Course Specification

Course Summary Information		
1	**Course Title**	Master of Science (MSc) Health Data Science and Clinical Informatics Postgraduate Diploma (PGDip) Health Data Science and Clinical Informatics Postgraduate Certificate (PGCert) Health Data Science and Clinical Informatics
2	**Course Code**	MSc – PT1854 (FT), PT1857 (PT) PG Diploma – stand-alone PT1853 (FT), PT1856 (PT) PG Certificate – stand-alone PT1852 (FT), PT1855 (PT)
3	**Awarding Institution**	Birmingham City University.
4	**Teaching Institution(s)** (if different from point 3)	Not applicable
5	**Professional Statutory or Regulatory Body (PSRB) accreditation** (if applicable)	Not applicable

6	**Course Description**
	The MSc Health Data Science and Clinical Informatics at Birmingham City University is a cutting-edge programme designed to equip you with the data-driven skills needed to shape the future of healthcare. As the healthcare industry embraces digital transformation, the demand for professionals who can harness the power of data, artificial intelligence (AI), and informatics has never been greater. This interdisciplinary course provides you with a strong foundation in biostatistics, epidemiology, health technology assessment, machine learning, and health data modelling, as well as hands-on experience with electronic health records (EHRs), biomedical imaging, and sensing technologies. Whether you're from a health, life science, computing or engineering background, this course prepares you to apply advanced analytical techniques to real-world health challenges, inform clinical decision-making, and improve patient outcomes. You'll learn to work confidently with large and complex health datasets, gaining the practical and theoretical expertise sought by employers across the NHS, public health agencies, digital health companies, and the pharmaceutical sector. With flexible full-time and part-time options and expert teaching led by the Department of Life and Sports Sciences, supported by colleagues from the Schools of Architecture, Built Environment, Computing and Engineering, and Law and Social Sciences, you'll benefit from a rich interdisciplinary learning experience that prepares you to lead in a rapidly evolving digital healthcare landscape. **Join us at BCU and become a driver of data-led innovation in health.**

7	Course Awards		
7a	**Name of Final Award**	**Level**	**Credits Awarded**
	MSc Health Data Science and Clinical Informatics	Level 7	180
7b	**Exit Awards and Credits Awarded**		
	Postgraduate Diploma in Health Data Science and Clinical Informatics	Level 7	120
	Postgraduate Certificate in Health Data Science and Clinical Informatics	Level 7	60

8	Variation from the University Regulations
	N/a

9	Delivery Patterns			
Mode(s) of Study	**Location(s) of Study**	**Duration of Study**	**Code(s)**
MSc Full-time	City South Campus, Westbourne Rd, Edgbaston	12 months	PT1854
PGDip Full-time	City South Campus, Westbourne Rd, Edgbaston	9 months	PT1853
PGCert Full-time	City South Campus, Westbourne Rd, Edgbaston	6 months	PT1852
MSc Part-time	City South Campus, Westbourne Rd, Edgbaston	24 months	PT1857
PGDip Part-time	City South Campus, Westbourne Rd, Edgbaston	18 months	PT1856
PGCert Part-time	City South Campus, Westbourne Rd, Edgbaston	12 months	PT1855

10	Entry Requirements
	The admission requirements for this course are stated on the course page of the BCU website at https://www.bcu.ac.uk/.

11	Course Aims
1	Provide students with core knowledge and practical skills in health data science, including biostatistics, epidemiology, and clinical informatics.
2	Develop students' ability to apply advanced data analytics and machine learning techniques to real-world healthcare challenges.
3	Equip students with the skills to critically evaluate health technologies and translate data insights into improved clinical and public health outcomes.
4	Foster independent research skills through a substantial dissertation project, preparing graduates for professional practice or further study.

