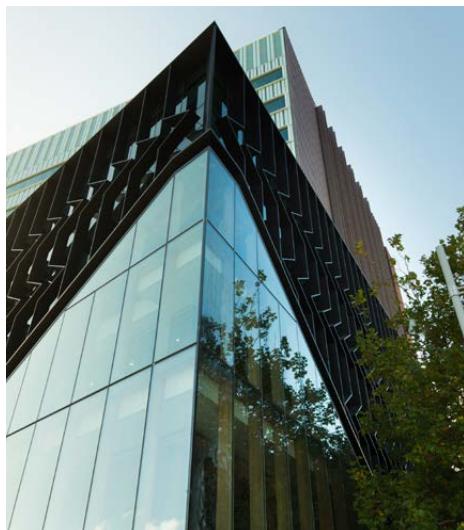
## Preparation for school leavers

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 more information, go to [www.science.auckland.ac.nz/subject-guide](http://www.science.auckland.ac.nz/subject-guide).

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)

[www.science.auckland.ac.nz/  
logic-and-computation](http://www.science.auckland.ac.nz/logic-and-computation)



## Complementary majors

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

### LOGIC AND COMPUTATION +

Applied Mathematics

Computer Science

Information Systems

Mathematics

Physics

Statistics

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

# BSc degree planner – Logic and Computation

## BSc

Year 1

COMPSCI  
101 or 107

PHIL  
101

YEAR 1  
ELECTIVE

With appropriate prerequisites can also be filled by Stage II or III.

### Year 1 elective:

COMPSCI 105, 220, 320, 350, 367,  
LINGUIST 100, 103, 200, 300, 313, 320,  
LOGICOMP 201, 300-302,  
MATHS 150, 250, 253, 255, 315, 326, 328,  
PHIL 105, 216, 222, 266, 305, 315, 323

Year 2

COMPSCI  
225

PHIL  
222

GEN ED

### Note:

1. Stage II COMPSCI courses require a GPA of 2.0 or higher.
2. COMPSCI 220 requires 15 points from MATHS 108, 110, 150 or 153.

Any Stage

Year 3

YEAR III  
CORE

YEAR III  
CORE

YEAR III  
CORE

YEAR III  
CORE

Stage III Science

GEN ED

Year III CORE: COMPSCI 320, 350, 367, LINGUIST 300, 313, 320, LOGICOMP 301, 302, MATHS 315, 326, 328, PHIL 305, 315, 323

1. Courses in a minimum of three subjects listed in the BSc Schedule
2. At least 180 points (12 courses) must be above Stage I
3. Up to 30 points (two courses) may be taken from outside the faculty
4. 30 points (two courses) must be taken from the appropriate General Education Schedules for BSc students
5. At least 75 points (five courses) must be at Stage III, of which 60 points (four courses) 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)

A major in Logic and Computation is a coherent group of related courses from Computer Science, Philosophy, Mathematics and Linguistics. Logic and Computation courses give you a sound practical knowledge of programming and conceptual analysis needed for deeper theoretical understanding of the subjects. Listed below are the courses in the Logic and Computation major and can be taken in any of the four main disciplines in the programme.

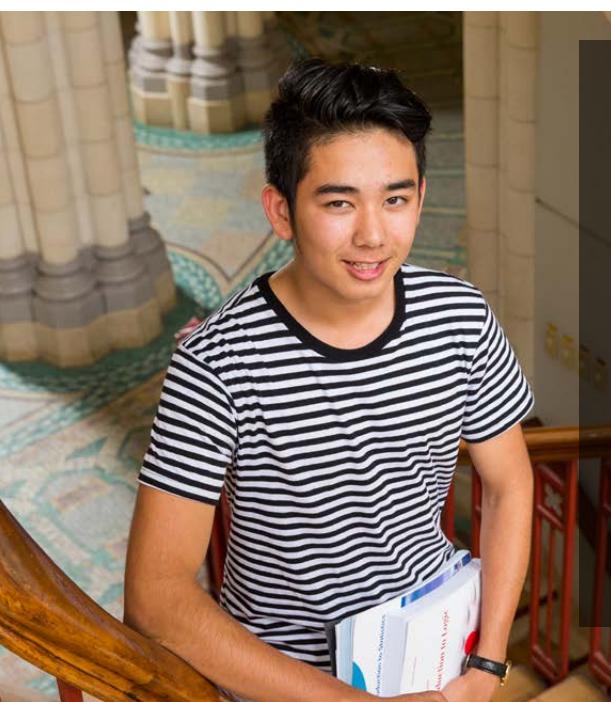
<b>Undergraduate Logic and Computation courses</b>	
<b>Course code</b>	<b>Title</b>
<b>Stage I</b>	
COMPSCI 101	Principles of Programming
COMPSCI 105	Principles of Computer Science
COMPSCI 107	Computer Science Fundamentals
LINGUIST 100	Introduction to Linguistics
LINGUIST 103	Introduction to English Linguistics
MATHS 150	Advancing Mathematics 1
PHIL 101	Introduction to Logic
PHIL 105	Critical Thinking
<b>Stage II</b>	
COMPSCI 220	Algorithms and Data Structures
COMPSCI 225	Discrete Structures in Mathematics and Computer Science
LINGUIST 200	Syntax
LOGICOMP 201	Special Topic
MATHS 250	Advancing Mathematics 2
MATHS 253	Advancing Mathematics 3
MATHS 255	Principles of Mathematics
PHIL 216	Modal Logic
PHIL 222	Intermediate Logic
PHIL 266	Games, Rationality and Choice
<b>Stage III</b>	
COMPSCI 320	Applied Algorithmics
COMPSCI 350	Mathematical Foundations of Computer Science
COMPSCI 367	Artificial Intelligence
LINGUIST 300	Syntax: Function and Typology
LINGUIST 313	Lexical Functional Grammar
LINGUIST 320	Topics in Pragmatics
LOGICOMP 301	Philosophy and Computation
LOGICOMP 302	Special Topic
MATHS 315	Mathematical Logic
MATHS 326	Combinatorics
MATHS 328	Algebra and Applications
PHIL 305	Advanced Logic
PHIL 315	Topics in Applied Logic
PHIL 323	Philosophy of Logic

For course descriptions and prerequisite information, go to  
[www.science.auckland.ac.nz/logic-and-computation](http://www.science.auckland.ac.nz/logic-and-computation)

# Careers in Logic and Computation

Can you imagine life without your smartphone, your computer, or your gaming console? Computing technology is everywhere in everyday life. Every industry is becoming more and more dependent on computing technology and the market for experts in that field continues to expand and diversify. Graduates who are adaptable and who have demonstrated skills in computing, analytical thinking and communication will always be in demand. The Logic and Computation programme can provide students with programming knowledge, problem solving, communication skills and the logical and critical thinking skills that are highly-valued and sought-after in the marketplace.

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		



*"I chose to study Logic and Computation because it seemed appropriate for the rapidly growing technological era that we are now in. I have always been inherently curious, and eager to learn about things like 'Siri' in the iPhone – and this is the perfect major to understand how the back end of voice command programmes like Siri and those in GPS systems work.*

*"Once I finish my degree, my goal is to move into a digital marketing and programming role in an innovative organisation. I believe that studying Logic and Computation will help to make that happen."*

**Asim Mughal** is studying toward a BSc/BCom conjoint degree majoring in Logic and Computation, Computer Science, Marketing and International Business.

# 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/rainbowscience](http://www.science.auckland.ac.nz/rainbowscience)

## 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 Logic and Computation?**

**[logic@auckland.ac.nz](mailto:logic@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)