

## 6.5 Research and Professional Ethics

### 6.5.1 Headline information about the module

<b>Module title</b>	Research and Professional Ethics
<b>Module NFQ level (only if an NFQ level can be demonstrated)</b>	9
<b>Module number/reference</b>	M5
<b>Parent programme(s) the plural arises if there are embedded programmes to be validated.</b>	MSc Data Analytics Post Graduate Diploma in Science in Data Analytics
<b>Stage of parent programme</b>	Award
<b>Semester (semester1/semester2 if applicable)</b>	Semester 1/semester 2
<b>Module credit units (FET/HET/ECTS)</b>	ECTS
<b>Module credit number of units</b>	5
<b>List the teaching and learning modes</b>	Full-time and Part-time
<b>Entry requirements (statement of knowledge, skill and competence)</b>	See Section 4
<b>Pre-requisite module titles</b>	None
<b>Co-requisite module titles</b>	None
<b>Is this a capstone module? (Yes or No)</b>	No
<b>Specification of the qualifications (academic, pedagogical and professional/occupational) and experience required of staff (staff includes workplace personnel who are responsible for learners such as apprentices, trainees and learners in clinical placements)</b>	<p>Academic and Professional: PhD desirable and a minimum of an MSc is required. However, in exceptional cases, NFQ Level 8 in Data Analytics, Computer Science, Software Development, Software Engineering or equivalent may be acceptable when combined with significant industrial experience.</p> <p>Pedagogical: Teaching experience is desired. Completion of postgraduate CPD/Certificate in Teaching and Learning or similar preferred. Experience in blended learning delivery required. In absence of experience, training will be mandatory and will be provided.</p>
<b>Maximum number of learners per centre (or instance of the module)</b>	60
<b>Duration of the module</b>	2 semesters

Average (over the duration of the module) of the contact hours per week (see * below)						2.5 Hours				
Module-specific physical resources and support required per centre (or instance of the module)						Physical resource requirements are 1 laptop or PC/workstation per student. Online and on campus resources as per programme specification.				
Analysis of required learning effort										
*Effort while in contact with staff										
Lecture, directed group work and demonstrations		Mentoring, small-group tutoring & directed reading		Other (Assessment)		Directed e-learning (hours)	Independent learning (hours)	Other hours (specify)	Workbased learning hours of learning effort	Total effort (hours)
Hours	Minimum ratio teacher/learner	Hours	Minimum ratio teacher/learner	Hours	Minimum ratio teacher/learner					
5	1:60	5	1:30	5	1:60	15	95	N/A	N/A	125
Allocation of marks (within the module)										
				Continuous assessment		Supervised project	Proctored practical examination	Proctored written examination	Total	
Percentage contribution				100%					100%	

#### 6.4.2 Module aims and objectives

This module aims to provide the underlying research concepts and skills necessary for students to undertake data driven projects within the legal, social and ethical context of a professional work environment with consideration for governance, risk and compliance.

The aims of this module:

1. Learning through reflection and performing skill audits for continuing professional development;
2. Research methods, tools and approaches for designing and developing a computing research project, incorporating literature review synthesis and source data analysis;
3. Professional codes of practice and ethics in computing research, Machine Learning and Cognitive Systems;
4. IT governance, risk and compliance;
5. Ethics of the commercialisation of customer data

### 6.4.3 Minimum intended module learning outcomes

On completion of this module the learner will be able to:

1. Reflect on ones' own learning and engage in peer discussions, critique professional codes of practice and societies, and establish a professional development plan. (Linked to PLO 5, PLO 7)
2. Critically analyse data driven projects, with consideration for ethical implications, IT governance, risk and compliance. (Linked to PLO2, PLO6, PLO7)
3. Identify and articulate a research focus and design, based on current career aspirations, engage in critical peer review to gain insight and reflect upon the appropriate technical, legal, social, ethical and professional context of a research project. (Linked to PLO4, PLO8)
4. Critically appraise a range of literature pertinent to a specialist area within computing, draw conclusions and communicate judgements. (Linked to PLO1, PLO 3)
5. Evaluate and justify appropriate research focused data collection and analysis methods using ethically based design-led approaches. (Linked to PLO8)

### 6.4.4 Rationale for inclusion of the module in the programme and its contribution to the overall IPLOs

This module provides learners with knowledge, skills and competencies within research, professionalism, ethics and governance allowing them to practically connect learning to modules throughout the programme, and particularly, the applied data project in the final semester.

