Computer science

The study of computer science to 100 or 200-level provides students with sufficient skills to use computers effectively as a tool in other disciplines. The study of computer science to 300-level provides students with sufficient knowledge of computing principles and sufficient experience of computing practice to commence work as computing professionals, or, with sufficiently good results, to undertake the honours year. The honours year provides a further year of professional development for students planning industry-based careers and also serves as a foundation for students considering research careers.

A Bachelor of Computer Science (BCS) degree is available through the Faculty of Engineering. See the *Electrical Engineering and Computer Science (p.1)* entry of this Handbook for details.

Computer science as a science major is not available to students enrolled in the software engineering stream of the BE/BSc. These students will be required to complete a major in an alternative science discipline.

100-level

Undergraduate Programs Manager: Ms L Walker

The Department of Computer Science and Software Engineering offers four 100-level subjects. Students who intend to proceed to 200-level computer science must take either the pair 433-171 Introduction to Programming followed by 433-172 Algorithmic Problem Solving; or the pair 433-151 Introduction to Programming (Advanced) followed by 433-152 Algorithmic Problem Solving (Advanced).

Students not planning to take second-year subjects should take either 433-171 Introduction to Programming or 433-151 Introduction to Programming (Advanced).

Neither of the two introductory subjects 433-171 and 433-151 assume prior programming experience. However, students should note that 433-151 Introduction to Programming (Advanced) is intended for students who have attained a mark of 35 or more for Mathematical Methods 3/4 (or equivalent), and an ENTER of 90 or more (or equivalent). Students who fall outside these guidelines and who do not have prior programming experience should enrol in 433-171 Introduction to Programming instead.

The subject 615-145 Concepts in Software Development I contains material that overlaps with the content of 433-171 Introduction to Programming and 433-151 Introduction to Programming (Advanced), and credit may not be gained for more than one of these three subjects.

In addition to 25 points of computer science subjects, students planning to major in computer science must complete 25 points (two subjects) of study in the Department of Mathematics and Statistics. Students intending to proceed to 300-level study in computer science are also encouraged to complete the subject 431-102 Digital Systems 1: Fundamentals (non-science points).

200-level

Undergraduate Programs Manager: Ms L Walker

Subjects available in the Department of Computer Science and Software Engineering at 200-level include 433-252 Software Development Principles and Tools, 433-253 Algorithms and Data Structures, 433-254 Software Design, and 433-255 Logic and Computation. Students who have completed a 25 point sequence of computer science subjects, and 25 points of study in the Department of Mathematics and Statistics, are eligible to take all of these subjects.

Students planning to major in computer science must complete all of 433-252, 433-253, 433-254 and 433-255 in order to maximise their subject choices at 300-level.

Students intending to proceed with 300-level studies in computer science but not majoring in computer science are required to complete 433-252, 433-253, and 433-254.

Students who are intending to take some 200-level studies in computer science but are not continuing with 300-level studies in computer science are advised to enrol in either or both of the subjects 433-252 and 433-253. Subject 433-252 should be taken prior to, or concurrently with, 433-253. Students seeking an appreciation of the mathematical basis for computing to complement their studies in mathematics or linguistics may enrol in 433-255 as a single subject at the second-year level.

Students majoring in computer science and intending to proceed to BSc (Honours) in computer science are strongly advised to undertake study of mathematics and statistics at the second-year level, and are encouraged to complete the subject 431-102 Digital Systems 1: Fundamentals. The 12.5 point subject 431-102 must be taken as non-science points.

300-level

Undergraduate Programs Manager: Ms L Walker

The Department of Computer Science and Software Engineering offers the following 300-level subjects: 433-303 Artificial Intelligence, 433-313 Computer Design (additional prerequisite: 431-102), 433-330 Theory of Computation, 433-332 Operating Systems, 433-341 Software Engineering Process and Practice, 433-342 Software Engineering Methods, 433-343 Professional Issues in Computing, 433-351 Database Systems, 433-352 Data on the Web, 433-353 Networks and Communications, 433-361 Programming Language Implementation, 433-371 Interactive System Design, 433-380 Graphics and Computation, 433-393 Directed Study 3A and 433-394 Directed Study 3B. Note that 433-342, 433-343, 433-393 and 433-394 must be taken as non-science points. The subject 615-335 Distributed Systems will also be of interest to some students.

Students intending to major in computer science must complete at least four of 433-303, 433-313, 433-330, 433-332, 433-341, 433-351, 433-352, 433-353, 433-361, 433-371 and 433-380.

Students intending to proceed to 400-level computer science should note the minimum requirements for acceptance to BSc (Honours) listed below. These requirements are met by students who have completed a major in computer science.

Students enrolled in the BSc may take 400-level subjects only if they meet the prerequisites and have gained approval from the Department of Computer Science and Software Engineering. Such subjects must be taken as non-science points.

Bachelor of Science (Degree with Honours) and other 400-level options

Coordinator: Dr T Baldwin

Students who wish to consolidate their knowledge of computer science and who have completed a BSc with a major in computer science with an honours grade average in their third-year studies should consider undertaking the BSc (Honours) year. This involves two components: 433-401 Computer Science Research Project (37.5 points), and five 400-level advanced coursework subjects (62.5 points). Completion of the honours year serves as a preparation for postgraduate studies and an opportunity to strengthen practical skills before seeking industry employment. To be eligible for entry to the BSc (Honours) degree in computer science students must have:

- completed 50 points of 300-level computer science;
- passed the subject 433-255 Logic and Computation;
- passed at least 25 points of 100-level mathematics or statistics;
- satisfied the BSc (Honours) *Admission requirements (p.1)*.

