College of Engineering and Technology

PgCert/PgDip/MSc Big Data Analytics

Programme Specification

<table>
<thead>
<tr>
<th>Commencing</th>
<th>September 2014</th>
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<tr>
<td>JACS code</td>
<td>I420</td>
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<tr>
<td>Programme Code</td>
<td>MI4AA (campus) / OLPBZ (online)</td>
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<tr>
<td>Valid for delivery at</td>
<td>University of Derby (Kedleston Road Campus) University of Derby Online Learning (from January 2019)</td>
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SECTION ONE: GENERAL INFORMATION

1.1 Programme Title
MSc Big Data Analytics

1.2 Award title and interim awards
Final award:
MSc Big Data Analytics
PG Cert Big Data Analytics
PG Dip Big Data Analytics
Interim awards:
PG Cert Big Data Analytics
PG Dip Big Data Analytics

1.3 Mode of study
Full-time
Part-time
Online Learning

1.4 Programme start date/review date
Start date: September 2014
Period of Validation: Indefinite

1.5 Awarding Institution
University of Derby

1.6 College Managing the Programme
College of Engineering and Technology

1.7 Institution(s) Delivering the Programme
University of Derby
Mediterranean College

1.8 Relevant external subject benchmark statements
QAA Subject benchmark statement for Mathematics, statistics and operational research (QAA212 12/07) QAA Annex to subject benchmark statement for Master's degrees in Computing (2011)

1.9 External Accreditation/Recognition
None

1.10 JACS Code
I420

1.11 Programme specification last updated
September 2018
SECTION TWO: OVERVIEW AND PROGRAMME AIMS

2.1 Overview

Big data is all around us. Every day, 2.5 quintillion (2,500 followed by 15 zeros) bytes of data are created, and 90% of the data in the world today has been generated in the last two years. As a consequence, the ability to identify and obtain intelligence from big data requires a set of skills which is increasingly in demand.

“The demand for Big Data professionals continues to grow as companies further expand their strategies, harnessing the power of Big Data into all areas of their business operations” (Harnham Salary guide 2014, page 10).

The MSc in Big Data Analytics provides students with the opportunity to gain in-depth knowledge and critical understanding of a range of issues and concepts in Big Data Analytics. A central theme of the programme is the extraction, analysis and management of information from big data using a variety of scientific techniques and software tools.

This programme is designed both for graduates from relevant technological subject (such as Science, Technology, Engineering and Mathematics, or STEM degrees, as well as subjects areas where statistical analysis is a core subject), who wish to explore and gain knowledge pertaining to Big Data Analytics and for current professionals in Analytics and Data Science who wish to extend their knowledge and expertise of the field. It provides a robust grounding in the key principles and tools, together with a strong focus on industrial applications. Thus, it provides a foundation for either further research, or a career applying leading edge software analytics technology to industry.

An important aspect of this Masters programme is that its structure and learning outcomes have been designed in conjunction with SAS (http://www.sas.com/en_us/company-information.html), a leading provider of software platforms for data mining and business intelligence, widely used in both industry and academia. More specifically, a critical and deep understanding of the relevant theoretical aspects related to big data is integrated with SAS, as well as other up-to-date software applications, to gain a comprehensive knowledge relevant to both prospective and well established IT professionals and entrepreneurs, who want to make an impact in the field of Big Data Analytics.

This programme offers a taught face-to-face programme that incorporates real-world industry based problems to be addressed during both supervised tutorial sessions and independent work. It is an intellectually demanding process that requires not only specialist knowledge of Big Data Analytics, but also the ability to apply multidisciplinary concepts to real world problems relevant to today’s dynamic business and scientific areas.

The programme is located within the College of Engineering and Technology, which has delivered a wide range of successful postgraduate programmes in computing and computing-related areas for many years, and provides a stimulating and supportive learning environment, evidenced by the consistently positive students’ feedback.

Furthermore, the School has close and well-established links with industry through research and high profile consultancy projects, ensuring that the programme remains up-to-date and relevant. The School also has close links with SAS, who are global leaders in data analytics and a variety of existing modules include this software alongside other tools that are relevant to the area, both at undergraduate and postgraduate level.
Graduates from the programme will be equipped for careers in business intelligence and data analytics, which includes the analysis and extraction of information from Big Data sets relating to any type of industry or business. Additionally, graduates will gain high level skills and knowledge pertaining to consultancy and entrepreneurship. This programme also provides a suitable grounding for progression on to PhD studies.

2.2 Programme Aims

This programme has been designed with the following principles at its core:

- **Employability** – This programme employs a Learning, Teaching and Assessment (LTA) Strategy that is both geared towards the needs of industry and further academic study and thus presents opportunities to build up the practical experiences of students. Due to the high demand for Big-Data scientists, this programme provides students with a set of skills and knowledge to successfully follow a career in the field, or undertake further studies.

- **Curriculum informed by research** – The modules that students undertake incorporate the latest techniques and approaches, and are delivered by research-active academic tutors. Furthermore, these are also continuously revised to accommodate industry requirements.

- **Advanced professionalism** – Students will be required to reflect upon their personal, professional and vocational aspirations, and apply this experience to their own, professional development. In addition, students will be able to complement their studies with an appropriate SAS qualification, upon successful completion of the relevant examinations. Finally, students will satisfy the criteria for Chartered Information Technology Professional status, upon completion of satisfactory post programme industrial experience.

- **Learner autonomy** – Students are encouraged to become independent and autonomous, which is a fundamental characteristic of a Level 7 (masters) learner. In fact, critical and deep thinking is crucial to succeed in this industry-led sector.

Essentially the LTA approach is achieved through the creation of a learning community that comprises students and staff, who are engaged in reflective, lifelong learning, through a curriculum based on enquiry.

The main general aim of this programme is to equip students with Master’s level knowledge of Big Data Analytics theory, approaches, tools and technologies. It will develop their ability to effectively apply a variety of scientific techniques to real world problems arising in diverse fields. Through instruction and project work students will be provided with breadth and depth in their knowledge of Big Data Analytics.

As well as offering a route to further study at PhD level, successful completion of this programme will enable a student entering, or returning to, work, to more effectively communicate their knowledge and skills to a broad audience of people with diverse backgrounds in order to be able to operate in and lead multidisciplinary teams.
By studying this programme, students will achieve:

- Specialist knowledge about Big Data Analytics, and all the aspects related to this field, such as acquiring, managing, and visualising information, rigorous and effective communication skills, as well as a deep understanding of the ethical issues involved.
- An ability to apply advanced scientific and computational techniques to real world problems.
- A sound and critical understanding of the relationship of Big Data Analytics to other sciences, business, and industry.
- A critical appreciation and awareness of Big Data Analytics, emphasising the bridges between theory and practice.
- An ability to synthesise and communicate complex ideas using appropriate means, in particular with regard to multidisciplinary applications, teams and audiences.
- An ability to be a critically self-reflective practitioner, to learn and work both independently and as part of a multidisciplinary team.

2.3 Background/Context for Mediterranean College

Mediterranean College (Med College) is the first independent Anglophone College to be founded in Greece, in 1977. All tuition is therefore in English for all their awards.

For the computing programmes, during the first 3 semesters of the undergraduate awards, assessments may be completed either in Greek or English. Most students are comfortable completing their assessments in English, but a few aren’t.

Those students that do not have evidence of IELTS 5.5 must enrol for and pass a Level 3 English module alongside their first year (Level 4 modules), and also enrol for, and pass, a level 4 English module alongside their second year (level 5) modules. Any student failing to pass both English modules is deemed not to have achieved the equivalent of IELTS 5.5 by the end of the second year and will not be permitted to proceed to the final year of the programme, unless, and until, they pass the two English modules.

Students assessments, completed in Greek, are translated by an external translation service, the staff feedback comments are also translated into English, thereby permitting modules leaders to moderate the work and the feedback.

Med College have been in partnership with the University of Derby since 2013 providing franchises of Computing Awards: BSc Computer Science, BSc Computer Networks as full time programmes and MSc Advanced Computer Networks as a part time programme taken while students are often in full time work.

The addition of BSc Computer Games Programming (full time) and MSc Big Data Analytics (part time) are programmes that are attractive to local employers as well as students.

Med College has campuses in Athens and Thessalonica. Athens is the main administrative centre but both sites effectively run independent versions of the awards. Visits from University of Derby staff are made to both sites a couple of times a year. Each site has its own graduation ceremony annually for all the awards franchised from the University of Derby.
SECTION THREE: PROGRAMME LEARNING OUTCOMES

In order to qualify for a postgraduate award, students are required to satisfy the credit requirements of the award for which they have registered.

Specific Programme Learning Outcomes

The Specific Programme Learning Outcomes are articulated in terms of:

• Knowledge and Understanding
• Intellectual Skills
• Practical and Subject-Specific Skills
• Transferable Skills

3.1 Stage 1 – The Postgraduate Certificate

Knowledge and Understanding:

On completion of the programme, students should be able to demonstrate a sound knowledge and understanding of:

A1 A range of concepts, paradigms, theories, models and skills relevant to Big Data Analytics and its application to a number of application domains.

A2 Current issues and thinking, leading edge theory and practice and techniques applicable to research in the Big Data Analytics arena.

A3 Deep, relevant and up-to-date knowledge of issues within Ethics and Governance in Big Data Analytics.

Intellectual Skills

You will be able to:

B1 Analyse a range of complex problems in the field of Big Data Analytics.

B2 Apply innovative and novel methods in solving problems, making use of current knowledge at the forefront of Big Data Analytics.

B3 Successfully formulate and apply appropriate data mining, visualisation, statistical and mathematical models, to solve Big Data problems within the industry and for general research, and the ability to critically assess their limitations in practice.

Practical and Subject Specific Skills

You will be able to:

C1 Identify research issues in the field of Big Data Analytics.
C2 Practically apply appropriate theories, and principles to the solution of Big Data Analytics problems, enabling the analysis of data extracted, and appropriate visualisation where appropriate.

