

**1. Programme Title(s):**

MSc/PGDip\*/PGCert\* Data Analysis for Business Intelligence

\*Exit award only

**2. Awarding body or institution:**

University of Leicester

**3. a) Mode of study**

Full time

**b) Type of study**

Campus-based

**4. Registration periods:**

The normal period of registration is 12 months.

The maximum period of registration is 24 months.

**5. Typical entry requirements:**

2:2 UG degree in Mathematics or other numerate subject such as Physics from a British University or equivalent international level as defined under regulations. Applicants from a computer science background would be considered on a case by case basis through the assessment of the student transcript. Applicants with non-standard first degrees and/or significant work experience will again be assessed on a case by case basis, taking the nature and currency of their work experience into account. This will be done through personal interviews of such applicants, taken by the programme director.

Standard College English language requirements, in line with Senate Regulation 1.

**6. Accreditation of Prior Learning:**

None.

**7. Programme aims:**

The programme aims to provide a route for students in their transition from undergraduate study to employment in data-led sectors. It provides the opportunity to gain practical experience in databases (and achieve two professionally accredited certificates) and a rigorous understanding of applied statistics, data mining, operational research and related areas.

In particular it aims to

- foster confidence, convey knowledge and develop expertise in data analysis and handling;
- provide an advanced education in the fundamental mathematical concepts and techniques relevant to data analysis;
- develop the ability to produce rigorous justifications of assertions by logical arguments;
- enhance the ability to model the world using mathematical models, and to be able to produce innovative, cost-effective, and robust solutions to real-world problems;
- enhance the ability to infer valid conclusions from raw data;
- stimulate intellectual development and hone powers of critical analysis, problem solving, written communication skills and improve presentational skills;

- develop the ability to communicate solutions to problems using language appropriate to any target audience;
- develop project-management skills (MSc only);
- enhance practical computing skills in software relevant to industry;
- raise students' expertise and understanding to a point where they could embark upon doctoral interdisciplinary study or enter data-led industrial sectors;
- raise students' ability to complete independent project work and foster the skill of developing innovative tools (MSc only).

#### 8. Reference points used to inform the programme specification:

- QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland
- QAA [Master's Degree Characteristics](#)
- QAA Benchmarking Statement [Mathematics, Statistics and Operational Research \(MMath\)](#)
- QAA [Annex to subject benchmark statement: Mathematics, statistics and operational research \(2009\)](#)
- [University Learning Strategy](#)
- University Employability Strategy
- Graduate Survey (2014)
- First Destination Survey
- External Examiner's Reports
- Informal concept document used to aid discussion with partner departments

#### 9. Programme Outcomes:

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
<b>(a) Subject and Professional skills</b>		
<b>Knowledge</b>		
Advanced knowledge of fundamental theories and techniques.	Lectures. Specified reading. Problem classes.	Written examinations, assessed coursework, project.
Knowledge and understanding of key techniques and algorithms in data analysis. Ability to modify and innovate.		
Familiarization with common industrial applications of data modeling and commonly used techniques.		
Knowledge of relevant computing languages and relevant software.	Lectures. Practical sessions. Project (MSc only).	
<b>Concepts</b>		
Rigorous understanding of relevant methods.	Lectures. Specified reading. Problem classes.	Written examinations, assessed coursework, project.
Practical understanding of implementations.	Lectures. Specified reading. Problem classes. Project (MSc)	

