**Please refer to the AM4 Guidance Notes as you complete this descriptor.**

**Part One: Module Leader’s section: core module details**

**1. Module Title: Data-Driven Decision Making.**

**2. SCQF Level: Level 11**

**3. SCQF Credit Value: 20 4. ECTS Credit Value: 10**

**5. Module Code: INF11116** [Admin Use Only]

**6. Module Leader: Laura Muir**

**7. School: Computing**

**8. Edinburgh Napier Subject Group Area:** Information Systems (INF)

|  |  |
| --- | --- |
| **9. Prerequisites –** To study this module you will need the learning equivalent to the module listed or have passed this module | |
| Is a Prerequisite Required? | Yes ☐ No ☒ |
| Module Code | N/A |
| Module Title | N/A |
| Examples of Equivalent Learning | N/A |

**10. What you will learn and what this module is about**

In this module you will learn how organisations can use data to develop their organisation and enhance their understanding of how data is collected, analysed, and managed, not simply in terms of the tools required but also how data impacts on the people, processes, and technology used by the business. In addition you will learn a scientific approach to organise and interrogate data, the concepts of using statistical inference within decision-making, how to apply scientific principles in a systematic and methodological way to simplify complex data and use data to segment subjects in to homogeneous groups, including statistical modelling techniques. Emphasis is given to the presentation of data to facilitate understanding. The module also considers how these impact upon the decision-making process from a strategic and tactical perspective

**11. Description of Module Content**

A primary use of data by contemporary organisations is to analyse and explore opportunities for growth or change, either directly or indirectly. The demand for business data, whether operational management, data analytics or data science (such as “big data”, machine learning & predictive analytics) has increased substantially. This has resulted from an organisational need for a more sophisticated approach to analytics and data from both a business and statistical understanding of data and its impacts on the organisation. This raises complex and multifaceted issues.

The aim of the module is to enable you develop a deep understanding of the business context and impact of data, the meaning of the data (including in terms of statistics), and to give you an opportunity to express this in the form of professional written reports. Topics covered include:

\* The role of the data scientist

\* Data strategy and Key Performance Indicators (KPIs)

\* Deployment and implementation

\* Governance, ethical and cultural implications

\* Exploring and describing data,

\* Statistical inference – parametric methods t – tests and Analysis of Variance Statistical presentation of data.

\* Multivariate methods – principal component analysis, exploratory factor analysis and segmentation methods (Hierarchical clustering, K means and K modes).

\* Statistical modelling – OLS regression, general linear models exemplified by Binary Logistic models

\* Diagnosing model fits

The R package for statistics will be used in this module.

The Benchmark Statement for Computing[[1]](#footnote-1) specifies the range of skills and knowledge that should be incorporated in computing courses. This module encompasses cognitive skills in computational thinking and its relevance to everyday life, critical evaluation and professional considerations and practical skills in the deployment and use of tools and critical evaluation of complex problems in addition to providing useful generic skills for employment.

**12. Learning Outcomes of the module**

Upon completion of this module you will be able to:

LO1: Critically evaluate the drivers and strategies for advanced analytics and its impact on organisational decision-making

LO2: Critically assess the roles and impact of ethics, governance and professionals in data analysis

LO3: Apply methods of data reduction and of classification to data to identify sub-groups

LO4: Construct and diagnose statistical models to allow prediction of effects and input into strategy development.

**13: Indicative References and Reading List**

T1: Building a Digital Analytics Organization: Create Value by Integrating Analytical Processes, Technology, and People into Business Operations (2013), Pearson, Judah Phillips, ISBN-13: 978-0-13-337278-6

T2: Data Science for Business: What you need to know about data mining and data-analytic thinking (1st Edition) (2014), O'Reilly, Foster Provost & Tom Fawcett, ISBN-13: 978-1449361327

T3: Big Data at Work: Dispelling the Myths, Uncovering the Opportunities (2014), Harvard Business Publishing, Thomas H. Davenport (Author) ISBM 987-1-4221-6816-5

T4: Toomey, D., (2014). R for Data Science, Packt Publishing Ltd, Birmingham

T5: Zumel. N. and Mount, J., (2014). Practical Data Science with R, Manning Publications, NY

T6: Good Practice Team, Effective tables and graphs in official statistics, Government Statistical Service, <https://gss.civilservice.gov.uk/wp-content/uploads/2014/12/Effective-graphs-and-tables-in-official-statistics-version-1.pdf>, 2014

**Part Two: Module Leader’s Section: Versions\***

\* indicates that this section may be set up in SITS to have different content to reflect a different occurrence/delivery of the module

**Blended Version:**

**\*14. Occurrence**

14a. Primary mode of delivery: Blended

14b. Location of Delivery: Scotland Edinburgh Napier

Partner: N/A –

14c. Member of staff with primary responsibility for delivering module, if different from Module

Leader:Calum Alexander and Robert Raeside

**\*15. Moodle Presence**

Please select **one:**

1. ☐This version of the module does not require a Moodle presence.

