Programme Specification for Postgraduate Programme
Leading to:
MSc Data Science and Analytics
Postgraduate Diploma Data Science and Analytics
Postgraduate Certificate Data Science

Applicable for all postgraduate students starting in 2021

<table>
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<tr>
<th>Version No.</th>
<th>Date</th>
<th>Notes – QA USE ONLY</th>
<th>QA</th>
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<tr>
<td>2021-22 v1.0</td>
<td>30 July 2021</td>
<td>Programme for a September 2021 start.</td>
<td>JP</td>
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<tr>
<td>V1.1</td>
<td>March 2022</td>
<td>Updated to reflect change to Brunel University London Pathway College (BPC)</td>
<td>BGS</td>
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</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/Computer Science

4. Contributing college/department/division/associated institution
   Brunel University London Pathway College (BPC) offers the following Validated Programme Element/s which enable progression on to this programme:
   • Generic Pre-Masters

5. Programme accredited by
   Not Accredited

6. Final award(s) and FHEQ Level of Award
   FHEQ Level 7
   MSc Data Science and Analytics
   PG Diploma Data Science and Analytics
   PG Cert Data Science

7. Programme title
   MSc Data Science and Analytics

8. Programme type (Single honours/joint)
   N/A

9. Normal length of programme (in months) for each mode of study
   MSc:
   - Full time, 12 months (1 academic year)
   - Part time, 24 months (2 academic years)

   For students commencing their studies at BPC, the normal length stated above will vary as follows:
   • Pre-Masters January commencement: + 9 months
   • Pre-Masters May commencement: + 4 Months

   Staged study:
   PGCert: Part-time only, 12 months (1 year)
   PGDip: Part-time only, 12 months (1 year) + PGCert
   MSc: Part-time only, 12 months (1 year) + PGDip

10. 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

    Staged study:
    The maximum period of registration for each stage shall be the normal length of the programme plus one year.
    The maximum period to complete the MSc (from registration on the PGCert to completing the MSc) is 6 years.

11. Variation(s) to September start
    See BPC Validated Programme Element Specifications for intakes for those programmes

12. Modes of study
    Full-time, Part-time and Staged Part-time

13. Modes of delivery
    Standard delivery on-campus.
14. Intermediate awards and titles and FHEQ
   Level of Award
   PG Certificate in Data Science (FHEQ L7)
   PG Diploma in Data Science and Analytics (FHEQ L7)

15. UCAS Code
   N/A

16. HECos Code
   100366

17. Route 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)

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 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 increasingly 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.

In addition to the subject contents relevant to data science, the students will have the opportunity to develop a broader set of skills
including study skills, research skills, employment skills and capability skills through teamwork (e.g. the group projects), guest lectures
or workshops from industry, and dissertation projects with industrial collaborations.
## 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>Masters Award Only</th>
<th>Associated Assessment Blocks Code(s)</th>
<th>Associated Study Blocks Code(s)</th>
<th>Associated Modular Blocks Code(s)</th>
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<tr>
<td>7</td>
<td>C K</td>
<td>Comprehend and synthesise the key concepts from the disciplines defining modern data science.</td>
<td>CS5802, CS5801, CS5805, CS5803, CS5811, CS5809, CS5806, CS5810</td>
<td>CS5701, CS5702, CS5705, CS5703, CS5706, CS5709, CS5710</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.</td>
<td>CS5802, CS5801, CS5805, CS5803, CS5811, CS5809, CS5806, CS5810</td>
<td>CS5701, CS5702, CS5705, CS5703, CS5706, CS5709, CS5710</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>K S</td>
<td>Evaluate, select, combine and apply data science tools and techniques to problems in social, business and/or scientific domains.</td>
<td>CS5801, CS5803, CS5811, CS5810</td>
<td>CS5701, CS5702, CS5703, CS5706, CS5710</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>K S</td>
<td>Critically evaluate the role of data science in addressing problems in social, business and/or scientific domains.</td>
<td>CS5809, CS5804</td>
<td>CS5709, CS5704</td>
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<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>CS5802, CS5806</td>
<td>CS5702, CS5706</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 data science.</td>
<td>CS5804</td>
<td>CS5704</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>CS5804</td>
<td>CS5704</td>
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**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.
- One or more guest lectures from industry are normally provided in study blocks where relevant.
- 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.
- Presentations or workshops are used to develop communication skills and to provide immediate formative feedback to students.
- 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. Also a dedicated supervisor will be assigned to each group to provide continuous support and formative feedback to students during the whole process.
- Personal tutoring is integrated together with the group project supervision.
- Content delivery, practical sessions and assessments (generally) use real-life data and examples.
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 coursework 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.
**FHEQ Level 7**