12	**Course Learning Outcomes**
Knowledge and Understanding	
1	Critically appraise epidemiological, statistical, and informatics methods used in health data analysis, including advanced regression and survival analysis using R or Python, drawing appropriate conclusions and making evidence-based recommendations.
2	Evaluate the use of electronic health records (EHRs), digital health tools, and biomedical data sources, including their structure, strengths, limitations, and potential for improving health outcomes.
3	Analyse ethical, legal, and governance frameworks that regulate the use of health data, including data protection, privacy, and patient/public involvement, and reproducible workflows using Git/GitHub.
4	Critically evaluate emerging digital technologies, including machine learning and artificial intelligence applications in healthcare, including predictive modelling, decision-support systems, and fairness/bias in algorithms.
5	Examine health economic and health technology assessment approaches, and their role in guiding resource allocation, policy, and clinical practice.
6	Interpret complex health datasets, including biomedical or sensor-derived data, using appropriate computational and analytical techniques, , with consideration of clinical and translational applications.
7	Analyse contemporary issues in digital health and health informatics, such as personalised medicine, digital inequalities, and the integration of health and social care data.
8	Design and critique research studies in health data science, integrating statistical, epidemiological, and computational approaches to address complex public health and clinical challenges.
Skills and Other Attributes	
9	. Apply advanced statistical and data science tools (e.g., R, Python, machine learning libraries, and Lynx) to clean, integrate, and analyse complex health datasets. Demonstrate collaborative and reproducible research skills using Git and GitHub for version control, code sharing, and workflow management.
10	Communicate complex data-driven insights effectively to diverse audiences, including clinicians, policy-makers, patients, and academic peers.
11	Work collaboratively in interdisciplinary teams, drawing on expertise from public health, computer science, clinical practice, and biomedical engineering to address health challenges.
12	Demonstrate professionalism and ethical integrity in data handling, research conduct, and decision-making, adhering to legal and institutional standards.
13	Reflect on professional practice and personal development, identifying areas for growth and demonstrating commitment to lifelong learning in a rapidly evolving field.
14	Demonstrate a wide range of transferable skills to support employment, including critical thinking, problem solving, project management, ICT, teamwork, and independent working.

13	Level Learning Outcomes
Upon completion of PG Certificate in Health Data Science and Clinical Informatics students will be able to:	
	Demonstrate a critical understanding of core concepts in health data science, clinical informatics, epidemiology, and biostatistics.
	Apply appropriate software tools (e.g., R, Python, and Lynx) to manage, clean, and visualise health data from diverse sources, including electronic health records, while using Git and GitHub to support version control, collaboration, and reproducible workflows.
	Recognise and reflect on ethical, legal, and governance considerations in health data use, including privacy, confidentiality, and professional integrity.
Upon completion of PG Diploma in Health Data Science and Clinical Informatics students will be able to:	
	Apply advanced statistical, epidemiological, and informatics methods to analyse and interpret complex health datasets, drawing evidence-based conclusions.
	Critically evaluate applications of machine learning, artificial intelligence, and data visualisation to support clinical decision-making and address health challenges.
	Appraise interdisciplinary approaches, including health economics, biomedical imaging, and digital health tools, and their role in improving population and clinical outcomes.
	Communicate complex analytical insights effectively to different audiences, including clinicians, policymakers, and academic peers.
Upon completion of MSc in Health Data Science and Clinical Informatics students will be able to:	
	Design, execute, and critically evaluate an independent, interdisciplinary research project addressing a real-world challenge in health data science or clinical informatics.
	Synthesise statistical, computational, and domain-specific knowledge to generate original insights that contribute to digital health scholarship and professional practice.
	Demonstrate reflective practice, professionalism, and leadership in the use of health data, showing commitment to ethical standards, lifelong learning, and transferable employability skills.

14	Course Learning, Teaching and Assessment Strategy
	Course Learning, Teaching and Assessment Strategy The MSc in Health Data Science and Clinical Informatics adopts a student-centred, applied learning approach, underpinned by a blended teaching model that integrates theoretical knowledge with practical skills development. This strategy supports students in becoming agile, work-ready health data professionals capable of applying data science to real-world clinical and public health challenges. **Learning and Teaching Approach** Learning on this programme is designed around a blend of structured on-campus sessions and flexible online learning activities. Approximately 80% of contact time will be delivered in person through lectures, seminars, interactive workshops, and lab-based practicals using statistical and machine learning tools (e.g., , R, Python and Lynx). These face-to-face sessions provide opportunities for real-time discussion, collaborative problem-solving, and hands-on data analysis using industry-relevant software and datasets. Students will also be introduced to Git and GitHub for version control, collaboration, and reproducible project management. Complementing this, 20% of learning activities will be delivered online via BCU's virtual learning environment (VLE) (Moodle/Cadmus). These include pre-recorded lectures, supplementary reading, online quizzes, discussion boards, software tutorials, and virtual guest lectures from external health data experts. This flexible model supports a variety of learning styles and enables students to consolidate their knowledge at their own pace. The course promotes interdisciplinary learning by drawing from fields such as biostatistics, informatics, public health, data science, and clinical research. Engagement with real-world data from a range of sources, including publicly

available datasets curated by national health data initiatives (such as HDR UK), ensures that learning remains applied and professionally relevant.