<b>Intended Learning Outcomes</b>	<b>Teaching and Learning Methods</b>	<b>How Demonstrated?</b>
<b>Techniques</b>		
Ability to code algorithms in a range of commonly used languages.  Ability to develop and apply strategies to solve problems.  Ability to use commonly used commercial software.	Practical sessions. Project (MSc only).	Assessed coursework, project.
<b>Critical analysis</b>		
Analysis of problem and development of appropriate solution strategy. Analyze and solve 'messily defined' industrial problems.	Lectures. Problem classes. Feedback on assessed problems. Project (MSc only).	Written examinations, assessed coursework, project.
<b>Presentation</b>		
Presentation of concepts, algorithms and solutions.	Practical sessions. Tutorials. Project (MSc only).	Assessed coursework, project.
<b>Appraisal of evidence</b>		
Critical appraisal of algorithms and solutions.	Course work. Project (MSc only).	Written examinations, assessed coursework, project.
<b>(b) Transferable skills</b>		
<b>Research skills</b>		
Conduct background research and literature surveys.  Summarize content from information sources.	Course work. Project (MSc only).	Assessed coursework. Project.
<b>Communication skills</b>		
Response to questioning.  Scientific communication (written and oral).  Project presentation (written and oral.)	Practical sessions. Tutorials. Project (MSc only).	Assessed coursework. Project.
<b>Data presentation</b>		
Project presentation (written and oral.)	Practical sessions. Tutorials. Project (MSc only).	Assessed coursework, project.
<b>Information technology</b>		
Various computer languages (FORTRAN, C, C++) and specialist software (FLUENT).  Office software.	Throughout.  Coursework. Project (MSc only).	Assessed coursework, project.
<b>Problem solving</b>		
Analysis, breakdown, synthesis, critical examination.  Computational modeling skills.	Practical sessions. Tutorials. Project.  Coursework. Project (MSc only).	Written examinations, assessed coursework, project.  Assessed coursework, project.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
<b>Working relationships</b>		
Scientific discussion.	Practical sessions. Tutorials. Project (MSc only).	Project.
<b>Managing learning</b>		
Study skills.	Throughout.	Written examinations, assessed coursework, project.
Independence and time management.	Structured support decreasing through year. Project (MSc only).	Meeting deadlines.
Information retrieval.	Coursework. Project (MSc only).	Assessed coursework, project.
<b>Career management</b>		
Scientific discussion.	Practical sessions. Tutorials. Project (MSc only).	Project.
Organisation. Time management.	Structured support decreasing through year. Project (MSc only).	Meeting deadlines.
Careers and business awareness.	Careers workshops. Industry-led project. Guest speakers.	Destination data. Student feedback.

#### 10. Special features:

- Interdisciplinary programme using expertise from across the College.
- Industry-linked dissertations.
- Option of achieving professional certification of skills arising from practical components – namely, *SAS Base Programmer for SAS 9* and *Microsoft Certified Solutions Associate (MCSA): SQL Server 2012*.
- While these industry certifications are highly desirable for career progression, the additional training relevant to attempting these are not mandatory and students can opt to achieve the MSc without passing the external industrial exams. However, some of the more industry facing MSc projects will necessitate achieving these certifications, implying the strong link between career progression in the industrial setup and the offered certifications. Thus, undertaking the additional certifications is strongly encouraged.

#### 11. Indications of programme quality:

Letters of support from industry.

External examiners'.

#### 12. Scheme of Assessment

As defined in Senate Regulation 6: Regulations governing Taught Postgraduate Programmes of Study (see [Senate Regulations](#))

#### 13. Progression points

As defined in Senate Regulation 6: Regulations governing Taught Postgraduate Programmes of Study (see [Senate Regulations](#))

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course and a recommendation will be made to the Board of Examiners for an intermediate award where appropriate.

#### 14. Rules relating to re-sits or re-submissions:

As defined in Senate Regulation 6: Regulations governing Taught Postgraduate Programmes of Study (see [Senate Regulations](#))

#### 15. Additional information [e.g. timetable for admissions]

We seek to launch the programme in October 2014. Mathematics already runs certification. Furthermore, given that Computer Science is a partner department in this programme, programme level monitoring will be carried out between Maths and Computer Science - the existing MSc Committee within the Department of Mathematics would undertake the role of the Board of Studies for the new degree, with representation from the Department of Computer Science invited to the meetings twice a year. At these joint meetings the MSc Committee will undertake the annual developmental review of the programme and monitor students' performances.

