Data Science

Propel your career through world-class learning

JAMES COOK UNIVERSITY
AUSTRALIA

DESIGNED ALONGSIDE INDUSTRY

TOP 2% OF THE WORLD'S UNIVERSITIES

5 STARS FOR SKILLS DEVELOPMENT

This brochure contains information on:

- **Master of Data Science**
- **Graduate Diploma of Data Science (IoT)**
- **Graduate Diploma of Data Science**
- **Graduate Certificate of Data Science**

online.jcu.edu.au

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The online student experience at JCU

Personalised support from your Student Success Advisors

Benefit from the support of a one-on-one Student Success Advisor during your online degree. Along with your tutors, your Student Success Advisor is there for you from your first day as a student with JCU Online. They are readily available to help you navigate your online degree and keep you motivated throughout your course.

Interactive learning environment

JCU's interactive, immersive online environment enhances the learning experience. Video, audio, forums and practical exercises created by leading data scientists suit a wide range of personal learning styles and help learning come to life.

The opportunity to connect with academics and collaborate with fellow students – regardless of location – means you'll build a professional network, without having to leave your lounge room.

Qualify from a world-class university

JCU is ranked in the top 2% of global universities and has five stars for graduate job success and full-time employment (Good Universities Guide).

Career Opportunities with JCU Online Data Science

Data science is one of the world's fastest growing sectors, mirroring the incredible pace of evolution in data and the need to find value in the data. A 2019 article from the Wharton Business School, 'What's driving the demand for data scientists?', demonstrated how qualified data scientists are in strong demand across every industry from health, research, marketing, retail, finance, manufacturing, IT and user design to professional and scientific services.

The demand for data scientists has grown 15–20 times in three years across all sectors and is expected to continue this rapid growth. There is an increasing need for qualified and capable professionals who can create the models and shape the systems that capture and analyse the right data, then turn it into value.

JCU Online offers two Master qualifications, two Graduate Diplomas and a Graduate Certificate in Data Science. Each course has been designed with input from industry leaders to ensure you get the hands-on skills and high-level knowledge that will seperate you from other data scientists.
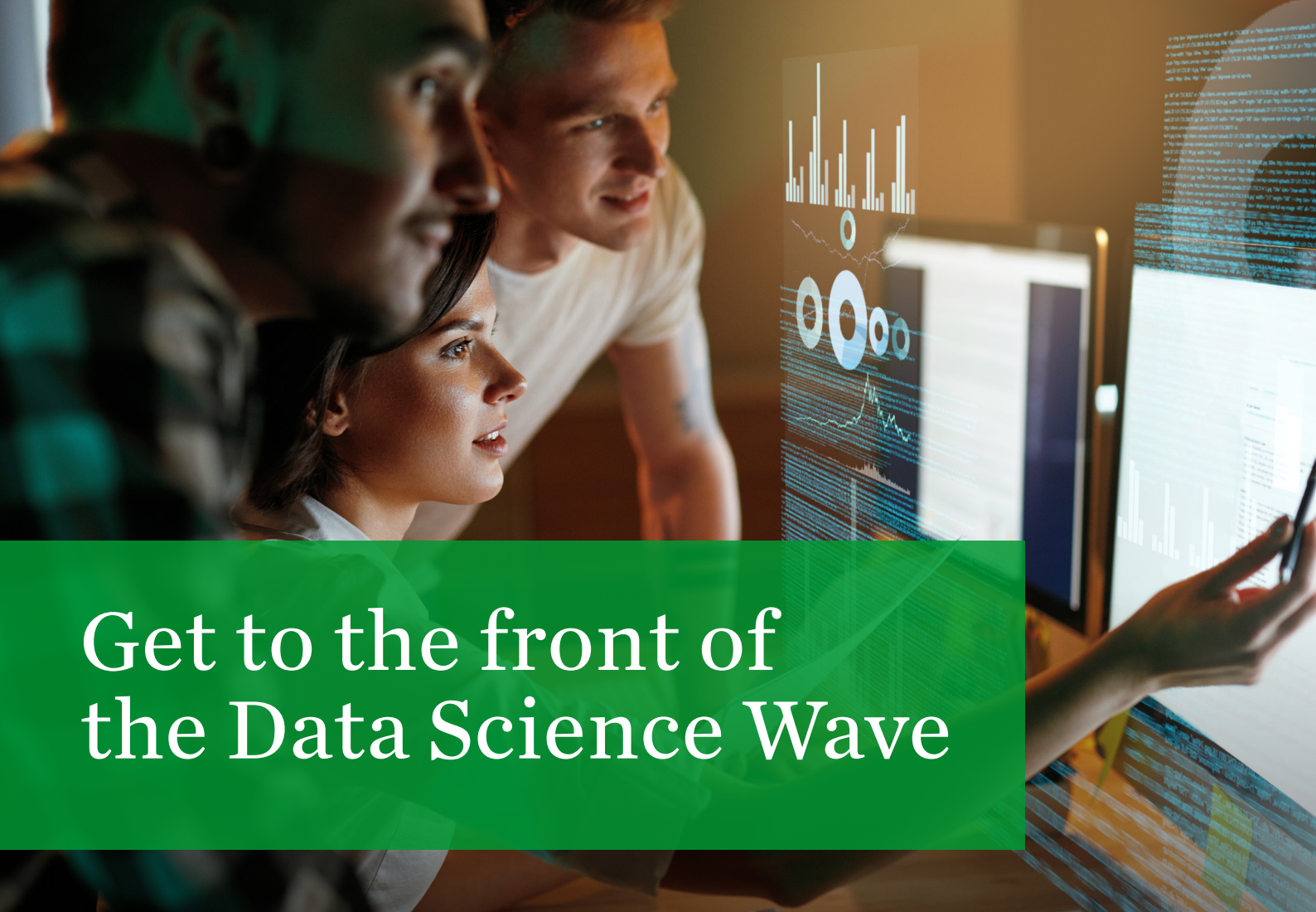
Get to the front of the Data Science Wave

Position yourself for success with a JCU Online Master of Data Science – a higher degree that will put you at the forefront of the data science revolution.

Masters-qualified data scientists command high salaries

Top-level data scientists earn a median salary of

$240,000 p/a

The need for data scientists is global and intensifying

Annual demand for data scientists has a projected increase of

12%(near-term)

Roles are varied and in demand

Data Scientist, Business Analyst, AI Developer, Machine Learning Scientist, and more

Master of Data Science

A Master of Data Science from JCU Online will provide you with sophisticated skills and knowledge that will open up a wealth of opportunities in today's data-driven world. The course takes you beyond the textbook and into the real world by providing a deep understanding of how data informs business strategy.

As companies look to unlock the secrets hidden in data, demand for data science professionals who can mine data to deliver valuable business solutions will only increase.

You will gain skills in Programming (Python and R), Visualisation (Tableau) and Cloud platforms like AWS. The course is also SAS Certified.

Graduate Diploma of Data Science (IoT specialisation)

This Graduate Diploma gives you the specialist skills to create the end-to-end data ecosystems that redefine the way the world works and interacts. From human-centric smart devices to large infrastructural smart networks, you'll gain the skills to grow your career in rapidly expanding field.

Graduate Diploma of Data Science

The Graduate Diploma of Data Science helps you fast-track a career shift or career advancement. You gain immediately applicable skills and a clear understanding of the tools and frameworks you'll need to grow in whatever area of this diverse field you choose.

Graduate Certificate of Data Science

The Graduate Certificate of Data Science gives you immediately applicable data science skills and is a great foundation for moving into a data science career, and as a stepping stone towards higher qualifications.

An opportunity to specialise in IoT

The Internet of Things (IoT) connects the fabric of the world through improved human-machine interactions, enhanced data management and analytics. This is driving smarter, more informed decisions for businesses, industries and governments.

A 2019 report by Boston Consulting Group and Microsoft, Beyond predictive maintenance, The "Art of the Possible" with IoT, shows how the IoT market is projected to grow more than 30% a year over the next few years.

A Graduate Diploma in Data Science (IoT) from JCU helps you carve out a career in this booming field by giving you the skills to design end-to-end IoT ecosystems, integrate AI with IoT into an analytics pipeline, collect relevant data and enable the analysis of the data to inform and drive more effective and insightful strategies for businesses and governments.

Career opportunities in IoT

Businesses are demanding professionals with provable IoT skills in Computer Network and Systems Engineering, Program Development, Software and Applications Programming, Engineering Management, and more.

The advantage of studying Data Science at JCU

Want to take a faster career step in a research or corporate environment?

A 100% online degree in Data Science from JCU is your ticket to a bigger career in one of the fastest growing professions worldwide.

- 100% online learning – study to your own timetable with no on-campus classes or exams

- Qualify sooner with one of Australia's fastest part-time Master of Data Science Degrees

- Upskill now and capitalise on the data science revolution

Gain the skills industry needs

Including Programming (Python and R), Visualisation (Tableau) and Cloud platforms like AWS.

Increased Employability

Differentiate yourself from other Data Scientists with a strong theoretical focus on real-world understanding of how data informs business strategy.

Proven capability

Capstone projects and masterclasses build a career-ready portfolio, help you gain experience in solving real-world problems and prove your skills.

One of Australia's fastest part-time Masters

Unlike traditional on-campus degrees, at JCU Online you can complete six subjects each year. This means you can complete more subjects per year, making it one of the fastest part-time Masters degrees in this field in Australia.

Qualify-as-you-go study options

Build towards your Masters through flexible entry points and 'qualify-as-you-go' through our nested qualifications; gain a Graduate Certificate of Data Science after completing four subjects and a Graduate Diploma of Data Science after completing eight subjects.

Learn from an exceptional teaching staff

JCU's teaching staff have years of experience in research, academia and importantly, industry. Delivered by highly respected and award-winning academics*, this interdisciplinary approach boosts your skills in real-world situations. In a fast-paced field like data science, you can be confident JCU's teaching staff have their fingers firmly on the pulse.

Course details

	Total Subjects	Subject Duration	Total Course Duration (Minimum)*	Total Fees**
Master of Data Science	12 subjects	7 weeks per subject	24 months part-time	$45,288
Graduate Diploma of Data Science (IoT)	8 subjects	7 weeks per subject	16 months part-time	$30,192
Graduate Diploma of Data Science	8 subjects	7 weeks per subject	16 months part-time	$30,192
Graduate Certificate of Data Science	4 subjects	7 weeks per subject	8 months part-time	$15,096

^ All prices listed are in Australian dollars

* Duration dependent on individual study path and subject availability. Please speak to an Enrolment Advisor for more information

** Fees shown are indicative of 2024 prices

Course intakes:

Enrol to study in January, March, May, July, September or October
View academic calendar

FEE-HELP:

FEE-HELP is a government-supported loan scheme available for eligible students to help with some or all of your tuition costs. Some conditions do apply.

To check your eligibility, feel free to speak with a Student Enrolment Advisor today.

Recognition of Prior Learning (RPL):

If you already have a data, maths or science qualification or have significant industry experience, these can count as credit towards your online postgraduate studies.

As long as your qualifications or experience match the course requirements, this can reduce the overall time required to complete your degree.

To see if you're eligible, please speak with a Student Enrolment Advisor today.

Course structure

JCU Online's courses in Data Science are innovative, fully online courses that put professionals who recognise the power of data and numbers ahead of the pack, in one of the world's most in-demand sectors.

These programs will provide you with sought-after, advanced skills in data science and will prepare you for a future career in a research or business environment.

Master

Graduate Diploma

Graduate Certificate

Subjects

- Foundations for Data Science

- Database Systems

- Data Visualisation

- Statistical Methods for Data Science

- Programming and Data Analytics using Python

- Introduction to Data Mining

- Visual Analytics for Data Scientists using SAS

- Essential Mathematics for Data Scientists

- Advanced Data Management and Analysis using SAS

- Data Science and Strategic Decision Making

- Data Mining and Machine Learning

- Data Science Master Class 1

Graduate Diploma of Data Science (IoT) structure

Graduate Diploma

Graduate Certificate

- Foundations for Data Science

- Database Systems

- IoT Communication Systems

- Statistical Methods for Data Science

- IoT Edge Devices

- Introduction to Data Mining

- Data Visualisation

- IoT Security and Cloud Computing

Have questions?
Book a quick 15-minute call with an Enrolment Advisor or chat with us online

Schedule a call

Chat online

Entry requirements

Master

A Bachelor degree (whilst not a prerequisite for entry, high numeracy skills equivalent to senior level mathematics that includes algebra and elementary differential calculus is assumed); **OR**

At least five years of relevant work experience in an IT or Data Science related industry. Industry experience will need to include some background in computing, data analysis or programming. Application based on relevant industry experience must be supported by a detailed CV and proof of work experience.

Graduate Diploma & Graduate Diploma (IoT)

A Bachelor degree, plus high school intermediate level mathematics (basic algebra and differential calculus)*; or at least five years of relevant work experience (high numeracy skills); **OR**

A Bachelor degree in a relevant discipline (mathematics, statistics, physics, IT, computer science, engineering); **OR**

A Graduate Certificate of Data Science.

Graduate Certificate

A Bachelor degree, plus high school intermediate level mathematics (basic algebra and differential calculus)*; or at least five years of relevant work experience (high numeracy skills)

Inherent requirements

Inherent requirements are the identified abilities, attributes, skills, and behaviours that must be demonstrated, during the learning experience, to successfully complete a **course.** These abilities, attributes, skills, and behaviours preserve the academic integrity of the University's learning, assessment, and accreditation processes, and where applicable, meet the standards of a profession
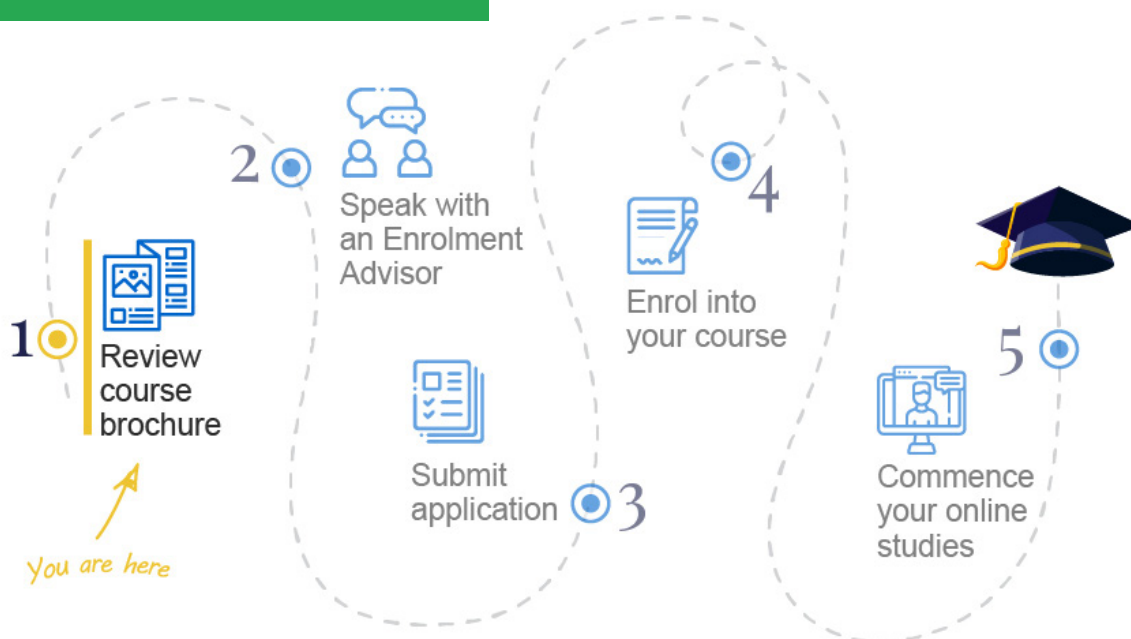
All JCU students have the opportunity to demonstrate, with reasonable adjustments where applicable, the inherent requirements for their course.

English language requirements

Applicants of non-English speaking backgrounds must meet the English language proficiency requirements of **Band 2 – Schedule II of the JCU Admissions Policy.**

*JCU offers a specified online mathematics subject, which can be completed prior to application if you do not currently meet the mathematical entry requirement level.

Next steps

1 Review course brochure
You are here

2 Speak with an Enrolment Advisor

3 Submit application

4 Enrol into your course

5 Commence your online studies

Get our help:

After you have read this brochure, the next step is to make sure online postgraduate study is right for you. Our friendly team of Enrolment Advisors are here to ensure you enrol in the course that aligns best with your goals. They will be with you every step of the way from application to enrolment, to make sure that your postgraduate study journey has a smooth start.

Our Enrolment Advisors will help you:

- Learn more about the course.
- Decide whether this course will help you reach your goals.
- Determine your eligibility for the course.
- Answer questions about your application.
- Offer support throughout the application process and more.

"We have a deep understanding of the admissions and enrolment process and can help students at every step to have a smooth start. In addition to this, we can also help students to choose the right course like Graduate Certificate, Graduate Diploma or Masters in the particular field depending on their future need,"
says Enrolment Advisor Shweta Dhayal.

Book a 15-minute call or chat with us online

Schedule a call   **Chat online**

Claire from JCU Online

Contact details

Phone: 1300 535 919
Email: learn@online.jcu.edu.au
Website: online.jcu.edu.au

Our Enrolment Advisors are available:

Monday and Tuesday: 8am – 6pm (AEST)
Wednesday and Thursday: 8am – 7pm (AEST)
Friday: 8am – 5pm (AEST)

Have questions?
Book a quick 15-minute call with an Enrolment Advisor or chat with us online

Schedule a call   **Chat online**

Application process

1. Call or email

1300 535 919
learn@online.jcu.edu.au

Speak to a dedicated Enrolment Advisor who will:

- Discuss your career goals and whether this is the right qualification for you.
- Assist you with questions about fees, subject selection and majors.
- Help ensure your enrolment experience is a smooth one.

Our Enrolment Advisors are available:

Monday and Tuesday:	8am – 6pm (AEST)
Wednesday and Thursday:	8am – 7pm (AEST)
Friday:	8am – 5pm (AEST)

2. Gather documents

Transcripts and certificates

Documents to confirm prior studies.

Proof of English language skills (if applicable)

If you have completed Year 12 in Australia, that's usually all the evidence you need.

3. Apply online

Once you've completed Steps 1 and 2, you're ready to apply online using our straightforward process.

Questions about your application?

Book a quick 15-minute call with an Enrolment Advisor or chat with us online

Schedule a call   **Chat online**

Foundations for Data Science

This subject will provide students with an overview of data science as a discipline as well as an introduction to a number of topics that play fundamental roles across various subjects in this area.

Students will learn different forms of representing and pre-processing data for further analysis and visualisation. They will also learn principles of algorithm analysis that will allow them to assess and compare the scalability of different algorithms to be studied across other subjects in the realm of data science.
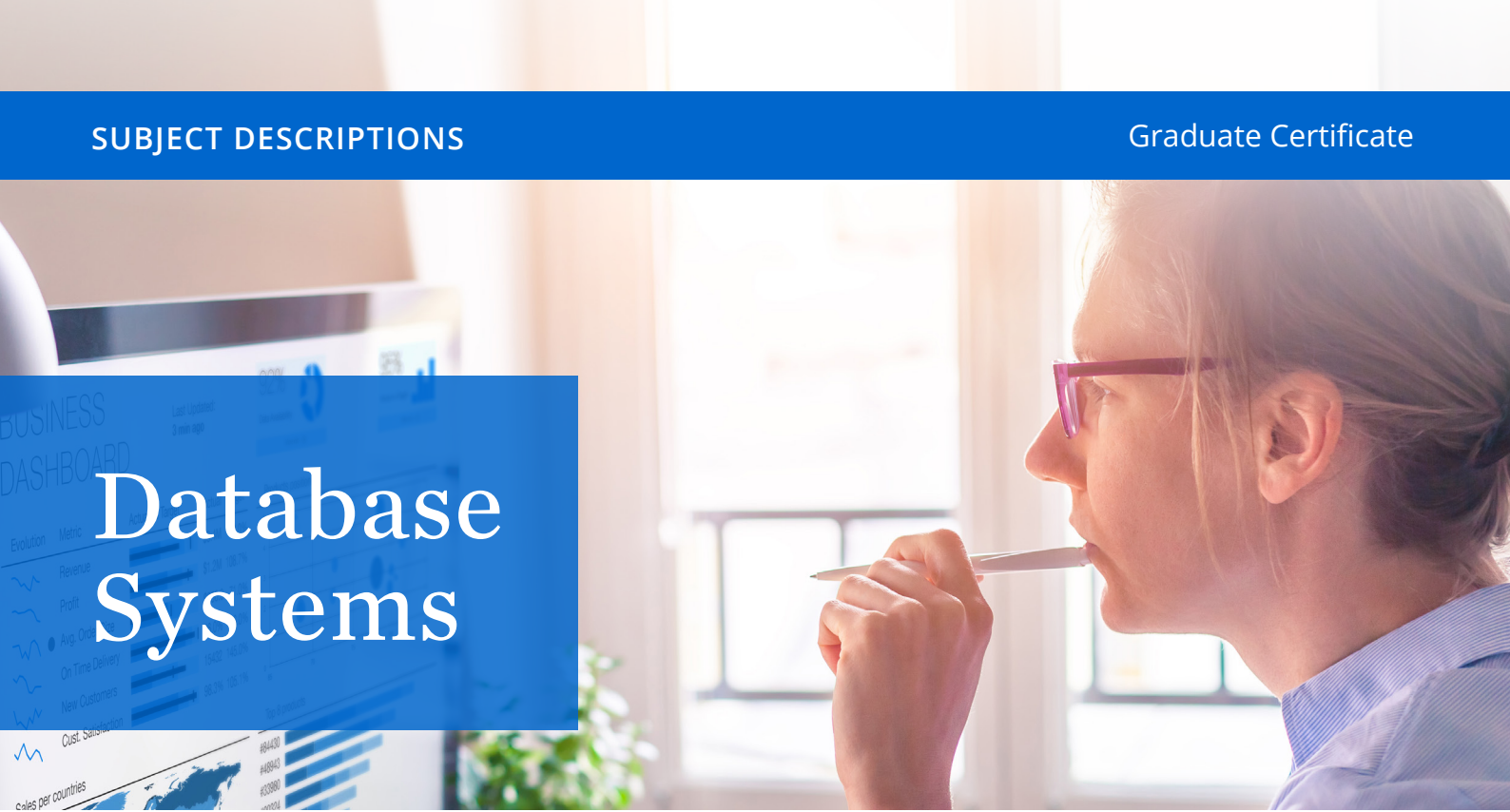
Core elements of this subject include: An Introduction to Data Science and Big Data; Data Types and Representation; Essentials on Data Visualisation of Tabular Data; Data Pre-Processing; Data Wrangling and Tidying; Algorithm Analysis; Case Studies; Software Practice (R).

Software platform: RStudio

Learning outcomes

- Explain what data science is about and the areas that play major roles within the realm of data science

- Explain and exemplify the most common forms of data types and representations

- Identify and describe, at a conceptual level, a core collection of simple yet powerful techniques for data visualisation in the realm of data science

- Conceptually describe and apply a core collection of elementary techniques for data pre-processing

- Interpret and explain, at a conceptual level, results of algorithm analyses

- Apply common data representation and data pre-processing techniques, such as wrangling and tidying, using the software package and language R.

Database Systems

The subject will provide an introduction to the principles and concepts of database systems and their importance in data science.

The relational model and various competing models for database, and a database query language are introduced and applied.

Through this subject you will develop skills in techniques and tools to model, design and implement a database system using SQL.

Software platform: SQL, SAS and SAS-SQL

Learning outcomes

- Critically appraise databases and database management systems, their features and rationale

- Formulate queries using a database query language

- Develop a database model using the entity-relationship model

- Describe and apply the techniques of normalisation

- Construct a database design for a database management system.

Data Visualisation

Data visualisation investigates paradigms and techniques to transform various data into images that effectively and accurately represent information about the data.

This course will introduce students to the fundamentals of data visualisation that focus on how data visualisation can solve a wide range of practical data interpretation problems arising in many applications. It will include the following topics: basic concepts of data visualisation, data representation and abstraction, marks and channels, visualisation design and analysis of techniques, interaction visualisation design and advanced topics for visualisation. In addition to basic concepts, design approaches and techniques of data visualisation, the course will employ Tableau, one of the most popular commercial data visualisation tools on the market, to analyse, visualise different kinds of data and implement projects.

Software platform: tableau

Learning outcomes

- Demonstrate sound knowledge of the basic theory, principles and concepts that underpin data visualisation techniques and strategies
- Apply related Visualisation principles and approaches to analyse, evaluate and improve visualisation
- Demonstrate effective skills to create interactive visualisation
- Apply storytelling principles for designing effective communications
- Employ Tableau to analyse and visualise data and design and implement visualisation projects.