Transferable Skills

You will be able to:

D1 Learn and work independently and autonomously.

D2 Communicate complex ideas using appropriate means.

D3 Integrate ideas and practice in a cross-disciplinary manner.

3.2 Stage 2 – The Postgraduate Diploma

Knowledge and Understanding

On completion of the programme, you will be able to demonstrate a sound knowledge and understanding of the following:

A4 The role of Big Data Analytics in the context of an increasingly complex networked world of modern society.

A5 The formation, application and limitations of data mining, visualisation, statistical and mathematical models, and their relevance in solving Big Data problems within the industry and for general research.

A6 Advanced data extraction techniques, their implementation, critical assessment, maintenance, and visualisation in relevant disciplines and the wider consequences of their use both locally and globally.

Intellectual Skills

You will be able to:

B4 Critically analyse current issues and developments in the field of Big Data Analytics.

B5 Critically discuss the importance of Big Data Analytics at a global scale.

B6 Engage in lifelong learning so as to remain at the forefront of their academic discipline.

Practical and Subject Specific Skills

You will be able to:

C3 Undertake research and sourcing, organising, and abstracting meaning from information and, often little knowledge.

C4 Acquire a critical understanding of Big Data Analytics tools for data manipulation and analysis of real-world data.
Transferable Skills

You will be able to:

D4 Acquire, evaluate and build upon complex and sometimes conflicting information relating to recent advances in Big Data Analytics.

D5 Apply new knowledge in novel and unfamiliar situations and in a cross-disciplinary manner.

D6 Become a reflective learner.

3.3 Stage 3 – The Masters Degree

Knowledge and Understanding
On completion of the programme, you will be able to demonstrate a sound knowledge and understanding of the following:

A7 Research methodologies and techniques applicable to a large scale research project as applied to Big Data Analytics.

Intellectual Skills
You will be able to:

B7 Critically assess contributions in the literature leading to the creation and justification of a methodologically sound research programme in Big Data Analytics.

Practical and Subject Specific Skills
You will be able to:

C5 Generate complex sustainable research proposals showing awareness of current issues and insights, and originality in Cyber Security and, where appropriate, proposing new hypotheses and speculations

Transferable Skills
You will be able to:

D7 Adopt an original and self-critical approach and undertake a significant piece of independent research in Big Data Analytics.

SECTION FOUR: PROGRAMME STRUCTURE

4.1 Structure and Curriculum
The programme is studied on either a full-time, part-time or online (OL) basis. The modules that make up the programme have particular importance in the preparation of students to the world of work and have been designed to meet the requirements of the QAA subject benchmarks.
Master of Science in Big Data Analytics

Level 7

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<tr>
<th>Module Code</th>
<th>Module Title</th>
<th>Credits</th>
<th>Status</th>
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<tbody>
<tr>
<td>7CS094</td>
<td>Studying at Masters Level &amp; Research Methods</td>
<td>20</td>
<td>Core</td>
</tr>
<tr>
<td>7CS512</td>
<td>Business Analytics</td>
<td>20</td>
<td>Core</td>
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<td>7CS516</td>
<td>Processing Big Data</td>
<td>20</td>
<td>Core</td>
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<tr>
<td>7CS517</td>
<td>Analytics: Ethics, Trust and Governance</td>
<td>20</td>
<td>Core</td>
</tr>
<tr>
<td>7CS519</td>
<td>Information Visualisation</td>
<td>20</td>
<td>Option</td>
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<td>7MA505</td>
<td>Statistical Techniques</td>
<td>20</td>
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<td>7CS518</td>
<td>Natural Language Processing</td>
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<td>7MA500</td>
<td>Optimisation</td>
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<tr>
<td>7CS997</td>
<td>Independent Scholarship*</td>
<td>60</td>
<td>Core</td>
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</table>

*For Independent Scholarship participants are required to complete a substantial research project on a topic related to the programme, including a final Dissertation/Master’s thesis. The topic of Independent Scholarship must be approved by the programme leader as being in line with the target award, and be approved by the Faculty as meeting the University Code of Practice and Research Ethics.

*Option to be selected from the following (subject to availability):
- Information Visualisation
- Statistical Techniques
- Natural Language Processing
- Optimisation

Students who do not complete the full Masters programme of study (180 credits), may be awarded a Postgraduate Certificate in Big Data Analytics with 60 credits if they pass three modules, including Studying at Masters Level and Research Methods.

A Postgraduate Diploma in Big Data Analytics can be obtained upon passing 120 credits from taught modules (i.e., all core modules and one optional).

It is possible to study either in full or part-time modes on campus or part time online.