Learning Activities

Throughout the course, students will be actively involved in:

- Practical workshops for data manipulation, modelling and visualisation
- Small group seminars for critical reflection, peer discussion, and formative feedback
- Student-led presentations and journal clubs to foster communication and knowledge synthesis
- Case-based learning and scenario analysis to contextualise theory in healthcare settings
- Independent learning supported by curated digital resources and academic support services

Dedicated access to laptops, labs, and software ensures students can effectively engage in computational and statistical components of the programme both on- and off-campus.

Assessment Strategy

Our assessments are designed to help students grow in confidence and skills while showing they've met the learning outcomes. Across the course, students are assessed in a variety of ways that test their ability to apply knowledge to real health data challenges, think critically, solve problems, and communicate clearly to different audiences. Assessments also encourage students to reflect on professional practice and work ethically. The course finishes with a dissertation, which gives students the chance to bring everything together in an independent piece of research. Formative feedback will be embedded throughout each module via peer discussions, draft reviews, quizzes, and tutor guidance. Summative feedback is constructive, criterion-referenced, and developmental equipping students to continuously improve their performance across the course.

Feedback and Feedforward

All students will receive timely, actionable feedback to guide their learning journey. Feedback is delivered through multiple channels, including written comments on assignments, one-to-one supervision meetings, in-class discussions, and digital feedback via Moodle/Cadmus. Feedforward strategies such as exemplars, rubrics, and interim project milestones are employed to help students anticipate expectations and improve future work.

Students undertaking the MSc dissertation will benefit from sustained one-to-one supervision from academic staff with research expertise in health data science and informatics. Supervision includes both academic guidance and structured skill-building (e.g., data ethics, protocol development, results interpretation).

Learning Partnership and Student Expectations

This programme is built on a collaborative learning partnership between students and staff. Students are expected to:

- Engage actively in all scheduled learning sessions (both on-campus and online)
- Undertake independent study and preparatory work for classes
- Participate in group work and peer review activities
- Meet submission deadlines and make use of available academic support

In return, the programme team commits to providing high-quality teaching, accessible learning resources, regular feedback, and academic support through personal tutors and dissertation supervisors.

15	Course Requirements

15a **Level 7:**

In order to complete this course a student must successfully complete all the following CORE modules (totalling 140 credits): MSc Health Data Science and Clinical Informatics

Module Code	Module Name	Credit Value	Semester
HDS7000	Introduction to Health Data Science and Epidemiological Principles	20	1
HDS7001	Applied Research and Epidemiological Methods in Health Data Science	20	1
HDS7004	Health Informatics	20	2
HDS7005	Health Data Modelling and Visualisation with Machine Learning	20	2
HDS7008	MSc dissertation	60	2/3

In order to complete this course a student must successfully complete at least 40 credits from the following indicative list of OPTIONAL modules.

Module Code	Module Name	Credit Value	Semester
HDS7003	Health Economics	20	1
HDS7002	Advanced Epidemiology and Biostatistical Methods	20	1
HDS7006	Data Analysis using Machine Learning	20	2
HDS7007	Biomedical Imaging and Sensing	20	2

Students must choose one optional module in Semester 1 and one optional module in Semester 2.

In order to complete this course a student must successfully complete all the following CORE modules (totalling 80 credits): PGDip Health Data Science and Clinical Informatics

Module Code	Module Name	Credit Value	Semester
HDS7000	Introduction to Health Data Science and Epidemiological Principles	20	1
HDS7001	Applied Research and Epidemiological Methods in Health Data Science	20	1
HDS7004	Health Informatics	20	2
HDS7005	Health Data Modelling and Visualisation with Machine Learning	20	2

In order to complete this course a student must successfully complete at least 40 credits from the following indicative list of OPTIONAL modules.