#### 16. External examining

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports can be found [here](#)

#### Appendix 1: Programme structure (programme regulations)

All programmes to formally include range of non-credit bearing attendance only activities for careers, student support etc.:

MA7903 – House hours

MA7094 – SQL

	Code	Title	Credits
<b>Semester 1</b>			
Core modules			
	MA7012	Scientific Computing	15
	CO7219	Internet and Cloud Computing	15
	MA7403	Statistics	15
Options			
15credits selected from:			
	CO7104	C++ Programming and Advanced Algorithms	15
	PA7081	Practical Programming	15
<b>Semester 2</b>			
Core modules:			
	MA7022	Data Mining and Neural Networks	15
	CO7218	Financial Services Information Systems	15
	MA7080	Mathematical Modelling	15
Options			
15 credits selected from:			
	MA7011	Computational Methods for Partial Differential Equations	15
	MA7406	Further Statistics	15
	MA7416	Advanced Statistics	15
	CO7212	Game Theory	15
	CO7002	Analysis and Design of Algorithms	15
<b>Summer</b>			
Core modules			
	MA7098	MSc DABI Project	60
Total			180

## Summer term

Individual projects: based around analysis of a real dataset, organization of database or preparation of data analysis software for a specific problem.

The term will also include preparation of two optional IT certification exams (with mini-projects for each system):

-SAS for data analysis (With external certification: *SAS Base Programmer for SAS 9*)

*“The SAS Certified Base Programmer for SAS 9 credential is the ideal certification for those relatively new to SAS programming or new to SAS certification. It is also the principle certification for other advanced certifications available from SAS.*

*Successful candidates should have experience in programming and data management using SAS 9 and should be able to:*

- *import and export raw data files*
- *manipulate and transform data*
- *combine SAS data sets*
- *create basic detail and summary reports using SAS procedures*
- *identify and correct data, syntax and programming logic errors.”*

-SQL (With external certification: *The Microsoft Certified Solutions Associate (MCSA): SQL Server 2012*)

*“The Microsoft Certified Solutions Associate (MCSA): SQL Server 2012 certification shows that you have a minimum set of skills to hit the ground running and differentiates you as better able to work with SQL Server 2012 in a real-world business context. This certification validates a set of core SQL Server 2012 skills that are relevant across multiple solution areas. The MCSA: SQL Server 2012 certification is a pre-requisite for both the MCSE: Data Platform and the MCSE: Business Intelligence certifications.”*

It is not mandatory to undertake the industrial examinations leading to these certifications and the MSc can be achieved without opting for these. At the same time, students will be strongly encouraged to consider these certifications given that these will prepare students for projects with the stronger industrial component, reflecting the potent link between career progression and these certifications.

## Appendix 2: Module Specifications

See module specification database <http://www.le.ac.uk/sas/courses/documentation>

# Skills Matrix: Msc Data Analysis for Business Intelligence

Date amended: 12/9/15

Programme Learning Outcomes	MA7080	MA7012	CO7105	MA7021	MA7071	CO7219	MA7077	MA7022	CO7218	MA7011	MA7406	MA7416	CO7212	CO7002	MA7098
<b>(b) Transferable skills</b>															
<b>(i) Oral communication</b>															
Present technical information to peers and tutors in an appropriate form	X						X	X							X
Present posters and projects to staff and peers	X														
<b>(ii) Written communication</b>															
Communicate technical information and mathematical arguments in an appropriate form for a given audience.	X	X	X			X	X	X	X		X	X	X	X	X
Communicate substantial report incorporating a large amount of material.	X										X	X		X	X
<b>(iii) Information technology</b>															
Use software and programming.	X	X	X	X			X	X		X	X	X		X	
<b>(iv) Numeracy</b>															
Manipulate and sort numerical data.	X	X	X	X	X		X	X			X	X		X	X
<b>(v) Team working</b>															
Work collaboratively as part of a team.															
<b>(vi) Problem solving</b>															
Learn to solve problems encountered in coursework with the aid of a computer.	X	X	X	X			X	X		X	X	X		X	
Learn to solve novel problems creatively.	X	X	X	X	X	X	X	X	X					X	X
<b>(vii) Information handling</b>															
Research project materials.	X										X	X			X
<b>(viii) Skills for lifelong learning</b>															
Learn independently and understand new concepts in the discipline readily.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Develop and implement personal plan of work to meet a deadline.	X	X	X	X			X	X		X	X	X		X	X
Use of IT and programming in the learning process.	X	X	X	X			X	X		X	X	X		X	X