- **On campus study** covers 2 Semesters per academic year, September to August with three modules (60 credits) per semester full time or two modules (40 credits) part time.
  - Full-time study – September to August (1 calendar year)
  - Part-time study – September or January start typically for a minimum of 2 years

Due to co-delivery of modules, only the entry point in January is available to students.
  - January to June (1.5 calendar year)

- **The online study mode** covers three Trimesters per academic year, September to August with three intakes a year and can be studied at a standard rate (20 credits / one module per trimester), or accelerated (40 credits / two modules per trimester). The
accelerated mode is offered by agreement with the course leader after the completion of the first module 7CS094 Studying Masters Level and Research Methods.

### 4.1.1 On Campus full time study pattern

#### MSc Big Data Analytics – on campus full time - September Start (12 months)

<table>
<thead>
<tr>
<th>Course Level</th>
<th>Semester</th>
<th>Modules</th>
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<tbody>
<tr>
<td>Postgraduate Certificate in Big Data Analytics</td>
<td>Autumn Semester Sept-Dec</td>
<td>Studying at Masters Level and Research Methods 7CS094, Processing Big Data 7CS516, Statistical Techniques 7MA505</td>
</tr>
<tr>
<td>Postgraduate Diploma in Big Data Analytics</td>
<td>Spring Semester Jan-May</td>
<td>Business Analytics 7CS512, Analytics: Ethics, Trust and Governance 7CS517, Information Visualisation 7CS519</td>
</tr>
<tr>
<td>Master in Big Data Analytics</td>
<td>Summer Semester May-Sept</td>
<td>Independent Scholarship/WBL 7CS997</td>
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#### MSc Big Data Analytics – on campus full time - January Start (16 months)

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<th>Course Level</th>
<th>Semester</th>
<th>Modules</th>
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<tbody>
<tr>
<td>Postgraduate Certificate in Big Data Analytics</td>
<td>Spring Semester Jan-May</td>
<td>Studying at Masters Level and Research Methods 7CS094, Business Analytics 7CS512, Analytics: Ethics, Trust and Governance 7CS517</td>
</tr>
<tr>
<td>Postgraduate Diploma in Big Data Analytics</td>
<td>Autumn Semester Sept-Dec</td>
<td>Processing Big Data 7CS516, Statistical Techniques 7MA505 or Natural Language Processing 7CS518</td>
</tr>
<tr>
<td>Master in Big Data Analytics</td>
<td>Spring Semester Jan-May</td>
<td>Independent Scholarship/WBL 7CS997</td>
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4.1.2 Online Learning delivery pattern

**Standard Rate of Study**

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<tr>
<td><strong>Spring 2019</strong></td>
<td>Studying at Masters Level and Research Methods 7CS094</td>
<td>Processing Big Data 7CSS16</td>
<td>Business Analytics 7CSS12</td>
<td>Studying at Masters Level and Research Methods 7CS094</td>
<td>Processing Big Data 7CSS16</td>
<td>Business Analytics 7CSS12</td>
<td>Studying at Masters Level and Research Methods 7CS094</td>
<td>Processing Big Data 7CSS16</td>
<td>Business Analytics 7CSS12</td>
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<td>Processing Big Data 7CSS16</td>
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<tr>
<td><strong>Summer 2019</strong></td>
<td>Studying at Masters Level and Research Methods 7CS094</td>
<td>Business Analytics 7CSS12</td>
<td>Analytics: Ethics, Trust and Governance 7CSS17</td>
<td>Processing Big Data 7CSS16</td>
<td>Statistical Techniques 7MA505</td>
<td>Information Visualisation 7CSS19</td>
<td>Independent Scholarship 7CS997</td>
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</tr>
<tr>
<td>** Autumn 2019**</td>
<td>Studying at Masters Level and Research Methods 7CS094</td>
<td>Business Analytics 7CSS12</td>
<td>Analytics: Ethics, Trust and Governance 7CSS17</td>
<td>Processing Big Data 7CSS16</td>
<td>Statistical Techniques 7MA505</td>
<td>Information Visualisation 7CSS19</td>
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**Accelerated Rate of Study**

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<tbody>
<tr>
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<td>Studying at Masters Level and Research Methods 7CS094</td>
<td>Processing Big Data 7CSS16</td>
<td>Business Analytics 7CSS12</td>
<td>Independent Scholarship 7CS997</td>
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<tr>
<td><strong>Summer 2020</strong></td>
<td>Processing Big Data 7CSS16</td>
<td>Statistical Techniques 7MA505</td>
<td>Business Analytics 7CSS12</td>
<td>Information Visualisation 7CSS19</td>
<td>7CS997</td>
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<tr>
<td>** Autumn 2020**</td>
<td>Processing Big Data 7CSS16</td>
<td>Statistical Techniques 7MA505</td>
<td>Business Analytics 7CSS12</td>
<td>Information Visualisation 7CSS19</td>
<td>7CS997</td>
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- Students will start with one module a trimester only.
- After passing the first module ‘Studying at Masters Level and Research Methods’ they can do two modules a semester based on the programme leader appreciation.
- Accelerated route will be available from the Academic Year 2019-2020.
- To ensure smooth delivery, all the modules have been scheduled for online delivery at the same time as on campus delivery, except from the following modules:
  - The module ‘Studying at Masters Level and Research Methods’ is delivered in each trimester as the first module taken in the online delivery which allows students to join at the beginning of any trimester.
4.1.3 Mediterranean College delivery pattern

The Mediterranean College will be using a specific delivery pattern, where the course is completed over two years (3 taught semesters plus dissertation).

