

Nottingham Trent University Course Specification

Basic Course Information		
1.	Awarding Institution:	Nottingham Trent University
2.	School/Campus:	School of Science and Technology/Clifton Campus; Nottingham Business School / City Campus
3.	Final Award, Course Title and Modes of Study:	MSc Data Analytics for Business (Part Time)
4.	Normal Duration:	2 Years
5.	UCAS Code:	N/A

6.	Overview and general educational aims of the course
	<p>The digital revolution has made data easy to digitally capture and inexpensive to store with organisations and businesses increasingly collecting data about various aspects of their operation, services, customers, suppliers and competitors with the hope of finding useful information with which to gain leverage or competitive advantage. As a result, small to medium enterprises are currently storing up to 50-100 terabytes of data finding themselves data rich yet information poor with a recent study by IBM showing that one in three business leaders do not trust their data¹. This is likely to continue with IBM estimating that 2.3 trillion gigabytes of data is being created per day, expecting this to increase to 40 Zetta bytes by 2020. According to a recent report by SAS and e-Skills, this has led to a 912% increase in demand over the last five years for professionals with expertise in managing and analysing big data sets, with a total of 132,000 new jobs to be created in the big data field by 2017².</p> <p>The <i>MSc Data Analytics for Business</i> course is therefore aimed at those business professionals who are increasingly aware of the need for their department and organisation to better capture, manage and analyse its data. As a student of the course, you will move through the well-proven CRoss Industry Standard Process for Data Mining (CRISP-DM) methodology for data analytics. You will develop a strong appreciation of the impact of big data and explore methods and techniques that will enable your organisation to identify the most important data to answer strategically important questions and thus link big data to innovation. You will learn how to critically review your organisation's infrastructure for capturing and managing large volumes of data and identify database and cloud-based technologies that enhance it. You will then be exposed to the area of data mining, developing knowledge and understanding needed to transform and analyse data to discover and visualise patterns that provide useful business intelligence (e.g. identifying risky customers or suppliers, improving the value chain, enhancing customer service, identifying the likelihood of illness or recovering, automatically recognising important agents/objects/events for which a product or service needs to respond). Finally, the course will develop your leadership and project management skills to maximise the value and impact of big data innovations within your organisation.</p> <p>The course is innovative in its design, aimed at students who are in employment, or have regular access to an appropriate workplace environment.</p>

You will attend university in 'study blocks' during which you will be introduced to relevant theories and concepts. Outside of these study blocks you will be expected to engage in independent learning, and will be guided through this by your module tutors. You will be encouraged to draw upon your work experiences to identify and critique practices within the sector, informing your own understanding and personal development.

Thus what you learn will be relevant and applicable to your work organisation, enabling you to make an impact and develop your career prospects.

The progressive integration of the business, computer science and applied mathematics make it a suitable and challenging option for a diverse mix of individuals; catering for both those business professionals who are relatively new to data analytics and looking to broaden and deepen their technical understanding or those who may be experienced in data analytics and now looking to progress their careers by gaining a wider perspective on the industry whilst honing the management and leadership skills necessary to realise the benefits of big data innovation.

¹<http://www.ibmbigdatahub.com/tag/587>

²http://www.sas.com/en_ie/news/press-releases/2013/january/Big-data-boost-for-UK-job-market-SAS-and-e-skills-report.html

7. **Course outcomes**

Course outcomes describe what you should know and be able to do by the end of your course if you take advantage of the opportunities for learning that we provide.

Knowledge and understanding

By the end of the course you should be able to:

- CLO1) critically evaluate the nature and challenges posed by big data to an organisation's strategic objectives and processes, with reference to relevant theoretical frameworks and methodologies^{7,c}
- CLO2) critically review the potential benefits and drawbacks of current business practice relating to the storage, management and analysis of large volumes of data
- CLO3) approach data analytics problems from various theoretical perspectives, identifying appropriate heuristics to find optimal solutions^{7,c}
- CLO4) generate data analytics solutions through problem identification, analysis, and the design or development of a system, and be able to assess and articulate how the system relates to business objectives^{7,c}
- CLO5) demonstrate critical awareness and understanding of current challenges and industry trends relating to database architectures, cloud services and data analytics^c
- CLO6) demonstrate critical understanding of the techniques applicable to your own area of professional practice and apply them within an appropriate legal and ethical framework^{7,c}

Skills, qualities and attributes

By the end of the course you should be able to:

- CLO7) deal with complex problems systematically and creatively^{7,c}
- CLO8) communicate clearly to specialist and non-specialist audiences
- CLO9) work independently, demonstrating self-direction and originality in tackling and solving problems, particularly when managing a project^{7,c}

CLO10) advance your knowledge and understanding by developing new practical skills in the area of database architectures, cloud services and data analytics^{7,c}

CLO11) take responsibility for independent learning, demonstrating the reflective skills and maturity required to manage your ongoing professional development^{7,c}

⁷These statements are QAA Level 7 benchmarked

^cThese statements are QAA Computing subject benchmarked (QAA, Feb 2016)

8. Teaching and learning methods

This part time course will be delivered in 'block release'. You will be provided with a teaching schedule in advance, but for each module you will attend university for a short period of intense learning. These study blocks *usually* follow a pattern of Thursday morning through to Saturday afternoon teaching, on one of the university sites. However, for your first module you will also be expected to attend an additional course induction session on Wednesday. During the intensive three day study block you will cover a significant amount of ground, and in order to make the most of this contact time we expect you to come prepared.