Module Code	Module Name	Credit Value	Semester
HDS7003	Health Economics	20	1
HDS7002	Advanced Epidemiology and Biostatistical Methods	20	1
HDS7006	Data Analysis using Machine Learning	20	2
HDS7007	Biomedical Imaging and Sensing	20	2

Students must choose one optional module in Semester 1 and one optional module in Semester 2.

In order to complete this course a student must successfully complete at least 60 credits from the following CORE modules: PGCert Health Data Science and Clinical Informatics

Module Code	Module Name	Credit Value	Semester
HDS7000	Introduction to Health Data Science and Epidemiological Principles	20	1
HDS7001	Applied Research and Epidemiological Methods in Health Data Science	20	1
HDS7004	Health Informatics	20	2
HDS7005	Health Data Modelling and Visualisation with Machine Learning	20	2

15b	Structure Diagram

Please note list of optional modules is indicative only. Students' choice will not be guaranteed for optional modules but a fair and transparent process will be adopted and shared with students.

Full-Time MSc in Health Data Science and Clinical Informatics

Duration: 12 months (Year 1, Block 1)

Total Credits: 180

Level 7

SEMESTER ONE	SEMESTER TWO	SEMESTER TWO/THREE
Core **Module code**: HDS7000 **Module title**: Introduction to Health Data Science and Epidemiological Principles (20 credits) **Core** **Module Code**: HDS7001 **Module title**: Applied Research and Epidemiological Methods in Health Data Science (20 credits)	**Core** **Module code**: HDS7004 **Module title:** Health Informatics (20 credits) **Core** **Module Code:** HDS7005 **Module title:** Health Data Modelling and Visualisation with Machine Learning (20 credits	**Core** **Module code:** HDS7008 MSc dissertation (60 credits) Note: This module runs across Semester 2 and Semester 3. Assessment and credit allocation occur entirely in Semester 3, following completion of the dissertation.
Optional **Module code**: HDS7003 **Module title**: Health Economics (20 credits) **Optional** **Module code**: HDS7002 **Module title:** Advanced Epidemiology and Biostatistical Methods (20 credits) **Students are required to choose one of the two available optional modules.**	**Optional** **Module Code**: HDS7006 **Module Title:** Data analysis using Machine Learning (20 credits) **Optional** **Module code:** HDS7007 **Module title:** Biomedical Imaging and Sensing (20 credits) **Students are required to choose one of the two available optional modules.**	

Full-Time PGDip in Health Data Science and Clinical Informatics

Duration: 9 months (Year 1, Block 1)

Total Credits: 120

Level 7

SEMESTER ONE	SEMESTER TWO
Core **Module code**: HDS7000 **Module title**: Introduction to Health Data Science and Epidemiological Principles (20 credits) **Core** **Module Code**: HDS7001 **Module title**: Applied Research and Epidemiological Methods in Health Data Science (20 credits)	**Core** **Module code**: HDS7004 **Module title:** Health Informatics (20 credits) **Core** **Module Code:** HDS7005 **Module title:** Health Data Modelling and Visualisation with Machine Learning (20 credits
Optional **Module code**: HDS7003 **Module title**: Health Economics (20 credits) **Optional** **Module code**: HDS7002 **Module title:** Advanced Epidemiology and Biostatistical Methods (20 credits). **Students are required to choose one of the two available optional modules.**	**Optional** **Module Code**: HDS7006 **Module Title:** Data analysis using Machine Learning (20 credits) **Optional** **Module code:** HDS7007 **Module title:** Biomedical Imaging and Sensing (20 credits) **Students are required to choose one of the two available optional modules.**

Full-Time PGCert in Health Data Science and Clinical Informatics

Duration: 6 months (Year 1, Block 1)

Total Credits: 60

Level 7

SEMESTER ONE
Core **Module code**: HDS7000 **Module title**: Introduction to Health Data Science and Epidemiological Principles (20 credits) **Core** **Module Code**: HDS7001 **Module title**: Applied Research and Epidemiological Methods in Health Data Science (20 credits)
SEMESTER TWO
Module code: HDS7004 **Module title**: Health Informatics (20 credits) **Core** **Module Code**: HDS7005 **Module title**: Health Data Modelling and Visualisation with Machine Learning (20 credits)