Statistical Methods for Data Science

Statistics is used in many disciplines. Applying statistical methods the right way can help data scientists make new discoveries and help managers make better decisions.

This subject will introduce students to practical applications and concepts involved in descriptive statistics, inferential statistics and linear modelling. Topics include methods of producing, exploring, displaying and summarising data, both of single and multiple variables, probability and sampling concepts, confidence intervals, hypothesis testing, correlation and regression. Emphasis will be placed on communicating findings from data investigations to a range of audiences. RStudio will be the tool of choice. A calculator will also be used to facilitate numerical calculations where appropriate.

Software platform: RStudio

Learning outcomes

- Demonstrate sound knowledge of the basic principles that underpin sample selection, experimental design statistical theories, data visualisation and linear modelling

- Effectively integrate and execute statistical theories and processes in RStudio

- Retrieve, analyse, synthesise and evaluate outputs produced from RStudio

- Integrate statistical principles, methods, techniques and tools covered in this course to plan and execute a statistical analysis

- Evaluate, synthesise and communicate findings from statistical investigations.

Programming and Data Analytics using Python

Students are introduced to fundamental principles and practices of computer programming in Python.

- Students learn and use problem-solving and software development techniques including planning, prototyping, version control, testing and debugging.

- Students develop procedural and object-oriented programs with console and graphical user interfaces.

- Students research and learn about developments in the field of programming languages and environments over recent times.

- Students also apply basic data visualisation with Python (Python visualisation libraries) and notions of data analysis with Python (e.g. NumPy and Pandas libraries).

Software platform: Python

Learning outcomes

- Apply fundamental application development skills in a modern programming environment
- Develop and utilise best-practice coding techniques
- Adopt self-learning with modern support resources
- Understand and apply Python libraries to problems in data science.

Introduction to Data Mining

We have entered the era of big data.

This subject will provide you with a range of widely used algorithms and techniques to automatically extract patterns and models from data. You will learn classic techniques for the most common descriptive and predictive tasks in data mining, including clustering, outlier detection and classification. The algorithms and techniques will be studied both at the conceptual, as well as at the practical levels. A software package will be adopted for hands-on data mining in real data sets.

Software platform: RStudio

Selected learning outcomes

- Integrate and apply an advanced body of practical, technical and theoretical knowledge, including understanding recent developments and modern challenges in Data Science and its application

- Retrieve, analyse, synthesise and evaluate complex information, concepts, methods or theories from a range of sources

- Plan and conduct appropriate investigations of data sets by selecting and applying qualitative and quantitative methods, techniques and tools, as appropriate to the data and the application

- Analyse requirements and demonstrate effective applications of appropriate computing languages and computational tools for data acquisition, queries, management, analysis and visualisation.

Visual Analytics for Data Scientists using SAS

In this subject, you will be encouraged to learn skills required to succeed in today's highly analytical and data-driven economy using robust industry-tested software for data science. This subject will introduce students to practical applications and concepts involved in advanced statistical modelling in SAS. Topics include:

- linear modelling with multiple predictor variables that maybe continuous or categorical in nature;
- conditional Probability and the odds ratio
- drawing inferences
- checking model diagnostics and model selection
- techniques for coping with data that are temporally or spatially correlated.

Software platform: SAS exclusively

Learning outcomes

- Demonstrate sound knowledge of the basic principles and theories that underpin advanced statistical modelling methods

- Effectively integrate and execute advanced statistical modelling theories and processes in SAS software to solve authentic problems

- Retrieve, analyse, synthesise and evaluate outputs produced using advanced statistical modelling methods in SAS software

- Critically examine different approaches to advanced statistical problems.

Essential Mathematics for Data Scientists

Data Science is grounded in mathematics.

This subject will provide students with the essential elements of mathematics required for data scientists. This subject will include elements of discrete mathematics including logics, sets, proof, functions, relations, graphs and trees. It will also include elements of linear algebra including linear systems and matrix formulation, vector spaces, eigenvalues/eigenvectors, singular value decomposition as well as optimisation and numerical methods. Computational aspects of this course will be developed in Matlab.

Software platform: MATLAB

Learning outcomes

- Identify and apply concepts of set theory, arithmetic, logic, proof techniques, binary relations, graphs and trees to solve problems in data science

- Apply linear algebra and numerical mathematics concepts for optimisation and dimensionality reduction in data science problems

- Apply and implement concepts in discrete mathematics, optimisation and linear algebra in data science using Matlab.

Advanced Data Management and Analysis using SAS

This subject will provide students with cutting-edge tools and techniques for high-performance and large-scale computing, with focus on computer models and software designed to handle Big Data sets in a distributed and/or parallel fashion.

Particular focus will be given to distributed and parallel computing using Map-Reduce/Hadoop and similar models for processing Big Data sets.

Software platform: SAS exclusively and Hadoop

Selected learning outcomes

- Compare and evaluate different systems and approaches for high-performance and large-scale computing to analyse standard data and big data

- Manage and prepare data using standard management frameworks for the purpose of transforming, cleaning to ensuring classical characteristic outcomes are achieved

- Perform data management tasks to improve data quality, entity resolution and data monitoring

- Examine and deploy data processing tasks in the Hadoop ecosystem for big data and critically evaluate the combination of Hadoop and SAS to overcome big data challenges.