The order of delivery for the modules for the four distinct emerging patterns is described in the diagram below.

Notes:
1. The delivery pattern repeats every two years (Someone joining in Spring 2022-23 would follow Pattern 2, delivered in Spring 2018-19)
2. Postgraduate Certificate in Big Data Analytics with 60 credits if they pass three modules, including Studying at Masters Level and Research Methods
3. Postgraduate Diploma in Big Data Analytics can be obtained upon passing 120 credits from taught modules (i.e., all core modules and one optional)
4.2 Personal Development Planning (PDP)

The University has a policy of encouraging students to engage in Personal Development Planning (PDP), which is an integral part of teaching and learning. This is further supplemented with the use of portfolio assessment, thus enabling students to create explicit intellectual links between the individual modules of the programme and their own personal and professional development.

Students on the Big Data Analytics programme will be provided with the opportunity to develop their personal development planning skills within the Studying at Masters Level & Research Methods module. This module will assist students with the development of critical self-analysis and reflective practice skills which underpins robust learning analysis and development planning. Specifically, it will help students to develop the following generic skills:

- Those required for the creation of the lifelong learner, who can set goals and identify resources for the purpose of learning
- An ability to critically review the literature, which includes identifying all of the key developments in a particular area of study, identifying limitations and avenues for further development or explanation
- An ability to recognise and respond to opportunities for innovation
- Leadership skills, which tend to be characterised by acquiring a vision (based on sound technical insights) coupled with the ability to encourage others to share in that vision and to ensure that this will not be to their detriment.

This will enable students of the programme to prepare to meet the academic requirements of the British Computer Society (BCS), enabling students to achieve Chartered Information Technology Professional status after completion subsequent satisfactory industrial experience post programme.

The newly established Data Science Research Centre will provide great opportunities for students to engage with real world learning, and work on current research projects. [https://www.derby.ac.uk/research/researchareas/data-science-research-centre/](https://www.derby.ac.uk/research/researchareas/data-science-research-centre/)
SECTION FIVE: PROGRAMME DELIVERY

The learning, teaching and assessment strategy has been guided by the School of Computing and Mathematics’ LTA strategy, and in line with good practice it has been developed to be mindful of the diverse nature of the students, their backgrounds and their prior experiences of learning and teaching. The overall aim of the learning, teaching and assessment, is to take the student through a relevant journey in terms of knowledge, the development of intellectual, transferable, analytical skills and critical awareness. A key component of the postgraduate computing programmes, is the focus upon the use of academic staff and students' experiences as an integral part of the learning process, both in terms of individuals reflecting on their experience and practice, and also groups of tutors and students sharing their experiences as a group.

Where activities are studied solely online, appropriately planned activities will be provided to support your studies (virtual seminars, online guest talks, online simulations, etc).

Throughout the programme you will be encouraged to take an independent and mature approach to your own learning activities, and to the active pursuit of understanding and insight into current and relevant issues and developments. As well as receiving formative feedback from staff and participants, you will be encouraged to reflect upon your own development through the establishment and maintenance of a professional portfolio. Subject specific practical and professional skills are developed both in workshops and by online learning. Some may involve technical activities or small projects, while others require the application of concepts, tools and techniques to given case studies, practical scenarios and organisations.

Intellectual and key skills are embedded within the learning experience. During induction you will be introduced to Studying at Masters Level and Research Methods, in particular critical analysis and writing skills, with support from peers and your tutors. This module also serves to introduce you to essential research skills for Masters study, and establishes the way in which your learning will be facilitated throughout the programme with the help of tutors.

You will develop autonomy as a learner by applying theoretical concepts to practical scenarios in a rigorous way. This experience will be augmented through access to the University’s Virtual Learning Environment, delivered via the UDO online portal. This portal will also give you access to additional materials, self-tests and further support.

As part of your development as a lifelong learner it is important that you reflect both on your learning and the processes which supported it. Your professional portfolio presents an opportunity to record evidence of your developing skill set, together with reflections that describe your advanced professional skills, as applied to real examples. Your portfolio is likely to be electronic and you will update it throughout the course of your studies.

5.1 Learning and Teaching Methods

All students are required to comply with research governance and ethics principles whilst undertaking their programme of study. This is of particular importance when conducting research involving other people e.g. for module assessments or Independent Studies. Information on these principles can be found on the University web site at www.derby.ac.uk/research/ethics

Throughout the programme students will be encouraged to adopt a critical and evaluative approach both to the synthesis of theory and practice and to the application of knowledge and understanding gained to your own role and to the wider organisational, economic and social context. The cognitive related abilities are imparted not only through the use of
lectures and background reading, but also by practical activities in laboratories which require deep understanding of the material in order to be successful.

