



JAMES COOK  
UNIVERSITY  
SINGAPORE

Celebrating  
**20**  
YEARS  
2003-2023

# Science

Bachelor of **Science (Majoring in Data Science)**  
Bachelor of **Science (Majoring in Aquaculture Science and Technology)**  
Bachelor of **Science (Majoring in Internet of Things)**



**1 university • 2 countries • 4 distinct locations**

Creating a brighter future for life in the Tropics and beyond, through education and research that makes a difference locally, and globally.

Brisbane | Cairns | Singapore | Townsville

# The Singapore campus of James Cook University

Established in 2003

The Singapore campus of James Cook University is fully owned by James Cook University Australia, which is ranked in the top 2% of universities in the world<sup>1</sup>. James Cook University Australia established its Singapore campus in 2003 as part of its expressed intent of internationalising its activities and offers a suite of university level programs at the Singapore campus covering the areas of Business, Information Technology, Psychology, Education, Science, Commerce, Accounting, Aquaculture, Environmental Science, Games Design, Tourism and Hospitality.

James Cook University offers Higher Degree by Research programs such as Doctor of Philosophy, Master of Philosophy and pathways to a higher degree.

Additionally, the campus offers courses at the pre-university level, specifically designed to provide pathways for students who are unable to immediately meet university entrance standards.

The Singapore campus of James Cook University is located at Sims Drive. The campus provides students with access to a full range of facilities and services to support their learning. These include lecture and seminar rooms, library and associated study facilities, computer laboratories, aquaculture research and teaching facility, financial lab and access to a variety of sporting facilities.

## James Cook University Inter-campus Exchange Program\*

James Cook University provides the opportunity for students to study in Singapore and in Australia and yet still remain as Singapore based students paying their fees in Singapore currency. This is a unique program designed to ensure that the students get the best possible outcomes from their years of study with the university, which operates across two countries.

## EduTrust Star

James Cook University has the highest level of quality assurance in Singapore for Private Education Institutions. This is known as EduTrust Star and is a symbol of recognition for outstanding achievement. EduTrust Star is awarded to those institutions for attaining a commendable level of performance in managing

their institutions and providing an outstanding quality of education and welfare for their students.

James Cook University is the first organisation with EduTrust Star. By obtaining this award for the third time in 2023, James Cook University has displayed its commitment and focus as a student centric educational institution.

## SQC STAR

James Cook University has also been awarded the Singapore Quality Class STAR (SQC STAR). The SQC STAR recognises SQC organisations that have made further improvement in their business excellence journey.

## Tropical Futures Institute

Given that research is a core component of the university, James Cook University established the Tropical Futures Institute to leverage off the university's research capability and strength and that creates substantive value-add to the research ecosystems of Singapore and the ASEAN region. The Tropical Futures Institute is the first research institute established by an Australian university in Singapore.

## James Cook Academy

Established in 2021, James Cook Academy is a wholly-owned subsidiary of James Cook University in Singapore, and marks the University's entry into Continuing Professional Development (CPD). This includes short courses and training programs in Industry 4.0 and areas that fit the needs of the Singapore workforce and community.

In support of this mission, James Cook Academy has acquired Eagle Infotech — which offers a wide range of short courses in information technology, digital marketing, communication, and more — to help working adults upgrade their skills and remain relevant and employable in today's ever-changing world.

James Cook Academy will support Eagle Infotech to further diversify its course offerings and delivery modes to deliver flexible and personalised programs, and will collaborate with industry partners and leverage EdTech to grow the CPD business in Singapore and the region.

<sup>1</sup> 2023 Times Higher Education World University Rankings and 2022 ShanghaiRanking Academic Ranking of World Universities as a percentage of higher education providers in the International Association of Universities (IAU) database

\* Terms and conditions apply



Cert No. : EDU-1-1001  
Validity : 10/04/2023 - 09/04/2027

SINGAPORE  
QUALITY CLASS  
STAR★





*James Cook University's science program is a leader in discovering innovative solutions to complex problems. Our lecturers empower students to discover, explore and pioneer innovative solutions through a strong focus on building hands-on, practical skills.*

Note: International students in Singapore on a Student Pass are not permitted to work. For more information please visit [www.ica.gov.sg](http://www.ica.gov.sg)

James Cook University is EduTrust Certified. The EduTrust certification scheme is administered by the Committee for Private Education (CPE), a part of SkillsFuture Singapore (SSG). EduTrust requires all students to be covered under a Fee Protection Scheme. In James Cook University, this is provided through Fee Protection Scheme Group Insurance. All students from James Cook University are covered hospitalization, surgery and treatment costs in accordance to insurance policy term and conditions under the Group Hospitalisation and Surgical insurance scheme. James Cook University will advise in the Standard Student Contract the total amount of insurance payable.