### Compulsory assessment block codes, titles and credit

*Students studying a staged masters will take the assessment blocks identified as PGCert or PG Dip dependent on the stage they are at.*

**PGCert**
- CS5801 Modern Quantitative Data Analysis (15 credits)
- CS5802 Critical Analysis of Modern Data (15 credits)
- CS5803 Data Visualisation (15 credits)
- CS5804 Research Project Management (15 credits)

**PGDip**
- CS5805 Ethics and Governance of Digital Systems (15 credits)
- CS5806 Machine Learning (10 credits)
- CS5809 Digital Innovation and Strategy (15 credits)
- CS5810 High Performance Computational Infrastructures (5 credits)
- CS5811 Distributed Data Analysis (15 credits)

**Optional assessment block codes, titles and credits**

N/A

### Part Time Scheme of Studies

**Year 1**
- Term 1 – CS5801 Modern Quantitative Data Analysis; CS5802 Critical Analysis of Modern Data
- Term 2 – CS5803 Data Visualisation; CS5804 Research Project Management

**Year 2**
- Term 1 – CS5805 Ethics and Governance of Digital Systems; CS5809 Digital Innovation and Strategy
- Term 2 – CS5806 Machine Learning; CS5810 High Performance Computational Infrastructures; CS5811 Distributed Data Analysis

### Compulsory study block codes, titles and credit volume

*Students studying a staged masters will take the study blocks identified as PGCert or PG Dip dependent on the stage they are at.*

**PGCert**
- CS5701 Quantitative Data Analysis (15 credits)
- CS5702 Modern Data (15 credits)
- CS5703 Data Visualisation (15 credits)
- CS5704 Research Project Management (15 credits)

**PGDip**
- CS5705 Ethics and Governance of Digital Systems (15 credits)
- CS5706 Machine Learning (15 credits)
- CS5709 Digital Innovation and Strategy (15 credits)
- CS5710 High Performance Computational Infrastructures (15 credits)

**Optional Study block codes, titles and credit volume**

N/A

**Part Time Scheme of Studies**

**Year 1**
- Term 1 – CS5701 Quantitative Data Analysis; CS5702 Modern Data
- Term 2 – CS5703 Data Visualisation; CS5704 Research Project Management

**Year 2**
- Term 1 – CS5705 Ethics and Governance of Digital Systems; CS5709 Digital Innovation and Strategy
- Term 2 – CS5706 Machine Learning; CS5710 High Performance Computational Infrastructures
### Compulsory modular block codes, titles and credits

Students studying a **staged masters** will take the dissertation in their third year.

**MSc**  
CS5500_CB Dissertation (60 credits)

**Part Time Scheme of Studies**  
Year 2 - (part time)  
Term 3 – CS5500_CB

Year 3 (part time staged masters)

### Optional modular block codes, titles and credits

N/A

### FHEQ Level 7 Progression and Award Requirements

**As per Senate Regulation 3**

A PGDip may be awarded by substitution of the dissertation (CS5500) for up to 30 credits of modular/assessment blocks in the taught part of the programme, provided the learning outcomes have been met.

### Pre-Masters Level

The pre-Masters structure are specified in the relevant Validated Programme Element Specifications. These documents also specify the progression requirements to FHEQ Level 7.

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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.