The practical based skills are developed through activities such as laboratory based exercises and through the use of coursework assessment. To be a successful practitioner in the field requires a wide range of skills and abilities. Thus learning experiences are varied, with the use of lectures, tutorials, laboratories, individual work, seminars and presentations as appropriate. The programme will be supported by the use of an Internet based repository, this will hold items such as downloadable lecture notes and tutorial notes, supplementary reading materials, hints and tips regarding assignments and exercises and discussion boards where tutors can deal with frequently asked questions and students can share knowledge in a mediated manner.

Intellectual skills are developed through the active involvement of students in learning, teaching and assessment. It is imperative therefore that all methods employed within modules take due account of active learning techniques allowing for analysis, synthesis, critical evaluation and contextual understanding to develop.

There is a significant emphasis on research; tutorials are generally geared/focussed towards exploring current research themes and topics. There is a strong emphasis towards students developing research oriented topics of personal interest which can later be developed into an independent study through the Independent Scholarship.

In the final phase of the Masters, all students take the module entitled Independent Scholarship. This is a research based project and in order to be successful in this module, students will have to develop good research skills and possess a high level of motivation. This module is the culmination of the work that the students undertake during their programme and their progress closely monitored and assessed.

5.1.1 Full Time Study

The development of the autonomous and independent learner is further enhanced by a range of technology enhanced learning tools and activities. You will have access reading and research activities, self-evaluation tools to enhance your self-directed study techniques.

Different methods will be used to activate different learning styles and you will therefore experience variety. Learning and teaching techniques are deliberately varied in nature and will include face to face or virtual lectures (the majority of modules will have this method as a basis of initial delivery), case studies, role play, debates, student presentations, both formative and summative enquiry based learning, and problem solving activities. The particular methods used in enabling these techniques will vary according to both the individual needs of the students, as well as whether students are physically present or studying at a distance. The programme encourages you to practically apply your learning through a variety of means with the aim being to encourage and develop your critical evaluation and the ability to synthesise and apply solutions to complex, real life problems.

Asynchronous learning forms a major part of your learning experience. Lecture and learning materials (including audio or video recordings) will be available for all students to enable materials to be revisited according to individual student need and pace.
5.1.2 Part Time Study
The MSc Big Data Analytics programme has been designed such that taught modules that comprise 120 Credits can be studied in any order (other than studying at Masters level, which must be studies in the first semester), subject to any timetable constraints and maximum time limits for the successful achievement of PG study. Students typically study modules at half the rate of full time study (one or two modules per semester), in consultation with the Programme Leader. At each opportunity for module selection, the Programme Leader will be available to counsel individual students.

5.1.3 Online Learning Study
In Online study, students will be actively engaging in group interaction, for example, using Wikis, Blogs, or discussion boards to capture student interaction asynchronously.

The nature of Online study is such that technology is employed to enhance and enrich the potential learning experience. Online materials are available that both present content and also promote learner engagement, with the material itself and with other OL learners.

When guest speakers present at UoD (subject to their approval), recordings will be made so that OL students can benefit from these experiences. From the commencement of the programmes, participative approaches to teaching will be used to facilitate the sharing of knowledge and experience. Logistical difficulties generated by cultural adjustments or different time zones will be recognised and support will be provided if required.

The Programme Leader will co-ordinate responses required by individual students’ care plans. The teaching and learning strategy will be adapted to ensure that the student is provided with the equal opportunities for teaching, learning and personal development.

All students are required to comply with research governance and ethics principles while undertaking their programmes of study. This is of particular importance when conducting research involving other people for module assessments or Independent Scholarship. Information can be found at www.derby.ac.uk/research/ethics.

5.1.4 Collaborative delivery
The MSc Big Data Analytics programme can be delivered at collaborative partners. Mediterranean College will deliver this programme using a specific delivery pattern, where the course is completed over two years (3 taught semesters plus dissertation).

5.2 Assessment
A range of assessments, commensurate with level 7 requirements has been devised. A flexible approach has been taken in developing the assessment strategy, to allow for the diverse nature of the student cohorts as well as the different learning styles of individual students. Programme team members have been encouraged to share good practice and create and develop relevant assessments. Assessments for all modules have been designed to be inclusive of students on any delivery route, whether full time, part time, or online.

Formative assessment will be provided across the breadth of modules to assist students in both a structured learning approach but also to provide feedback opportunities. This is particularly important in the early stages of the programme, as this gives clear benchmarks with regard to students’ progress on the programme. The process may include self-assessment, peer review, as well as feedback from the tutors following class exercises, for enquiry based learning and problem based learning activities etc.
Summative assessment will take different forms to ensure congruence with the programme aims and learning outcomes identified, and the Masters levels in knowledge, skills and personal development. Over the course of a programme students will experience different assessment methods which may include coursework, written exams, research projects, and a dissertation/thesis. A typical twenty credit module has an associated assessment workload of 6000 words (or equivalent). In this programme the final assessment at master’s level will be a major piece of independent study (either the Independent Scholarship or Learning from Professional Engagement on Placement (WBL) module), demanding the demonstration of a wide range of knowledge and skills, including those as indicated in the QAA level 7 benchmarks for Computing (2011).

5.3 Feedback

While verbal or written feedback will be provided for formative assessments, students will usually receive written feedback on all summative assessments. The balance of the overall assessment load, and its effectiveness, will be monitored on a regular basis by the programme team, in addition to the normal checks through programme committees and external examiner feedback. Assessment activities throughout the programme both draw on and allow, the enhancement of key skills. The Independent Scholarship stage also provides an opportunity to assess all of these skills.

Formative feedback is provided by peers and tutors during the programme and can be face-to-face or online via the University’s Virtual Learning Environment (VLE). Feedback may be given to the whole group, to small groups, or to individuals depending upon the nature of the activities.

VLE feedback will often be posted through a discussion forum, but as befits a programme that is continually being enhanced, new and emerging communication methods may be employed. After a workshop presentation or practical walkthrough you would typically receive some feedback sheets or verbal feedback.

Summative feedback is provided by tutors, usually at the end of the module. Normally this will consist of a marking grid showing what you have achieved against the learning outcome criteria, together with comments from your tutor.
SECTION SIX: ADMISSIONS

6.1 Entry Requirements

The University's standard entry requirements can be found at: https://www.derby.ac.uk/postgraduate/computing-courses/big-data-analytics-msc/

Applicants for the MSc Big Data Analytics programme will normally hold a 2.2 or higher Bachelor's degree in a Science, Technology, Engineering, Mathematics (STEM) or a closely related discipline with significant mathematical content at an appropriate level, or an equivalent international degree.

Applicants who do not meet these criteria may still be eligible if they can demonstrate relevant work experience in a management or supervisory position, supported by employers references, and can demonstrate effective communication and learning skills and the motivation to succeed during an interview.

Where required, interviews will be conducted by the Programme Leader and may be undertaken by telephone where access to campus may be prohibitive.

English language requirements are set by the University, and at the moment specify

- IELTS: 6.0 (with a minimum of 5.5 in all areas).

https://www.derby.ac.uk/postgraduate/applying/

In all cases where students do not come from the ‘traditional’ education route and who do not meet the ‘normal’ entry criteria that have been specified above, Recognition of Prior Experiential Learning (RPEL) or Recognition of Prior Certified Learning (RPCL) may be possible. RPEL/RPCL for this programme is granted in accordance with University policy. The University has embraced the spirit and content of the Special Education Needs and Disability Act (SENDA) documentation. All programmes in The College of Engineering and Technology have a clear and effective strategy for ensuring that access on to Computing programmes is as wide as possible for students with declared disabilities. The process is officially initiated by application, although in many cases this is pre-empted by discussions on ‘visit days’ prior to application. Following application to the programme, a meeting with the applicant, Programme Leader, Student Support Services and the Disability Advisor for College of Engineering and Technology is convened. This allows an evaluation of the needs and available facilities to be made and a ‘support plan’ to be worked out and agreed by all parties. This means that support can be available immediately on enrolment. The support plan is monitored and modified as required throughout the period of study.

The same entry and English requirements apply for our collaborative partners.

- Mediterranean College
SECTION SEVEN: STUDENT SUPPORT AND GUIDANCE

The programme team will provide personal support and guidance to you and advice on access to the university’s student support services. You will be provided with a detailed induction in your first few days of the programme to familiarise you with the university campus, processes and procedures, key personnel, programme details and tutors. Due to the high level of fellow international students in the full time and OL cohorts, this early induction will also focus on the challenges of working in a different cultural academic environment and on developing coping strategies to deal with this. Additional support will be given to ensure that students are familiar and confident in using the university’s VLE and related systems (e.g. access to the university online portal, UDo etc.). Specific support will be front loaded for Online students to ensure that they have the capability and confidence to engage with the university’s on-line learning systems. Attention will also be paid to the differences of studying at Master’s level to assist you in making the transition from undergraduate and/or professional body to postgraduate study.

The programme team consists of the programme leader and the module leaders at each stage and all the team will provide you with appropriate support and guidance related to your activities. In addition, you will be allocated a personal tutor who will monitor your progress and help you with individual issues. Online students also benefit from dedicated support through the online learning advisors (OLA) support team who can help resolve practical matters related to Online. International student enquiries including visa queries will be signposted to the International Student Centre, details are provided in the Programme Handbook.

The Faculty also provides a Student Liaison Officer who can provide additional support and advice and postgraduate administrative support as detailed in your Programme Handbook. The University central Student Support Services offer a wide range of general, specialist and professional support services for students as detailed in your programme handbook.

Students with special needs can register with the Student Support Services who can design a personalised Student Support Plan. The University also offers facilities for on campus students for religious observance in the Multi-Faith Centre.

Supervisory arrangements are formalised in terms of independent study for the Dissertation, with a designated tutor for each project. Additionally, personal tutorial support will be provided in the module Studying at Masters Level & Research Methods to work with you on a one-to-one and small group basis focusing on personal development planning issues to develop study and employability skills, and preparing you to become an independent learner to support life-long learning after completion of the programme. Interaction with all guest speakers (where permitted) will be video recorded for the benefit of Online students.