Before each study block you will be provided with pre-work. This may take the form of readings, exercises, discussion points and research to undertake within your organisation. By completing this pre-work in advance of the study block you will be familiar with the basic concepts and hence able to gain much more from the taught elements of the course.

During the study blocks, the learning and teaching methods you will encounter will vary, reflecting techniques most appropriate to the area of study. Thus, for example, you could be undertaking individual research, practicals, participating in small group or one-to-one tutorials, working with fellow students in seminar or workshop activities or attending larger group lectures. For some modules, you will work in specialist computing labs suitable for database modelling, general statistical processing, and performing data transformation and analytics. The aim of the study blocks is to ensure you have a sound grasp of the core knowledge base associated with the module, and are equipped with the basic skills necessary to apply that knowledge in the workplace. It is important that you make every effort to attend these study blocks; whilst we can give you access to learning resources, it is very hard to capture the learning experience during these study blocks and make up lost time.

After each study block you will be expected to undertake independent learning in order to consolidate and extend your learning, applying what you have learned to your work environment, and further exploring subjects before completing the module assessment. Independent learning will be guided by your module tutors, so you will be directed to relevant learning materials via NOW, our online learning workspace. Here you can access additional learning resources, share ideas, engage with your fellow students and tutors and manage your own file storage area. You can access NOW online from anywhere with an internet connection, so you'll be up-to-date with your course information wherever you are.

There are two project modules. The first, *Project Conceptualisation and Planning*, is designed to support the more substantive project module, the *Work-based Project*.

The *Project Conceptualisation and Planning* module features a study block that will provide you with the systems thinking, problem-solving, project management and requirements modelling skills necessary to establish and lead a management information systems project that utilises big data. Finally the *Work-Based Project* is an individual, independent project where you are able to negotiate the focus of the project and the way in which it will be delivered. You will be expected to apply the formal project planning and requirements modelling skills developed in the previous project module. The *Work-based Project* is a very flexible module, designed to encourage depth of understanding and the bringing together of your theoretical knowledge with practical skills. It enables you to focus on your strengths to address a substantial issue within your organisation, be it proposing significant changes to business processes to maximise the organisation's ability to leverage big data, embarking on a substantial data analytics task or actually developing software to optimise existing big data systems. An academic mentor will guide you through the project process and during regular meetings (either face to face or through remote working) provide individual support for your learning.

The learning and teaching philosophy emphasises the use of work-based learning; what you learn in the classroom will inform your practice and your work experiences will inform your academic learning. Throughout the course you will be given opportunities to apply the theoretical knowledge to your work organisation.

9. Assessment methods

Assessment methods are designed to best assess your learning in the given area; these could include examinations, academic reports or essays, technical reports, reflective work, practicals, presentations or portfolios. Note that for each module, there will be at least one developmental review point after the three day study block to assess how well you are progressing on your summative assessment with your tutor providing you with some concise developmental feedback.

For the Work-based Project, you will negotiate a project with your academic mentor, based on your workplace experiences and the module learning outcomes to establish objectives, key tasks and deliverables. It will include an element of formative assessment, so you are able to get feedback from your supervisor in the early stages of the project. During Induction, the course team will provide you with a schedule of assessments specific to your course of study. More details of assessments for individual modules can be found in the module specifications.

10. Course structure and curriculum

The MSc Data Analytics for Business degree is a 2-year part time course based around the following framework (total 180 credit points):-

- **3 'data analytics' modules focusing on the technical and applied mathematical aspects of big data systems (total 60 credit points)**
 - Big Data and Its Infrastructure (20 credit points)
 - Statistical Approaches to Data Analysis (20 credit points)
 - Practical Machine Learning Methods for Data Mining (20 credit points)
- **2 'business' modules focusing on enhancing organisational leadership skills and processes crucial for leveraging value from big data innovation (total 40 credit points)**
 - Delivering Value Creation (20 credit points)
 - Effective Change Management (20 credit points)

- **2 'project' modules focusing on preparation for and delivery of the capstone project (total 80 credit points)**
 - Project Conceptualisation and Planning (20 credit points)
 - Work-based Project (60 credit points)

The above modules collectively develop and assess the course learning outcomes.

Each module, except for the Work-based Project, will be delivered over a 12 week period, with the three day intensive study block taking place within the first two weeks of the module. The remaining ten weeks are for independent study and for you to complete the summative assessment with opportunities for interim developmental feedback. The Work-based Project will be delivered over a 6 month period with an interactive project workshop being delivered at your Year 2 Induction. You will then work with your employer and academic mentor to identify an issue relevant to your studies and explore it, in depth, within the context of your work organisation. You can shape the nature of the assessment for this module, so depending upon the aims and focus of your project.