### 6.4.5 Information provided to learners about the module

This module will introduce topics and issues in professional and research practice in an industrial and academic context. It will cover typical research methods and techniques for writing and presenting a literature review and research proposal within a professional context appropriate to the student's own career aspirations. In doing so, it will enhance the student's analytical and communication skills which form a large part of the requirements for achieving a masters level qualification. In addition, core project management skills relating to software development projects will be covered, with consideration for modern team-based approaches used in development.

*This module specification is replicated in the programme handbook and made available on Moodle.*

### 6.4.6 Module content, organisation and structure

#### Indicative Syllabus

#### Syllabus Content

Professional Ethics <ul style="list-style-type: none"> <li>Professional Societies (ICS, IEEE, ACM)</li> <li>Ethical Research and Implications (Computing, Machine Learning, Cognitive Systems...etc)</li> <li>Legal Considerations</li> <li>Intellectual Property</li> </ul>
IT governance, risk, and compliance <ul style="list-style-type: none"> <li>Information Security (ISO)</li> <li>Data Protection (GDPR)</li> <li>IT Governance and Risk Management (COBIT, ITIL)</li> </ul>
Designing a Research Project <ul style="list-style-type: none"> <li>Methodology and rationale</li> <li>Creating a conceptual framework</li> <li>The research statement/question/hypothesis/feasibility/ considering business intelligence aims</li> <li>Research aims, objectives &amp; deliverables</li> </ul>
Critically Reviewing the Literature <ul style="list-style-type: none"> <li>Literature Sources and Quality</li> <li>Data sourcing and analysis</li> <li>Critical Appraisal and Synthesis</li> <li>Technical Writing (Audience based)</li> <li>Source referencing (academic standard)</li> </ul>
Communication and Team Dynamics <ul style="list-style-type: none"> <li>Professional Communication</li> <li>Team Building and Development</li> <li>Cultural Diversity</li> <li>Collaboration through Technology</li> </ul>
Self-Development & Learning <ul style="list-style-type: none"> <li>Skills Audit and Gap Analysis</li> <li>Continuing Professional Development</li> <li>e-Portfolios</li> </ul>

#### 6.4.7 Module teaching and learning (including formative assessment) strategy

Students will receive a mix of lecture, tutorial and workshop-oriented learning. Both self-directed and directed learning will involve working on the problems provided during lectures as well as lab sessions while directed reading will set up scenarios for upcoming workshops. The learners spend their independent time to explore the problems assigned in the classroom to enhance their logical and practical understanding and quality of expertise in this field receiving formative feedback on their efforts.

As part of the teaching and learning strategy, tutorial activities will be utilised to encourage investigation, reflection, questioning, working as an individual and within a group, communicating effectively, giving feedback to lecturers and peers and sharing knowledge and experience.

To provide formative assessment for this module the learner will:

- Be provided an opportunity at the beginning of each class to reflect on the material which was covered the previous week ensuring their competency;
- Be encouraged to engage in peer-discussion surrounding current reading, issues and ideas;
- Be provided with journal articles to review outside of class, and to present a summary using peer-presentation;
- Be provided individual feedback on progress made within their research related project activity.

#### 6.4.8 E-learning

Moodle will be utilised to provide a single point of access for all the lecture material covered during this course. All CA work which is completed by the learner will be uploaded through dedicated Assignment uploading facilities on each Module page. This provides the learner with off-campus access to the course material. In addition, a collaborative software package (Basecamp) allows for formative feedback outside of scheduled class times.

#### 6.4.9 Module physical resource requirements

Physical resource requirements are 1 laptop or PC/workstation per student. In most cases laptops are student-supplied. In the case that students do not have laptops they will be provided by the institution.

#### 6.4.10 Reading lists and other information resources

##### Books & eBooks:

**Ethical and Secure Computing: A Concise Module**, Migga Kizza, J., (2019), Springer

**Ethics in A Computing Culture**, William Brinkman & Alton Sanders (2012) 1<sup>st</sup> edition: South-Western College Publishing.

**Project Management Case Studies and Lessons Learned: Stakeholders, Scope, Knowledge, Schedule, Resource and Team Management**, M. Kemal Atesmen (2014) 1<sup>st</sup> edition: Auerbach Publications.

**Project Management: Proven Principles in Agile Project Management for Successful Managers and Businesses**, Keane, T. (2017) 1<sup>st</sup> edition: (Project Management 101): Independently Published.

**Research Methods, Statistics, and Applications**, Kathryn A. Adams & Eva K. Lawrence (2018) 2<sup>nd</sup> edition: SAGE Publications.

**The Craft of Research**, Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams (2016) 4<sup>th</sup> edition: University of Chicago Press.

##### Full-Text e-Journals:

- Communications of the ACM
- Ethics and Information Technology
- Foundations and Trends in Information and Communication Theory
- Journal of Information Privacy and Security
- Journal of Information Ethics

#### 6.4.12 Module summative assessment strategy

This module is assessed through individual and group work. This will consist of two continuous assessments and one project.

**Module specific online and on campus assessment activities according to assessment type.**

Learning Type	Online activities	On campus activities
Knowledge Acquisition	<ul style="list-style-type: none"> <li>• Pre-recorded presentations</li> <li>• Multi-media text-based materials</li> <li>• Videos</li> <li>• Guest speakers</li> <li>• Open ed resources</li> </ul>	<ul style="list-style-type: none"> <li>• Face to face lecturers</li> <li>• Practical Demonstrations</li> </ul>
Collaboration	<ul style="list-style-type: none"> <li>• Group projects</li> <li>• Discussion forums</li> <li>• Virtual classroom peer learning</li> <li>• Team virtual lab activities</li> <li>• Group presentations</li> <li>• Mentoring</li> </ul>	<ul style="list-style-type: none"> <li>• Group projects</li> <li>• Team based lab activities / practical workshops</li> <li>• Group presentations</li> </ul>
Discussion	<ul style="list-style-type: none"> <li>• Discussion forums (synchronous and asynchronous)</li> <li>• Zoom breakout room discussions</li> <li>• Online tutorials</li> <li>• Project supervision</li> <li>• Webinars (industry experts)</li> <li>• Reflective activities</li> </ul>	<ul style="list-style-type: none"> <li>• Class discussion</li> <li>• Tutorials</li> <li>• Project supervision</li> <li>• Face to face lab / practical activities</li> </ul>
Investigation	<ul style="list-style-type: none"> <li>• Open ed resources</li> <li>• Lab observations</li> <li>• Project research</li> <li>• Information and data sourcing, analysis and evaluation</li> <li>• Flipped Learning</li> </ul>	<ul style="list-style-type: none"> <li>• data sourcing and analysis</li> </ul>
Practice	<ul style="list-style-type: none"> <li>• Virtual lab</li> <li>• Simulations</li> <li>• Case studies</li> <li>• Analysis of data sets</li> <li>• Presentations</li> <li>• Online quizzes / MCQs</li> </ul>	<ul style="list-style-type: none"> <li>• Labs</li> <li>• Practical workshops</li> <li>• Group work</li> </ul>
Production	<ul style="list-style-type: none"> <li>• E-portfolio</li> <li>• Reflective journal</li> <li>• Assessment outputs</li> <li>• Quiz / MCQs</li> <li>• Case studies</li> <li>• GitHub records</li> </ul>	<ul style="list-style-type: none"> <li>• Exam</li> <li>• Case studies</li> <li>• Student demonstration</li> </ul>

**For indicative Assessment Schedule see appendix 8**

The assessment links to learning outcomes are summarised below

A ✓ indicates that the PLO has been formatively assessed as per the teaching and learning strategy for the programme	Module Learning Outcomes					Programme Learning Outcomes							
	1	2	3	4	5	1	2	3	4	5	6	7	8
<b>Continuous Assessment 1</b>	✓	✓					✓			✓	✓	✓	✓
<b>Continuous Assessment 2</b>			✓	✓	✓	✓		✓	✓				✓

#### 6.4.13 Sample assessment materials

See appendix 9