The University offers a range of advisory services offering support to students. Most services are accessible on a drop-in basis and also offer appointments if you would like to discuss personal or academic related matters in more detail. Please familiarise yourself with the services and if you are experiencing any difficulties make sure that you speak to someone.

The Student Handbook and Diary is an excellent source of further information about support services. You will receive a copy when you enrol and they are also available from the Student Support and Information Services. You will need to regularly look up information in the handbook and the diary will help you to record deadlines and forthcoming events.

Given the professional opportunities afforded by an advanced Masters programme in Big Data Analytics, a key feature of support will be via the student cohort itself. Cohorts, whether
full, part time or online, will be encouraged to form synchronous support sets and produce asynchronous support materials e.g. through the use of Wikis and Blogs.

7.1 The Student Voice

We are very keen to hear about the experiences of students and welcome all feedback, good or bad which will help us to improve the student experience. We have therefore tried to find various ways in which you can feedback to us, both formally and informally. In terms of formal arrangements we encourage the election of student representatives who feed into the Programme Committee. These committees are held three times a year. Programme Committees review and monitor the operation of the programme and any intended changes to the programme need to be approved by the Programme Committee.

Student representatives play a vital role in the procedures for ensuring the quality and smooth running of your programme and can raise both concerns and areas of particular satisfaction at these meetings.

In addition, you are encouraged to make suggestions for improvements to the programme. You can do so directly, by contacting the Programme Leader. You can also pass comments via your student representative. In addition to the programme committee meetings there will also be regular monthly contact/communication between student representatives and the programme team. This allows many issues to be raised and responded to rapidly. Of course, we cannot guarantee to act in accordance with all requests but we will respond to each request with the reasons for our decisions.

The University also operates a number of annual surveys to which all students will be invited to participate.

7.2 Support for International Students

International students undergo two induction processes:

- A welcome week organised by the International Office. The purpose of this event is to help ‘culturalise’ international students and to give them an opportunity to embed within Derby and the institution.
- A Department of Computing and Mathematics induction process which is the same as that followed by all other Masters level students.

In addition to this, students receive regular contact with their Programme Leader who acts as a mentor and provides pastoral support where required. Further to this, the Student Liaison Officer is able to answer many queries. Finally, the International Office and Student Support are able to provide guidance and advice for matters relating to the administration of their course as well visa-related queries.
The MSc Big Data Analytics will provide students, on successful completion, a step up in their professional development and they will have excellent employment potential. There is a growing demand for Big Data Analytics professionals and the programme provides a postgraduate qualification that directly meets the needs of today's working environments with regard to a variety of emerging and innovative technologies and challenges posed by the increasingly complex networked world of modern society.

Information Technology professionals who can identify the root causes of business issues, and have the ability to model/analyse complex daily life scenarios as well as complex technical, biological, chemical, engineering, financial or economical systems and processes are much sought after.

Furthermore, in the Harnham Salary Guide 2014, a survey completed by over 1,000 respondents throughout the UK identified the following key points:

• There is a continuing shortage of qualified candidates for available Big Data roles.
• Salaries in jobs related to Big Data are very attractive, showing an increase of 6% over the last year.
• An average of 86% of respondents experience an overall job security.

After successfully achieving the MSc award students will be able to apply for membership of the British Computer Society (BCS). Upon completion of satisfactory industrial experience post award, students become eligible for Chartered Information Technology Professional status.

Whilst most students having completed and passed this programme are likely to progress into full time employment, the MSc Big Data Analytics also offers an excellent opportunity for students to progress onto PhD study.
SECTION NINE: EMPLOYER LINKS

Employers' needs and opinions have been taken into consideration in the design, content, and the delivery of this programme through dialogue with prospective employers. We have already established relationships with them in terms of placement in the current BSc provision (including Rolls Royce, JCB, SAP, SAS, Sony, Microsoft, Bosch, GKN Aerospace, and Roche Pharmaceuticals).

Our collaborations with industry have benefited the University (allowing us to keep the curriculum up to date), and the industrial partners who had access to academic expertise. The University has completed numerous Knowledge Transfer Partnerships (KTPs).

A significant number of dissertations and independent scholarship research project ideas and proposals are made by companies with which we work closely (i.e., Elastacloud). These specific proposals reflect current and real-life problems and provide an excellent opportunity for students to develop meaningful links with industry whilst at the same time completing relevant research into an industrial problem.

The newly established Data Science Research Centre will provide great opportunities for students to engage with real-world learning, and work on current research projects. 
https://www.derby.ac.uk/research/researchareas/data-science-research-centre/
### APPENDIX: MAPPING LEARNING OUTCOMES TO MODULES

| A1 | A2 | A3 | A4 | A5 | A6 | A7 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | C5 | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |
| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |
| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |
| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |
| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |
| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |
| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |
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| X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  |