The MSc Degree is awarded to students who successfully complete 180 credit points. A *Postgraduate Diploma in Data Analytics* is awarded to a student who successfully completes 120 credit points including the module, *Practical Machine Learning Methods for Data Mining*. A *Postgraduate Certificate in Business Computing* is awarded to a student who successfully completes any combination of modules totalling 60 credit points.

11. Admission to the course

For the most current information regarding all entry requirements for this course, please see the 'Applying' tab on the NTU course information web page.

12. Support for learning

Firstly the Course Operation Team, comprising the Course Leader, Administrative Assistant and Industry Liaison Manager, will oversee the operation and administration of your course and act as a central source of help and support. You will meet the team during the course Induction and at regular intervals thereafter. The team are based on our clifton site, but regularly travel to all the university campuses to meet students, employers and academics based in the schools. Note that the academic course team consists of all academic staff involved in the delivery of teaching and assessment activities and can be contacted by e-mail, telephone, letter, or in person.

Staff teaching on the course are generally educated to PhD level and many are members of professional institutions including Fellow of Higher Education Academy (FHEA), British Computer Society (BCS) and Institution of Electrical and Electronics Engineers (IEEE). Staff are generally active researchers and many have involvement with industry to undertake research or consultancy work. This ensures that staff have indepth knowledge of their discipline together with a strong understanding and appreciation as to how this knowledge is applied in the workplace.

Student Services provide a range of specialist student services across NTU which can be accessed directly by all NTU students via http://www.ntu.ac.uk/student_services/index.html. They cover areas such as student finance and fees, accommodation, study support and health and well-being.

The course operation team's Industry Liaison Manager will work with employers who may be sponsoring you on the course, or simply providing an environment in which to apply your learning. Thus the Industry Liaison Manager can work with you and your employer to communicate key course information and discuss support for your learning such as study time and identifying / negotiating learning opportunities within your work environment.

Finally NTU has worked to ensure library and learning resources are available to access remotely or from across the three sites. The team will introduce students to the facilities available during induction, and the library specialists are on hand in the libraries or via online support to answer any questions you may have in terms of accessing appropriate learning resources.

13. Graduate destinations/employability

The course has been designed with employability in mind and will therefore develop your integral understanding of business processes, statistics, and key computer science concepts for data management and analytics. This will help students who are currently Business Analysts, Systems Analysts or positions involving management information systems to transition to more data architect, predictive modelling or data science roles. Conversely, those currently employed in data architect, analytic or predictive modelling roles will be better equipped to transition to higher management and leadership roles requiring a more holistic understanding of how big data analytics impacts on all functions and roles of the organisation.

The market for those with big data analytics skills remains in a rapid expansion phase. As mentioned in Section 6, according to a recent report by SAS and e-Skills, there has been a 912% increase in demand over the last five years for professionals with expertise in managing and analysing big data sets, with a total of 132,000 new jobs to be created in the big data field by 2017. Also, according to Deloitte, the deepening shortage of Data Science talent and cybersecurity challenges are trends shaping businesses today³.

Finally, our experiences across the university on the design and delivery of postgraduate taught courses indicates that employers are seeking students who are able to demonstrate not only specific technical knowledge, but also the personal and business-related skills to apply this knowledge within the work environment. To quote from the 2014 Higher Education Careers Service Unit report:

*"Employers' requirements for Masters-level qualifications are linked to their requirements for specific skills, abilities and knowledge. Employers emphasise the value of practical, work-related experience during Masters courses."*⁴

³ <http://www2.deloitte.com/us/en/pages/deloitte-analytics/articles/analytics-trends.html>

⁴ <http://www.universitiesuk.ac.uk/highereducation/Pages/PostgraduateEmployability.aspx#.U4IqUK1OXDc>

14. Course standards and quality

Effective management is crucial to the process of ensuring that course standards and quality are achieved and maintained. Management of this course will be effected through two formally constituted committees; the Course Committee and the Board of Examiners.

The Course Committee will oversee the strategic direction, quality assurance and management of the course. The constitution and brief of the Course Committee will be in accordance with the University's policy and practice in the University Handbook.

The Course Committee and Student Forum encourages feedback and discussion each term. Full details will be provided in the Course Handbook.

The Examination Board will operate in accordance with current University policy and procedures as stated in the University's Quality Handbook and agreed in the development and approval of the course.

In addition to the formal committees, further quality assurances are built into the management of the course with course team meetings, module leader reports, student evaluation processes and course annual reporting.

15. Assessment regulations

This course is subject to the University's Common Assessment Regulations (located in Section 16 of the Quality Handbook). Any course specific assessment features are described below:

None – Common Assessment Regulations apply

16. Additional Information

Collaborative partner(s):	N/A
Course referenced to Quality Assurance Agency for Higher Education (QAA)	
Benchmark Statements:	Yes, QAA Level 7 and Computing
Course recognised by:	N/A
Date this course specification approved:	27 th September 2016

Any additional information: