



Unit outline

Name of unit

Introduction to Data Science (BDS DSC 102)

Unit description

This subject provides an introduction and understanding of Data Science, and the various activities and tasks that a Data Scientist performs. Topics cover data mining, data cleaning and reduction, and basic modelling. The application of data science in business is explored. Hands-on laboratory activities and projects will help student apply and extend newly acquired skills and knowledge.

SECTION 1 – GENERAL INFORMATION (CORE)

1.1 Administrative details

Associated higher education awards (for example, Bachelor, Diploma)	Duration (for example, one semester, full year)	Level (for example, introductory, intermediate, advanced level, 1st year, 2nd year, 3rd year)	Unit coordinator
Bachelor of Data Science	3 years	1 st Year	To be confirmed

1.2 Core or elective unit

Indicate if the unit is a:

- ☒ core unit
☐ elective unit
☐ other (please specify below):

1.3 Unit weighting

Using the table below, indicate the credit point weighting of this unit and the credit point total for the course of study (for example, 10 credit points for the unit and 320 credit points for the course of study).

Unit credit points Example: 10 credit points	Total course credit points Example: 320 credit points
3 credit points	78 credit points

1.4 Student workload

Using the table below, indicate the expected student workload per week for this unit.

No. timetabled hours per week (1)	No. personal study hours per week (2)	Total workload hours per week (3)
3 hours	3 hours	6 hours

(1) Total time spent per week at lectures, tutorials, clinical and other placements, etc.

(2) Total time students are expected to spend per week in studying, completing assignments, etc.

(3) Sum of (1) and (2) equals workload hours.

For those students requiring additional English language support, how many additional hours per week is it expected that they will undertake?

Additional English language support: _____ hours per week

1.5 Delivery mode

Tick all applicable delivery modes for the unit and provide details in the following text box: If necessary or preferred, you may provide this information in a separate document, using the 'Attach evidence here' function of the online form.

- ☒ Face to face on site
- ☐ E-learning (online)
- ☐ Intensive/block mode (where the unit or a face to face component is delivered in a block)
- ☐ Mixed/blended
- ☐ Distance/independent learning (untimetabled)
- ☒ Full-time
- ☐ Part-time
- ☐ External
- ☐ Fast track
- ☐ Other (please specify)

1.6 Work-integrated learning activity

If the unit includes a work-integrated learning component (where completion of the unit requires students to undertake learning in a workplace outside of their higher education provider), provide details including the rationale, the specification and methods for assessing the learning outcomes, monitoring arrangements and whether the work integrated learning is required for professional accreditation. If necessary or preferred, you may provide this information in a separate document, using the 'Attach evidence here' function of the online form.

Also if available, upload copies or templates of the formal agreements with third parties for the work-integrated learning activity, using the 'Attach evidence here' function of the online form.

Refer to the TEQSA Guidance Note on Work-Integrated Learning as required (available on the TEQSA website).

1.7 Prerequisites and co-requisites

Are students required to have undertaken a prerequisite or co-requisite unit for this unit?

☒ Yes ☐ No

If YES, provide details of the prerequisite or co-requisite requirements below.

Mathematics for Data Scientists

1.8 Other resource requirements

Do students require access to specialist facilities and/or equipment for this unit (for example, special computer access, physical education equipment)?

☒ Yes ☐ No

If YES, provide details of specialist facilities and/or equipment below.

Computer/Laptop, SAS, Python Anaconda

SECTION 2 – ACADEMIC DETAILS (CORE)

Learning outcomes for the unit
On successful completion of this unit students will be able to:
Examine the basic concepts of data science and applications [Knowledge of Data Science]
Use quantitative abilities to solve data science problems [Problem Solving and Decision Making]
Evaluate and dissect data in different ways [Creativity and Innovation]
Demonstrate teamwork skills to formulate solutions for mathematical problems [Teamwork]
Interpret a data set and present findings in oral and written form. [Intercultural Competence / Communication]
Not addressed [Global Citizenship / Ethics]

Topics included in the unit
Week 01: Introduction: Data-Analytic Thinking <ul style="list-style-type: none">• The Ubiquity of Data Opportunities• Example: Hurricane Frances• Example: Predicting Customer Churn• Data Science, Engineering, and Data-Driven Decision Making
Week 02: Business Problems and Data Science Solutions <ul style="list-style-type: none">• From Business Problems to Data Mining Tasks• Supervised Versus Unsupervised Methods• Data Mining and Its Results
Week 03: The Data Mining Process <ul style="list-style-type: none">• Implications for Managing the Data Science Team• Other Analytics Techniques and Technologies
Week 04: Data Pre- processing <ul style="list-style-type: none">• Data cleaning• Data transformation• Data reduction• Overview of various techniques with examples
Week 05: Introduction to Predictive Modelling: From Correlation to Supervised Segmentation Models, Induction, and Prediction
Week 06: Fitting a Model to Data <ul style="list-style-type: none">• Classification via Mathematical Functions• Regression via Mathematical Functions• Over fitting and Its Avoidance• Generalization• Over fitting Examined
Week 07: Similarity, Neighbours, and Clusters <ul style="list-style-type: none">• Similarity and Distance• Nearest-Neighbour Reasoning

Topics included in the unit
Week 08: Decision Analytic Thinking I: What Is a Good Model? <ul style="list-style-type: none"> Evaluating Classifiers Generalizing Beyond Classification
Week 09: Ranking Instead of Classifying <ul style="list-style-type: none"> Profit Curves ROC Graphs and Curves
Week 10: Evidence and Probabilities Example: Targeting Online Consumers with Advertisements
Week 11: Data Science and Business Strategy <ul style="list-style-type: none"> Thinking Data-Analytically, Redux Achieving Competitive Advantage with Data Science Sustaining Competitive Advantage with Data Science Attracting and Nurturing Data Scientists and Their teams Examine Data Science Case Studies
Week 12: Wrap up and Presentation of projects

Assessment tasks			
Type (1) (see examples noted below this table)	When assessed – year, session and week (for example, year 1, semester 1, week 1)	Weighting (% of total marks for unit)	Cross reference to learning outcomes
Individual Assignments	Sessions 1, 4 and 9	20%	SLO A,E
Mid Semester Examination	Mid Semester Exam Week	20%	SLO B,C
Group Project	Sessions 2, 7 and 12	20%	SLO A,D
Final Examination [3 hours]	Exam Week	40%	SLO B

(1) Examples of types of assessment tasks include: assignments; examinations; group projects; online quizzes/tests; presentations; work-based projects; and reflective journals. Ensure that details of the types of assessment tasks are included such as specific topics, duration/length/word limit of assessment and any specific formats.

2.1 Prescribed and recommended reading

Provide below, in formal reference format, a list of the prescribed and recommended reading for the unit.

Prescribed Text <ul style="list-style-type: none"> Foster Provost and Tom Fawcett (2013). <i>Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking</i> 1st edition. O'Reilly Media.
Recommended Reading <ul style="list-style-type: none"> Lillian Pierson (2015). <i>Data Science for Dummies</i> 1st edition. For Dummies.