# Programme Specification for Postgraduate Programme

**Leading to:**

**MSc Data Science and Analytics**

*Applicable for all postgraduate students starting in 2019*

<table>
<thead>
<tr>
<th>Version No.</th>
<th>Date</th>
<th>Notes – QA USE ONLY</th>
<th>QA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>July 2019</td>
<td>New Programme Specification created for 2019/20</td>
<td>SB/RJC</td>
</tr>
<tr>
<td>2</td>
<td>22 August 2019</td>
<td>Updates to codes and hyperlinks.</td>
<td>JP</td>
</tr>
<tr>
<td>3</td>
<td>3 September 2019</td>
<td>MSc Data Science and Analytics (with Professional Development) route withdrawn by Senate on 26 September 2018, last intake was September 2018.</td>
<td>JP</td>
</tr>
</tbody>
</table>

## Postgraduate Taught Programme

1. **Awarding institution**: Brunel University London
2. **Teaching institution(s)**: Brunel University London
3. **Home college/department/division**: College of Engineering, Design and Physical Sciences/ Dept of Computer Science
4. **Contributing college/department/division/associated institution**: LBIC for Alternative Level 4 (see section 25)
5. **Programme accredited by**: N/A
6. **Programme title**: MSc Data Science and Analytics
7. **Programme type (Single honours/joint)**: N/A
8. **Normal length of programme (in months) for each mode of study**: 12 months full-time
   - 24 months part-time
   - Where students commence their programme at pre-Masters Level in LBIC, the normal length stated above will vary as follows:
     - Pre-Masters January Level commencement (with placement): + 6 months
     - Pre-Masters Level May commencement (without placement): + 4 months
9. **Maximum period of registration for each mode of study**: FT - Normal length of programme plus 2 years
    - PT – Normal length of programme plus 2 years
10. **Variation(s) to September start**: None for Standard Levels; See document “Validated Programme Element Specification for LBIC Generic Pre-Masters (with and without work placement)” for Alternative pre-Masters Level entry points
11. **Modes of study**: Full-time and Part-time
12. **Modes of delivery**: Standard delivery on-campus.
13. **Intermediate awards and titles and FHEQ Level of Award**:
    - PG Certificate in Data Science and Analytics (FHEQ L7)
    - PG Diploma in Data Science and Analytics (FHEQ L7)
14. **UCAS Code**: N/A
15. **HECoS Code**: I200PDATA
18. Relevant subject benchmark statements and other external and internal reference points used to inform programme design

- UK Quality Code for Higher Education
- QAA Subject Benchmark Statement
- Brunel University London 2030
- Brunel Placement Learning Policy, as published under the ‘Placements’ section of the ‘Managing Higher Education Provision with Others’ page.

19. Admission Requirements

Details of PGT entry requirements are provided on the University’s and College website.
Levels of English for non-native speakers are outlined on Brunel International’s language requirements.

20. Other relevant information (e.g. study abroad, additional information on placements)

There will be satisfactory supervision, guidance and support for students embarking on the internship. The school has developed an established academic process for the supervision of students on internship through the experience at UG level and further information is provided in a separate document.

21. Programme regulations not specified in Senate Regulation 3. Any departure from regulations specified in Senate Regulation 3 must be stated here and approved by Senate.

N/A

22. Further information about the programme is available from the College website.

Course webpage

### 23. EDUCATIONAL AIMS OF THE PROGRAMME

Data science is a new and emerging field in both academic and industry terms. Data science provides a pipeline between academic disciplines – its coverage is consequently wide. Most obviously, because interaction with the data is critical to any analysis, those who work with big data need substantial and creative IT skills. Common conceptions combine computer science (acquisition and parsing of data), mathematics, statistics and data mining (filtering and mining of data), graphic design (representation and refinement of data) and information visualisation (interaction with data). On top of this, however, there is much that: (a) Behavioural science can offer (in terms of the way that people consciously and unconsciously perceive/attend to and interpret data) and, in addition, how careful analysis can be used to ‘nudge’ behaviour to ensure that products/services are used to best effect; and (b) management science can offer in relation to understanding innovation, value and business models.

Consequently, data science requires what are increasing termed as ‘T-shaped’ practitioners – having a strong grounding in the core disciplines of information and computer science and statistics for example, but partnered with a broad appreciation of aspects of the other reference disciplines noted. Our broad academic rationale is that the higher-educational sector does not serve the intellectual needs of the market particularly well. Whilst many courses deal with aspects related to data analytics and business intelligence systems, they often: (a) Fail to address reference disciplines in a T shaped manner; (b) fail to appreciate the complex nature of such environments and the latest in conceptual and technical thinking; (c) ignore the realities and complexities of real-world applications of such ideas; and (d) fail to reflect on the philosophy, use and implications of such principles in such a context.

With the above in mind, the aim of the programme is to develop a critical awareness of the state-of-the-art in data science and demonstrate the practical skills necessary to create value in its application to business, scientific and/or social domains.
### 24. PROGRAMME AND INTERMEDIATE LEARNING OUTCOMES

The programme provides opportunities for students to develop and demonstrate knowledge and understanding (K) cognitive (thinking) skills (C) and other skills and attributes (S) in the following areas:

<table>
<thead>
<tr>
<th>FHEQ Level</th>
<th>Category (K = knowledge and understanding, C = cognitive (thinking) skills, S = other skills and attributes)</th>
<th>Learning Outcome</th>
<th>MastersAward Only</th>
<th>Associated Assessment Blocks Code(s)</th>
<th>Associated Study Blocks Code(s)</th>
<th>Associated Modular Blocks Code(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>C K</td>
<td>Comprehend the key concepts and nuances of the disciplines that need to be synthesised for effective data science.</td>
<td></td>
<td>CS5605 CS5606 CS5607 CS5608 CS5603 CS5609 CS5514</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>C K</td>
<td>Demonstrate a critical understanding of the challenges and issues arising from taking heterogeneous data at volume and scale, understanding what it represents and turning that understanding into insight for business, scientific or social innovation (i.e., data science).</td>
<td></td>
<td>CS5605 CS5606 CS5607 CS5608 CS5603 CS5609 CS5514</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>K S</td>
<td>Develop a practical understanding of the skills, tools and techniques necessary for the effective application of data science.</td>
<td></td>
<td>CS5605 CS5606 CS5607 CS5608 CS5603 CS5609 CS5514</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>K S</td>
<td>Apply a practical understanding of data science to problems in social, business and/or scientific domains.</td>
<td></td>
<td>CS5609 CS5587 CS5500</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>C K</td>
<td>Evaluate the effectiveness of applied data science in relation to the challenges/issues addressed.</td>
<td></td>
<td>CS5608 CS5609 CS5500</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>S</td>
<td>Conduct, report and evaluate a significant programme of research related to the problems and challenges of distributed systems.</td>
<td>X</td>
<td>CS55000 CS5551</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>S</td>
<td>Demonstrate competencies appropriate to professional practice related to data science and analytics</td>
<td></td>
<td>CS5514 CS5609</td>
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</table>

**Learning/teaching strategies and methods** to enable learning outcomes to be achieved, including formative assessments

In relation to the learning outcomes above:

- Lectures are (generally) used to deliver relevant material.
- Seminars and group tutorials are (generally) used to apply acquired knowledge via exercises and/or to develop critical insight and reflect on material.
- Practical laboratory sessions are (generally) used to both demonstrate and apply key approaches, tools and techniques etc.
- Directed private study is used to (a) supplement and consolidate the points above and (b) broaden individual knowledge and understanding the subject matter.
- Group projects and professional practice are used to develop employability skills.
- In the last week of teaching for the module CS5587 Work Placement Office will deliver a workshop on CV writing to all students in the programme whether they are doing an industrial secondment or not.
Summative assessment strategies and methods to enable learning outcomes to be demonstrated.

The assessment of all learning outcomes above is achieved by a balance of courseworks and examinations (as detailed in the individual module specifications). Assessments range in form from written reports/essays through to conceptual/statistical modelling and programming exercises, according to the demands of particular modules. Additionally, in class tests are used to assess a range of knowledge, including a range of specific technical subjects.

25. Programme Structure, progression and award requirements

Programme structures and features: levels, assessment blocks, credit and progression and award requirements

- **Compulsory block**: one which all students registered for the award are required to take as part of their programme of study. These will be listed in the left hand column;

- **Optional block**: one which students choose from an ‘option range’. These will be listed in the right hand column;

- **A core assessment** is an assessment identified within an assessment block or modular block (either compulsory or optional) which must be passed (at grade C- or better) in order to be eligible to progress and to be eligible for the final award. All core assessments must be specified on the programme specification next to the appropriate assessment or modular block:

  Where students are expected to pass the block at C- or better, but not necessarily all elements, then the block itself is core.
  
  e.g. AB5500 Project (40)
  Core: Block

  Where only some elements of assessments are required to be passed at C- or better, these will be identified by listing each element that is core
  
  e.g. ABXXX1 Title (XX credits)
  Core: 1 & 4

  Where students are expected to pass all assessments in a block then this will be identified. By setting the assessment this way, students are also required to pass the block by default. This will be identified thus:
  
  e.g. ABXXXX Title (XX credits)
  Core: All, Block

- **A non-core assessment** does not have to be passed at grade C- or better, but must D- or better in order to be eligible for the final award.

<table>
<thead>
<tr>
<th>FHEQ Level 7</th>
<th>Compulsory assessment block codes, titles and credit</th>
<th>Optional assessment block codes, titles and credits</th>
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</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Compulsory study block codes, titles and credit volume</td>
<td>N/A</td>
<td>Optional Study block codes, titles and credit volume</td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Compulsory modular block codes, titles and credits</td>
<td>Optional modular block codes, titles and credits</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td></td>
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<tr>
<td>CS5606 Quantitative Data Analysis (15 credits)</td>
<td>N/A</td>
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<tr>
<td>CS5607 High Performance Computational Infrastructures (15 credits)</td>
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<tr>
<td>CS5608 Big Data Analytics (15 credits)</td>
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<td></td>
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<tr>
<td>CS5603 Data Visualisation (15 credits)</td>
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<td>CS5609 Learning Development Project (15 credits)</td>
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<td>CS5605 Digital Innovation (15 credits)</td>
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<tr>
<td>CS5551 Research Methods (15 credits)</td>
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<tr>
<td>CS5514 Systems Project Management (15 credits)</td>
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<tr>
<td>CS5500_Cb Dissertation (60 credits)</td>
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Part Time Scheme of Studies

Year 1
Term 1 – CS5514_CN; CS5606
Term 2 – CS5551_CN; CS5608

Year 2
Term 1 – CS5605; CS5607
Term 2 – CS5609; CS5603
Term 3 – CS5500_Cb;

FHEQ Level 7 Progression and Award Requirements

As per Senate Regulation 3

PGDip may not be awarded by substitution of the dissertation CS5500 for modular/assessment blocks in the taught part of the programme.

Pre-Masters Level

Pre-Masters Level structure available to international students is specified in document “Validated Programme Element Specification for LBIC Generic Pre-Masters (with and without work placement)”. This document also specifies the admission and progression requirements.

Please note: this specification provides a concise summary of the main features of the programme and the learning outcomes that a student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods can be found in the modular block, assessment and study block outlines and other programme and block information. The accuracy of the information contained in this document is reviewed by the University from time to time and whenever a modification occurs.