2. ☒This version of the module requires a Moodle presence that is not shared with any other

versions.

3. ☐This version of the module requires a Moodle presence that is shared with other versions

(please provide details):

**\*16. LTA Approach**

**Learning & Teaching methods including their alignment to LOs**

You will attend for one day per month during term time for intensive face-to-face lectures, workshops, tutorial and computer-based practical sessions (LO 1-4). This will be further supported by online material and discussion forums using a variety of communication technologies such as Moodle and Skype. You will be encouraged to develop your learning through peer and tutor interaction, either face to face or through electronic communication. Self-study readings supported by in-class and online discussions hosted through the VLE will develop skills as independent learners (LO 1-4). Formative feedback in online quizzes will encourage independent learning through data collection, analysis, synthesis, as well as skills in developing sound argument (LO 1-4). The lecture programme will be enhanced by material from guest speakers and will be made available online. The material for the lab-based practical sessions will be made available online with a support forum

**Embedding of employability/PDP/Scholarship skills**

This module addresses employability at a high level. Students’ information literacy, employability and scholarship skills are also enhanced by the development of critical reading and writing skills required. Additionally, the understanding of wider business context will enhance ability to deliver value to employers.

**Assessment (formative or summative)**

Formative assessment will be provided during tutorial and lab-based practical sessions at the face to face monthly meetings and/ or online forum. There will also be a series of online quizzes that will give a formative check of progress. The main summative assessment will comprise one practical coursework worth 100% of the final mark (covering LOs 1 - 4). The first elements of this coursework will be submitted around week 7 (worth 30%), and will be based on a prescribed organisational context and data set for analysis of the business case associated data manipulation. The second element (worth 70%) will be adaptable to the business context and data in relevant to the students’ organisation, and will be submitted at the end of the module, after which the final summative feedback will be given.

**Research / teaching linkages**

The School of Computing is actively expanding its research in this area. Extensive use is made of case study research, which is an essential skill for post graduate students at this level. Also academic texts & articles which present research methods and findings are explored in the tutorial and self-study activities.

The statistics aspects of this module is rooted in the premise that the development of a sound knowledge of the role of statistical methods to the collection, analysis and modelling of data supports decision-making and research. The module will be facilitated by two experienced statisticians with inputs from “big data” research projects and industry collaborations. The module will be run in workshop format over three half days and be based on a participative and learner-focused pedagogical approach – where students will be encouraged to participate in hands on data analysis and knowledge discovery. Underpinning business and industrial research from both public and private sectors will support and refresh the module content. The assessments will include an investigation using R to interrogate a large data set and apply inferential statistics to investigate key research questions and a more complex study of linked data in which statistical modelling will be applied

**Supporting equality and diversity**

All course materials will be made available in the VLE prior to teaching & presentation. This will enable students requiring additional support to work through the material at their own pace. Tutorials group discussion to encourage class integration

**Internationalisation**

Much of the module material addresses the impacts of the global nature of information technology, including the increasingly trans-national nature of the Internet.

Students will be referred to a range of international sources such as journal articles, conference papers and websites.

**\*17. Student Activity (NESH)**

|  |  |  |
| --- | --- | --- |
| **Mode of Activity** | **L & T Activity** | **NESH** |
| Face to Face | Lecture | 6 |
| Face to Face | Tutorial/Seminar/Class Groupwork | 15 |
| Online | Online Surgery | 12 |
| Online | Lecture | 6 |
| Online | Lab | 5 |
| Independent Learning | Individual learning activities | 116 |
| Assessment | Coursework | 40 |
| **TOTAL NESH**  **To calculate total, please select the whole table and press F9 key** | | **200 hours** |

**\*18. Assessment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week Due** | **Type of Assessment** | **Weighting (%)** | **LOs**  **Covered** | **Length/**  **Volume** |
|  | **Component: Assessment One**  Enter assessment element(s): |  |  |  |
| 7 | Coursework | 30 | 1,2,3,4, | 12 Hours |
| 15 | Coursework | 70 | 1,2,3,4, | 38 |
|  | **Module Total**  **To calculate the total fields, select the whole table and press F9 key** | **100%** |  |  |