For more details please visit the Committee for Private Education (CPE), a part of SkillsFuture Singapore (SSG) website: [www.ssg.gov.sg/cpe/pei.html](http://www.ssg.gov.sg/cpe/pei.html)

# Bachelor of Science (Majoring in Data Science)

Data and analytics capabilities have made a leap forward in recent years. The volume of available data has grown exponentially, more sophisticated algorithms have been developed, and computational power and storage have steadily improved. Career opportunities in data science, big data and analytics are growing dramatically. Data scientists work in every industry – from defence departments to internet start-ups and financial institutions – and tackle big data projects on every level. They are among the most sought-after jobs in the tech world today.

Graduates of the Bachelor of Science at James Cook University will be able to:

- Integrate and apply a coherent body of theoretical and technical knowledge, including underlying concepts and principles, within the domain of data science
- Critically appraise the role and relevance of science in society, particularly in creating sustainable futures in the tropics, worldwide
- Demonstrate broad understanding of the methods of science, including the creative processes involved in developing scientific knowledge, and its contestable and testable nature
- Retrieve, analyse, synthesise and evaluate information from a range of sources
- Plan and conduct reliable, evidence-based laboratory and/or field experiments by selecting and applying methods, techniques and tools, as appropriate to one or more science disciplines
- Organise, analyse and interpret scientific data using mathematical, statistical and technological skills
- Convey scientific ideas, arguments and conclusions clearly and coherently through well-developed written and oral communication skills and a variety of media
- Identify, analyse and generate solutions to unpredictable or complex problems by applying scientific knowledge and skills with initiative and well-developed judgment
- Critically review regulatory requirements, ethical principles and, where appropriate, cultural frameworks, to work effectively, responsibly and safely in diverse contexts

- Reflect on current skills, knowledge and attitudes to manage their professional learning needs and performance, autonomously and in collaboration with others

## Study Program

Students are required to complete 24 subjects as per following:

### 7 Core Subjects

Preparatory Chemistry  
Preparatory Mathematics  
Science, Technology and Truth  
Modelling Natural Systems  
Quantitative Methods in Science  
Professional Placement or Special Topics 1

### 1 subject (Also known as skill subjects)

Database Modelling  
Introduction to Geographic Information Systems  
Mathematics for Scientists and Engineers  
Linear Algebra  
Data Visualisation  
Sensors and Sensing for Scientists

### + 8 Major Subjects

Foundations of Data Science  
Mathematical Foundations  
Advanced Statistical Modelling  
Statistical Data Mining for Big Data  
Natural Language Processing, Web Scraping and Large Data Processing  
Neural Network and Deep Learning  
or Optimisation and Operations Research

### 2 Subjects

Database Modelling  
Linear Algebra  
Discrete Mathematics  
Data Visualisation

### + 9 additional electives

### 2 subjects (Also known as breadth subject)

Problem Solving and Programming I  
Programming II

### 3 subjects (Level 2, 3 or 5 Science subjects)

### 2 subjects (Level 1, 2, 3 or 5 subjects)

### 2 subjects (Level 3 or Level 5 subjects)



# Entry Requirements

## Entry Requirements

- The entry requirements differ from country to country but in general applicants must have satisfactorily completed 12 years of schooling or equivalent
- Successful completion of the James Cook University Foundation Program will also satisfy the entry requirement

## Pre-requisite

- Assumed Knowledge: English (Units 3/4,C), Mathematical Methods (3/4,C); or equivalent
- Recommended: At least one of Biology, Chemistry, Earth and Environmental Science, Geography, Marine Science, Specialist Maths or Physics (Units 3/4,C); or equivalent
- Applicants who have not completed high school intermediate level (or equivalent) Mathematics B (or equivalent) must select MA1020: Preparatory Mathematics as part of their study plan to successfully complete the Bachelor of Science

## English Requirements

- Applicants of non-English speaking backgrounds must meet the English language proficiency requirements of IELTS 6 (no component lower than 6.0) / TOEFL (Internet Based) 74 (no component less than 18) / Pearson PTE Academic 52 (no component less than 52); or
- Satisfactory completion of James Cook University Singapore English Language Preparatory Program (ELPP); or
- Successful completion of other qualifications completed in English Language deemed comparable to Australian standards on a case-by-case basis in accordance to JCU admissions guidelines.

## Advanced Standing

- Students may apply for credit transfer for previous tertiary study in accordance with the Credit Transfer Procedure. Maximum advanced standing up to 48 credit points within the last two years on a case-by-case basis

**Duration:** 2 years full time

3 years part time

**Course Structure:** 3 trimesters per year

**Intakes:** March, July, November

**Total Tuition Fees (2023):** S\$64,800 (International)  
S\$62,208 (Domestic)\*

*\*Fees apply to all Singapore residents (Singapore Citizens, Permanent Residents and all pass holders excluding those holding a Student Pass).*

### Note:

- All course fees include the corresponding Singapore Goods and Services Tax (GST), which is 8% in 2023.
- There will be an increase of GST in 2024 to 9%, hence this will affect the total tuition fees.
- The details of the instalment breakdown will be provided in your Student Contract. Please contact us for further details.

## Career Prospects:

Possible careers graduates in the Bachelor of Science majoring in data Science can look forward to include the following:

- Data Engineer
- Data Analyst
- Data Scientist
- Data Architect
- Business Intelligence Analyst
- Data Analyst Manager



# Bachelor of Science

## (Majoring in Aquaculture Science and Technology)

**Breeding, rearing, and harvesting of fish, shellfish, and aquatic plants is the main objective of Aquaculture. This is an increasingly important area for developing a sustainable, food secure, future. Ensuring a consistent supply of food and associated products for human consumption, while also helping in the preservation of species in the wild, is key to solving real world problems. Throughout this major, students will explore the scientific and practical applications of breeding, rearing and harvesting of plants and animals in all types of water environments. You will understand the biodiversity of species and how they are farmed, the design of aquaculture systems, and the basics of nutrition.**

Graduates of the Bachelor of Science at James Cook University will be able to:

- Integrate and apply a coherent body of theoretical and technical knowledge, including underlying concepts and principles, within the domain of data science
- Critically appraise the role and relevance of science in society, particularly in creating sustainable futures in the tropics, worldwide
- Demonstrate broad understanding of the methods of science, including the creative processes involved in developing scientific knowledge, and its contestable and testable nature
- Retrieve, analyse, synthesise and evaluate information from a range of sources
- Plan and conduct reliable, evidence-based laboratory and/or field experiments by selecting and applying methods, techniques and tools, as appropriate to one or more science disciplines
- Organise, analyse and interpret scientific data using mathematical, statistical and technological skills
- Convey scientific ideas, arguments and conclusions clearly and coherently through well-developed written and oral communication skills and a variety of media
- Identify, analyse and generate solutions to unpredictable or complex problems by applying scientific knowledge and skills with initiative and well-developed judgment
- Critically review regulatory requirements, ethical principles and, where appropriate, cultural frameworks, to work effectively, responsibly and safely in diverse contexts

- Reflect on current skills, knowledge and attitudes to manage their professional learning needs and performance, autonomously and in collaboration with others

## Study Program

Students are required to complete 24 subjects as per following:

### 7 Core Subjects

Preparatory Chemistry  
Preparatory Mathematics  
Science, Technology and Truth  
Modelling Natural Systems  
Quantitative Methods in Science  
Professional Placement or Special Topics 1

### 1 Subject (Also known as skill subjects)

Database Modelling  
Introduction to Geographic Information Systems  
Mathematics for Scientists and Engineers  
Linear Algebra  
Data Visualisation  
Sensors and Sensing for Scientists

### + 8 Major Subjects

Introduction to Biological Processes  
Introduction to Biodiversity  
Evolution  
Diagnosis of Bacterial Diseases in Aquaculture  
Introduction to Aquaculture  
Aquaculture: Feeds and Nutrition  
Sustainable Aquaculture

### 1 Major Elective Subject

Aquaculture: Propagation  
Aquaculture: Stock Improvement

### + 9 Elective Subjects

### 2 subjects (Also known as breadth subject)

Problem Solving and Programming I  
Programming II  
Evolution of the Earth  
Environmental Processes and Global Change  
Mathematical Foundation  
Mathematical Techniques  
Foundations of Data Science

### 3 subjects (Level 2, 3 or 5 Science subjects)

### 2 subjects (Level 1, 2, 3 or 5 subjects)

### 2 subjects (Level 3 or Level 5 subjects)

# Entry Requirements

## Entry Requirements

- The entry requirements differ from country to country but in general applicants must have satisfactorily completed 12 years of schooling or equivalent
- Successful completion of the James Cook University Foundation Program will also satisfy the entry requirement

## Pre-requisite

- Assumed Knowledge: English (Units 3/4,C), Mathematical Methods (3/4,C); or equivalent
- Recommended: At least one of Biology, Chemistry, Earth and Environmental Science, Geography, Marine Science, Specialist Maths or Physics (Units 3/4,C); or equivalent
- Applicants who have not completed high school intermediate level (or equivalent) Mathematics B (or equivalent) must select MA1020: Preparatory Mathematics as part of their study plan to successfully complete the Bachelor of Science