Data Science and Strategic Decision Making

This subject is designed to provide an integrated knowledge for understanding and managing information resources, building basic business intelligent system, interpreting business statistics, and developing practical decision models.

It will equip students with decision-making tools and illustrate their applications. Businesses typically collect large volumes of data with relative ease. However, data are often meaningless until they are analysed for trends, patterns and relationships and then become useful information. Acting on this useful information to develop solutions and support decision-making is a key business skill required by data scientists.

Software platform: various

Selected learning outcomes

- Critically evaluate data and information as an organisational resource and identify issues in managing data/information/ knowledge when faced with uncertainty

- Identify how data is integrated as a strategy in different organisations based on strategic management theory

- Review and assess different information architectures to identify where strategic data resides in organisations

- Apply graphical and numerical tools for organising, analysing, interpreting, and presenting data in a balanced scorecard

- Apply analytical frameworks for organising, analysing, interpreting and presenting data to formulate strategy and inform strategic decisions.

Data Mining and Machine Learning

This subject will provide students with a range of algorithms based on machine learning techniques for advanced data analysis and mining.

These algorithms and techniques fall within the most common machine learning paradigms. In particular, students will learn sophisticated supervised learning methods.

Software platform: RStudio

Learning outcomes

- Understand the roles of machine learning in the realm of data mining to diverse audiences

- Compare and different machine learning methods

- Analyse real world tasks using machine learning techniques learnt in this subject, in particular a. describe, choose, and apply appropriate supervised machine learning methods for descriptive data mining tasks

- Synthesise and communicate the method and findings to diverse audiences.

Data Science Master Class 1

Data Science is a field that is transforming society with applications in essentially all domains, from business to science and healthcare.

It is constantly evolving, with new techniques in mathematics, statistics, machine learning and computation/data manipulation continually emerging to extract knowledge and value from data. The Data Science Master Class series will bring in leaders in the field to report recent advances in data science techniques and/or applications of data science. Specifically, this master class will explore natural language processing (NLP), web scraping and APIs to harvest data with Python and explore the data science workbench approach to managing production pipelines of work that can be re-used in different data science projects.

Software platform: PySpark and Python

Learning outcomes

- Understand and apply new data science skills, knowledge and techniques to solve problems in data science using NLP

- Apply data science skills, knowledge and techniques to solve problems in data science NLP projects with a focus on web scraping

- Understand how to deploy data science projects into production pipelines

- Communicate effectively the results of the project as strategic insights.

Foundations for Data Science

This subject will provide students with an overview of data science as a discipline, as well as an introduction to a number of topics that play fundamental roles across various subjects in this area.

Students will learn different forms of representing and pre-processing data for further analysis and visualisation. They will also learn principles of algorithm analysis that will allow them to assess and compare the scalability of different algorithms to be studied across other subjects in the realm of data science.

Core elements of this subject include: An Introduction to Data Science and Big Data; Data Types and Representation; Essentials on Data Visualisation of Tabular Data; Data Pre-Processing; Data Wrangling and Tidying; Algorithm Analysis; Case Studies; Software Practice (R).

Software platform: RStudio

Learning outcomes

- Explain what data science is about and the areas that play major roles within the realm of data science
- Explain and exemplify the most common forms of data types and representations
- Identify and describe, at a conceptual level, a core collection of simple yet powerful techniques for data visualisation in the realm of data science
- Conceptually describe and apply a core collection of elementary techniques for data pre-processing
- Interpret and explain, at a conceptual level, results of algorithm analyses
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Database Systems

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Software platform: SQL, SAS and SAS-SQL

Learning outcomes

- Critically appraise databases and database management systems, their features and rationale

- Formulate queries using a database query language

- Develop a database model using the entity-relationship model

- Describe and apply the techniques of normalisation

- Construct a database design for database management system.

IoT Communication Systems

This subject is a practical introduction to the Internet of Things (IoT) with a focus on the communication technology that makes IoT possible.

In the first part of the subject, students will learn about typical IoT system architectures and design considerations, briefly review the development history of IoT technology, and explore likely future directions and trends. In the second part of the subject, students focus on the communication technologies that are central to all IoT systems.

Students will learn how sensor data can be transmitted over wired and wireless networks, including issues such as the characteristics of radio transmissions, the nature of communication channels, digital data communication technologies, and antenna properties . Students will learn about major wireless standards such as WiFi, Bluetooth, CAT-M1, NB-IoT, Zigbee, and LoRaWAN.

Learning outcomes

- Explain the IoT ecosystem and typical system architectures

- Critically analyse the role and impact of IoT in current and future technologies, including the opportunities, benefits, risks, ethics and broader implications

- Assess and analyse the effectiveness of the main types of communication system commonly used in industrial and commercial settings

- Justify and report on the choice of a communication system for an application scenario, taking into account important technical, social and economic considerations.