Part-Time MSc in Health Data Science and Clinical Informatics

Duration: 24 months (year 1 block 1 and year 2 block 2)

Total Credits: 180

Year 1		
SEMESTER ONE	**SEMESTER TWO**	**SEMESTER THREE**
Core **Module code**: HDS7000 **Module title**: Introduction to Health Data Science and Epidemiological Principles (20 credits)	**Core** **Module code**: HDS7001 **Module title:** Applied Research and Epidemiological Methods in Health Data Science (20 credits)	**Optional** **Module code:** 1. HDS7003 Health Economics (20 credits) OR 2. HDS7002 Advanced Epidemiology and Biostatistical Methods (20 credits)
Year 2		
Core **Module code**: HDS7004 **Module title**: Health Informatics (20 credits) **Core** **Module code**: HDS7005 **Module title:** Health Data Modelling and Visualisation with Machine Learning (20 credits)	**Optional** **Module Code**: 1. HDS7006 Data Analysis using Machine Learning (20 credits) OR 2. HDS7007 Biomedical Imaging and Sensing (20 credits)	**Core** HDS7008 MSc Dissertation (60 credits) Please note: This module will run in Semester 2 and Semester 3. Assessment and credit allocation occur entirely in Semester 3, following completion of the dissertation.

Part-Time PGDip in Health Data Science and Clinical Informatics

Duration: 18 months (year 1 block 1 and year 2 block 2)

Total Credits: 180

Year 1		
SEMESTER ONE	**SEMESTER TWO**	**SEMESTER THREE**
Core **Module code**: HDS7000 **Module title**: Introduction to Health Data Science and Epidemiological Principles (20 credits)	**Core** **Module code**: HDS7001 **Module title:** Applied Research and Epidemiological Methods in Health Data Science (20 credits)	**Optional** **Module code:** 1. HDS7003 Health Economics (20 credits) OR 2. HDS7002 Advanced Epidemiology and Biostatistical Methods (20 credits)
Year 2		
Core **Module code**: HDS7004 **Module title**: Health Informatics (20 credits)	**Core** **Module code**: HDS7005 **Module title**: Health data modelling and visualisation with machine learning (20 credits) **Optional** **Module Code**: 1. HDS7006 Data Analysis using Machine Learning (20 credits) OR 2. HDS7007 Biomedical Imaging and Sensing (20 credits)	

Part-Time PGCert in Health Data Science and Clinical Informatics

Duration: 12 months (year 1 block 1)

Total Credits: 60

Year 1		
SEMESTER ONE	**SEMESTER TWO**	**SEMESTER THREE**
Core **Module code**: HDS7000 **Module title**: Introduction to Health Data Science and Epidemiological Principles (20 credits)	**Core** **Module code**: HDS7001 **Module title:** Applied Research and Epidemiological Methods in Health Data Science (20 credits)	**Core** **Module code:** 1. HDS7005 Health Data Modelling and Visualisation with Machine Learning (20 credits) OR 2. HDS7004 Health Informatics (20 credits)

16 Overall Student Workload and Balance of Assessment

Overall student *workload* consists of class contact hours, independent learning and assessment activity, with each credit taken equating to a total study time of around 10 hours. While actual contact hours may depend on the optional modules selected, the following information gives an indication of how much time students will need to allocate to different activities at each level of the course.

- *Scheduled Learning* includes lectures, practical classes and workshops, contact time specified in timetable
- *Directed Learning* includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning
- *Private Study* includes preparation for presentations, report/coursework

The *balance of assessment* by mode of assessment (e.g. coursework, exam and in-person) depends to some extent on the optional modules chosen by students. The approximate percentage of the course assessed by coursework, report and in-person is shown below.

Level 7

Workload

20% time spent in timetabled teaching and learning activity

Activity	**Number of Hours**
Scheduled Learning	360
Directed Learning	180
Private Study	1,260
Total Hours	1,800

Balance of Assessment

Assessment Mode	**Percentage**
Coursework/report	90%
In-Person	10%