Note:

- While 50 points of 300-level study in computer science is a minimum entry requirement for the BSc (Honours) program in computer science, students should note that the 400-level honours subjects offered by the department have individual prerequisites that may not be satisfied by some combinations of 50 points at 300-level. Students wishing to retain a wide range of options at the 400-level are advised to select at least four of 433-303, 433-330, 433-341, 433-351, 433-361 and 433-380 as part of their third-year program of study.
- Students should also note that study of mathematics or statistics at the second-year level is strongly recommended.
- Students from other institutions and other backgrounds should contact the honours coordinator to determine their eligibility for entry to the BSc (Honours) degree.

For further information about the honours program please refer to *Bachelor of Science (Degree with Honours) and Bachelor of Information Systems (Degree with Honours) (p.1)*.

The Department of Computer Science and Software Engineering also offers the Postgraduate Diploma in Science (Computer Science) for students from other backgrounds who need to take a program of study that includes some 300-level subjects. This is a one-year full-time program comprising six subjects (of which at most two may be at 300-level) and a 25-point research project. Details of the Postgraduate Diploma in Science appear in the Faculty of Science Postgraduate Handbook.

Suggested subjects

The recommended subject sequence for a BSc student intending to major in computer science is:

100-level subjects

- either 433-171 or 433-151 (12.5 points)
- either 433-172 or 433-152 (12.5 points)
- two or three 100-level subjects in mathematics and statistics (25 or 37.5 points)
- optional enrolment in 431-102 Digital Systems 1: Fundamentals (12.5 points, non-science)

- other 100-level science or non-science subjects to make up 100 points.

200-level subjects

- all of computer science 433-252, 433-253, 433-254, 433-255 (50 points)
- optional enrolment in two 200-level subjects in mathematics and statistics (25 points)
- other 100-level and 200-level subjects from the Department of Computer Science and Software Engineering or other departments in the Faculty of Science to make up 100 points.

300-level subjects

- At least four of 433-303, 433-313, 433-330, 433-332, 433-341, 433-351, 433-352, 433-353, 433-361, 433-371 and 433-380 (50 points)
- Other 200-level and 300-level subjects from the Department of Computer Science and Software Engineering or other departments in the Faculty of Science to make up 100 points, possibly including additional subjects from the list above, 433-343 (12.5 points, non-science) and 615-335 Distributed Systems.

400-level subjects

For a list of the 400-level subjects available in the BSc (Honours) degree, see *Bachelor of Science (Degree with Honours) and Bachelor of Information Systems (Degree with Honours) (p.1)*.

Double major in computer science and mathematics and statistics

Completion of the following subjects will lead to a major in computer science and a separate major in mathematics and statistics with a specialisation in discrete mathematics. Both Departments have endorsed the following recommend subject sequence.

First year

433-171 Introduction to Programming (or advanced version 433-151)

433-172 Algorithmic Problem Solving (or advanced version 433-152)

620-141 Mathematics A (or advanced version 620-121)

620-142 Mathematics B (or advanced version 620-122)

620-143 Applied Mathematics (or advanced version 620-123)

620-131 Scientific Programming and Simulation

Plus two additional subjects

Second year

433-252 Software Engineering Principles and Tools

433-253 Algorithms and Data Structures

433-254 Software Design

433-255 Logic and Computation

620-201 Probability

620-222 Linear and Abstract Algebra

620-261 Introduction to Operations Research

620-262 Decision Making

Third year

433-303 Artificial Intelligence

433-330 Theory of Computation

433-352 Data on the Web

620-352 Graph Theory

620-353 Discrete Mathematics

620-381 Computational Mathematics

Plus one other 300-level Mathematics and Statistics subject and one other 300-level Computer Science subject. Suggestions include 620-361, 620-351, 620-362, 620-374, 433-380, 433-361.

Further information

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Subject descriptions

The subjects listed below are regarded as science subjects for the BSc and BASc, and BSc combined degree students. Each subject is worth 12.5 points.

100-level subjects

433-151 Introduction to Programming (Advanced)
See full subject details on page 16.

433-152 Algorithmic Problem Solving (Advanced)
See full subject details on page 17.

433-171 Introduction to Programming
See full subject details on page 17.

433-172 Algorithmic Problem Solving
See full subject details on page 17.

200-level subjects

433-252 Software Engineering Principles & Tools
See full subject details on page 17.

433-253 Algorithms and Data Structures
See full subject details on page 17.

433-254 Software Design
See full subject details on page 17.

433-255 Logic and Computation
See full subject details on page 18.

300-level subjects

433-303 Artificial Intelligence
See full subject details on page 18.

433-313 Computer Design
See full subject details on page 18.

433-330 Theory of Computation
See full subject details on page 18.

433-332 Operating Systems
See full subject details on page 18.

433-341 Software Engineering Process & Practice
See full subject details on page 19.

433-351 Database Systems
See full subject details on page 19.

433-352 Data on the Web
See full subject details on page 19.

433-353 Networks and Communications
See full subject details on page 19.

433-361 Programming Language Implementation
See full subject details on page 19.

433-371 Interactive System Design
See full subject details on page 20.

433-380 Graphics and Computation
See full subject details on page 20.