Statistical Methods for Data Science

Statistics are used in many disciplines. Applying statistical methods the right way can help data scientists make new discoveries and help managers make better decisions.

This subject will introduce students to practical applications and concepts involved in descriptive statistics, inferential statistics and linear modelling. Topics include methods of producing, exploring, displaying and summarising data, both of single and multiple variables, probability and sampling concepts, confidence intervals, hypothesis testing, correlation and regression. Emphasis will be placed on communicating findings from data investigations to a range of audiences. RStudio will be the tool of choice. A calculator will also be used to facilitate numerical calculations where appropriate.

Software platform: RStudio

Learning outcomes

- Demonstrate sound knowledge of the basic principles that underpin sample selection, experimental design, statistical theories, data visualisation and linear modelling

- Effectively integrate and execute statistical theories and processes in RStudio

- Retrieve, analyse, synthesise and evaluate outputs produced from RStudio

- Integrate statistical principles, methods, techniques and tools covered in this course to plan and execute a statistical analysis

- Evaluate, synthesise and communicate findings from statistical investigations.

IoT Edge Devices

Sensor devices are the foundation of any Internet of Things (IoT) system.

This subject presents a hands-on introduction to sensors and the embedded computing systems that drive them. Students will develop software for IoT edge devices, specifically focussing on data acquisition from sensors. Students will also learn the operational mechanisms, strengths, and limitations of commonly used sensors, how to calibrate sensor devices and how to interpret technical specifications.

Learning outcomes

- Explain the operational principles, benefits and limitations of commonly used sensor technologies

- Select and justify sensors for given application scenarios, taking into account the relevant technical, economic and social constraints

- Design and implement software in order to interface with sensor and communication modules

- Communicate the project and its findings to a variety of audiences through advanced written and oral English language skills in a variety of media.

Introduction to Data Mining

We have entered the era of big data.

This subject will provide you with a range of widely used algorithms and techniques to automatically extract patterns and models from data. You will learn classic techniques for the most common descriptive and predictive tasks in data mining, including clustering, outlier detection and classification. The algorithms and techniques will be studied both at the conceptual, as well as at the practical levels. A software package will be adopted for hands-on data mining in real data sets.

Software platform: RStudio

Selected learning outcomes

- Integrate and apply an advanced body of practical, technical and theoretical knowledge, including understanding recent developments and modern challenges, in Data Science and its application

- Retrieve, analyse, synthesise and evaluate complex information, concepts, methods, or theories from a range of sources

- Plan and conduct appropriate investigations of data sets by selecting and applying qualitative and quantitative methods, techniques and tools, as appropriate to the data and the application

- Analyse requirements and demonstrate effective applications of appropriate computing languages and computational tools for data acquisition, queries, management, analysis and visualisation.

Data Visualisation

Data visualisation investigates paradigms and techniques to transform various data into images that effectively and accurately represent information about the data.

This course will introduce students to the fundamentals of data visualisation that focus on how data visualisation can solve a wide range of practical data interpretation problems arising in many applications. It will include the following topics: basic concepts of data visualisation, data representation and abstraction, marks and channels, visualisation design and analysis of techniques, interaction visualisation design and advanced topics for visualisation. In addition to basic concepts, design approaches and techniques of data visualisation, the course will employ Tableau, one of the most popular commercial data visualisation tools on the market, to analyse, visualise different kinds of data and implement projects.

Software platform: tableau

Learning outcomes

- Demonstrate sound knowledge of the basic theory, principles and concepts that underpin data visualisation techniques and strategies
- Apply related visualisation principles and approaches to analyse, evaluate and improve visualisation
- Demonstrate effective skills to create interactive visualisation
- Apply storytelling principles for designing and effective communications
- Employ Tableau to analyse and visualise data and design and implement visualisation projects.

IoT Security and Cloud Computing

This subject considers the security of Internet of Things (IoT) systems as well as the implementation of cloud-based data storage and analytics.

Students will learn how to integrate an IoT system into a cloud computing framework for analysis and operational decision making. Students will critically analyse the security issues in distributed IoT systems and identify strategies to reduce security risks. Other considerations include privacy, legal obligations and ethical issues related to the increasing prevalence of data in society.

Learning outcomes

- Explain how cloud computing works – its benefits, limitations, relevance and uses for IoT systems

- Integrate an IoT system into a cloud computing framework

- Develop, implement, and evaluate a cloud-based backend for data storage, visualisation and analysis to support business and operational decision-making

- Critically analyse IoT system security and ensure that all parts of an IoT system have been designed with security, privacy and ethical principles in mind

- Recognise and respond appropriately to the social, legal and ethical implications of IoT and cloud computing technologies, applying a high level of judgement while being able to justify those decisions.

Contact details

Phone: 1300 535 919
Email: learn@online.jcu.edu.au
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Our Enrolment Advisors are available:

Monday and Tuesday: 8am – 6pm (AEST)
Wednesday and Thursday: 8am – 7pm (AEST)
Friday: 8am – 5pm (AEST)

Have questions?

Book a quick 15-minute call with an Enrolment Advisor or chat with us online

Schedule a call   **Chat online**