## Career Prospects:

Possible careers graduates in the Bachelor of Science majoring in Aquaculture Science and Technology can look forward to include the following:

- Hatcheries management
- Stock nutrition programs and management
- Fresh water and marine farming
- Aquaculture research and development

## English Requirements

- Applicants of non-English speaking backgrounds must meet the English language proficiency requirements of IELTS 6 (no component lower than 6.0) / TOEFL (Internet Based) 74 (no component less than 18) / Pearson PTE Academic 52 (no component less than 52); or
- Satisfactory completion of James Cook University Singapore English Language Preparatory Program (ELPP); or
- Successful completion of other qualifications completed in English Language deemed comparable to Australian standards on a case-by-case basis in accordance to JCU admissions guidelines.

## Advanced Standing

- Students may apply for credit transfer for previous tertiary study in accordance with the Credit Transfer Procedure. Maximum advanced standing up to 48 credit points

**Duration:** 2 years full time

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Note:

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# Bachelor of Science (Majoring in Internet of Things)

The curriculum of this major equips scientists for the rapidly expanding world of sensors and data. Graduates will solve complex problems by applying technology to collect and analyse information from a wide range of sources. The main topics of study include electronics, programming, sensors, and statistics. Graduates will apply knowledge of the physical principles of sensors and electronics, in conjunction with software programming and data science skills, to build evidence-based analyses of their chosen application areas. Furthermore, they will critically appraise the benefits, risks and implications of technology in society.

Graduates of the Bachelor of Science at James Cook University will be able to:

- Integrate and apply a coherent body of theoretical and technical knowledge, including underlying concepts and principles, within the domain of data science.
- Critically appraise the role and relevance of science in society, particularly in creating sustainable futures in the tropics, worldwide
- Demonstrate broad understanding of the methods of science, including the creative processes involved in developing scientific knowledge, and its contestable and testable nature

- Retrieve, analyse, synthesise and evaluate information from a range of sources
- Plan and conduct reliable, evidence-based laboratory and/or field experiments by selecting and applying methods, techniques and tools, as appropriate to one or more science disciplines
- Organise, analyse and interpret scientific data using mathematical, statistical and technological skills
- Convey scientific ideas, arguments and conclusions clearly and coherently through well-developed written and oral communication skills and a variety of media
- Identify, analyse and generate solutions to unpredictable or complex problems by applying scientific knowledge and skills with initiative and well-developed judgement
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Completion of this major is also intended to provide students with the opportunity to articulate into the Bachelor of Engineering (Hons) (Electronic Systems and Internet of Things major) at the Cairns campus and complete the Bachelor of Engineering with only two additional years of full time study.





# Study Program

Students are required to complete 24 subjects as per following:

## 7 Core Subjects

Preparatory Chemistry  
Preparatory Mathematics  
Science, Technology and Truth  
Modelling Natural Systems  
Quantitative Methods in Science  
Professional Placement or Special Topics 1

### 1 Subject (Also known as skill subjects)

Database Modelling  
Introduction to Geographic Information Systems  
Mathematics for Scientists and Engineers  
Linear Algebra  
Data Visualisation  
Sensors and Sensing for Scientists

## + 8 Major Subjects

Introduction to Microcontroller Programming  
Electric Circuits  
Internet of Things Devices and Software  
Circuit Theory  
Advanced Statistical Modelling  
Internet of Things Systems and Security  
Sensor Technologies  
Statistical Data Mining for Big Data

## + 9 Elective Subjects

### 2 subjects (Also known as breadth subject)

Introduction to Biological Processes  
Chemistry: A Central Science  
Chemistry: Principles and Applications  
Problem Solving and Programming I  
Programming II  
Engineering 1  
Environmental Processes and Global Change  
Mathematical Foundations  
Mathematical Techniques  
Foundations of Data Science

### 3 subjects (Level 2, 3 or 5 Science subjects)

### 2 subjects (Level 1, 2, 3 or 5 subjects)

### 2 subjects (Level 3 or Level 5 subjects)

**Duration:** 2 years full time  
4 years part time

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## Career Outcome:

Graduates will be ready for different entry level jobs in this growing industry including, for example:

- IOT Developer
- IOT Architect
- IOT Embedded Systems Designer
- IOT Solutions Engineer





# Entry Requirements

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## Advanced Standing

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Your Local Representative:

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— James Cook University —

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James Cook University Australia offers pathway, undergraduate and postgraduate at the Singapore campus of James Cook University.  
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