**19. Length of module delivery.**

Over how many trimesters is this module delivered?

|  |  |
| --- | --- |
| ☒One | ☐Two ☐Three  *See Guidance Note 19* |

**20. Trimester(s) of delivery**

☐ One ☐ Two ☐ Three

**Online Version:**

**\*14. Occurrence**

14a. Primary mode of delivery: Online (Fully online)

14b. Location of Delivery: Scotland Edinburgh Napier

Partner: N/A –

14c. Member of staff with primary responsibility for delivering module, if different from Module

Leader:Calum Alexander and Robert Raeside

**\*15. Moodle Presence**

Please select **one:**

1. ☐This version of the module does not require a Moodle presence.

2. ☒This version of the module requires a Moodle presence that is not shared with any other

versions.

3. ☐This version of the module requires a Moodle presence that is shared with other versions

(please provide details):

**\*16. LTA Approach**

**Learning & Teaching methods including their alignment to LOs**

You will be supported by the Global Online team who will provide general overall support, and by the module teams who will provide module-specific online material and discussion forums using a variety of communication technologies such as Moodle and Skype (LO 1-4).. You will be encouraged to develop your learning through peer and tutor interaction through electronic communication

Self-study readings, supported by online discussions forum hosted through the VLE, will develop skills as independent learners (LO 1-4). Formative feedback will be provided via online quizzes (LO 1-4). The lecture programme will be enhanced by material from guest speakers and will be made available online. The material for the lab-based practical sessions will be made available online with a support forum

**Embedding of employability/PDP/Scholarship skills**

This module addresses employability at a high level. Students’ information literacy, employability and scholarship skills are also enhanced by the development of critical reading and writing skills required. Additionally, the understanding of wider business context will enhance ability to deliver value to employers.

**Assessment (formative or summative)**

There will also be a series of online quizzes that will give a formative check of progress. The main summative assessment will comprise one practical coursework worth 100% of the final mark (covering LOs 1 - 4). The first elements of this coursework will be submitted around week 7 (worth 30%), and will be based on a prescribed organisational context and data set for analysis of the business case associated data manipulation. The second element (worth 70%) will be adaptable to the business context and data in relevant to the students’ organisation, and will be submitted at the end of the module, after which the final summative feedback will be given.

**Research / teaching linkages**

The School of Computing is actively expanding its research in this area. Extensive use is made of case study research, which is an essential skill for post graduate students at this level. Also academic texts & articles which present research methods and findings are explored in the tutorial and self-study activities.

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**Internationalisation**

Much of the module material addresses the impacts of the global nature of information technology, including the increasingly trans-national nature of the Internet.

Students will be referred to a range of international sources such as journal articles, conference papers and websites.

**\*17. Student Activity (NESH)**

|  |  |  |
| --- | --- | --- |
| **Mode of Activity** | **L & T Activity** | **NESH** |
| Online | Lecture | 12 |
| Online | Practical Labs | 12 |
| Online | Online Surgery | 15 |
| Independent Learning | Individual learning activities | 121 |
| Assessment | Coursework | 40 |
| **TOTAL NESH**  **To calculate total, please select the whole table and press F9 key** | | **200 hours** |

**\*18. Assessment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week Due** | **Type of Assessment** | **Weighting (%)** | **LOs**  **Covered** | **Length/**  **Volume** |
|  | **Component: Assessment One**  Enter assessment element(s): |  |  |  |
| 7 | Coursework | 30 | 1,2,3,4, | 12 Hours |
| 15 | Coursework | 70 | 1,2,3,4, | 38 |
|  | **Module Total**  **To calculate the total fields, select the whole table and press F9 key** | **100%** |  |  |

**19. Length of module delivery.**

Over how many trimesters is this module delivered?

|  |  |
| --- | --- |
| ☒One | ☐Two ☐Three  *See Guidance Note 19* |

**20. Trimester(s) of delivery**

☐ One ☐ Two ☐ Three

**Admin Use**

**21. Approval**

|  |  |
| --- | --- |
| **Date of approval** |  |
| **Date of approval commencement** |  |
| **Final date of review** |  |

**22. External examiner’s name: Prof Shaun Lawson**

**23. Main Administrator’s Name:**

Louise Douglas, Assistant Faculty Operations Manager, School of Computing

**24. Notes** (for administrative use only)

**Admin Use (for each version)**

**25. Exemptions** (awarded from regulations)

1. http://www.qaa.ac.uk/en/Publications/Documents/SBS-Computing-consultation-15.pdf [↑](#footnote-ref-1)