# Course Specification

| Course Summary Information | | | |
|---|---|---|---|
| **1** | **Course Title** | BSc (Hons) Computer and Data Science | |
| **2** | **BCU Course Code** | **UCAS Code** | US0922 | I10C |
| **3** | **Awarding Institution** | Birmingham City University | |
| **4** | **Teaching Institution(s)** (if different from point 3) | | |
| **5** | **Professional Statutory or Regulatory Body (PSRB) accreditation** (if applicable) | | |

| **6** | **Course Description** |
|---|---|
| | Do you want to develop the skills needed to be a leading computing professional for the 21st century? Skills development in Data Science and Artificial Intelligence tops the list of four grand challenges facing the British industry as per the Industrial Strategy of the government. To respond to this national call - inspired by a global demand for these skills - BSc Computer and Data Science produces Computer Science graduates who specialise in the most modern methods on Artificial Intelligence, Machine Learning, Deep Learning, Data Visualisation and a wide range of tools for evaluating, storing, integrating and processing data to deliver high-value software solutions to the challenges faced by the modern economy. |

Also, to give you a solid foundation in Computer Science, this course shares a common first year with the Computer Science programme, and teaches computer programming, computer architecture, algorithms and data structures, network fundamentals and website design, all the while nurturing your creativity. In the second and third year the course continues to teach vital topics from Computer Science such as software engineering, cyber security and databases.

As a result, you can apply for job titles including the terms Computer Science, Software Engineer, Software Developer, Data Scientist, Machine Learning Engineer, and Artificial Intelligence.

You'll gain a well-rounded education in Computer and Data Science, whilst developing your teamwork and software development skills. This is because you will work collaboratively with academics and businesses, applying practice-based skills to real-life case studies and projects.

While studying your Computer and Data Science degree with us, you'll also have access to dedicated industry-standard facilities in a fully equipped lab running the latest software. Plus, we're home to a Cisco Systems and a Microsoft Academy Centre, so you can rest assured knowing our university course will prepare you for a successful career in the industry.

**What's covered in the course?**

In your first year you will share a common first year with the BSc Computer Science course. The first year covers fundamental concepts, such as computer programming, algorithms and data structures, computer systems, website development, and network fundamentals while also nurturing your creativity with an innovation project.

In your second year, you will consolidate your learning by studying four Computer Science modules and two Data Science specific modules. The Computer Science modules include

advanced topics, that is, cyber security and software design, as well as critical topics, that is, object-oriented programming and database & web application development. The Data Science modules are Introduction to Data Science and Data Visualisation that introduce the lifecycle and visualisation of a data-oriented project/product.

In the final year you will broaden your understanding of data science by studying specialised subjects like artificial intelligence and machine learning, modern data stores, deep neural networks and, data management and machine learning operations.

In addition, you will complete an individual project in order to demonstrate your technical skills and general employability in preparation for your career. The individual project simulates typical graduate workplace tasks that require in-depth knowledge and skills in a specific area of computer and data science. This will include consideration of wider issues and the ability to manage activities and resources, and to generate, implement and report on solutions to meet task objectives.

During your course, you'll have the opportunity to take a professional placement year between your second and third year. This is something we recommend highly, as it will give you an invaluable opportunity to hone your expertise, try out a potential career path and get relevant workplace experience that is valued by many employers. It will also boost your CV.

With emphasis on computer lab-based practical work and project delivery, this course will provide you with ample opportunity to acquire both the technical and transferable skills desired by industry. Extra support sessions in mathematics will be offered to students which will be led by a specialist mathematics tutor.

Underpinned by an extensive range of staff knowledge and skills, the course seeks to develop you into a confident independent and team problem solver who is willing to take on new challenges and experiences. You will be able to build an online portfolio for personal and professional development using software such as Mahara or GitHub.

We focus on employability so our course encourages and enables collaborative activity, engagement with work placements, projects and international exchanges. Various activities have been built into the course to promote employability such as innovation fest, mid-semester employability week and the mini project during level 4 induction week. You will have the opportunity to take a sandwich placement year between your second and third year. This is something that is highly recommended, as it will give you an invaluable opportunity to put your skills into practice, try out a potential career path and get relevant workplace experience that is valued by so many employers.

| 7 | Course Awards | | |
|---|---|---|---|
| 7a | Name of Final Award | Level | Credits Awarded |
| | Bachelor of Science with Honours Computer and Data Science | 6 | 360 |
| | Bachelor of Science with Honours Computer and Data Science with Professional Placement Year | 6 | 480 |
| 7b | Exit Awards and Credits Awarded | | |
| | Certificate of Higher Education Computer Science | 4 | 120 |

| | | | |
|---|---|---|---|
| | Diploma of Higher Education Computer and Data Science | 5 | 240 |
| | Bachelor of Science Computer and Data Science | 6 | 300 |

| 8 | **Derogation from the University Regulations** |
|---|---|
| | 1. A maximum volume of 30 credits per course in a Bachelor's or Integrated Master's degree can be compensated, except that any compensation of Level 3 modules is not included in that limit.<br>2. A maximum volume of 20 credits per course in a Master's degree (other than an integrated Master's degree) can be compensated.<br>3. No condonement of modules at Levels 4-7 is permitted.<br>4. Where appropriate, a stage mean of at least 50% is required for students to progress from Bachelor's level (Level 6) on to the final stage of an Integrated Master's degree (Level 7), or to transfer course from a relevant Bachelor's degree to an Integrated Master's degree. |

| 9 | **Delivery Patterns** | | |
|---|---|---|---|
| **Mode(s) of Study** | **Location(s) of Study** | **Duration of Study** | **Code(s)** |
| Full Time | City Centre | 3 years | US0922 |
| With Professional Placement Year | City Centre | 4 years | US1080 |

| 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/  or may be found by searching for the course entry profile located on the UCAS website. |

| 11 | **Course Learning Outcomes** |
|---|---|
| | **Knowledge** |
| 1 | Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of computer/data science technology. |
| 2 | Knowledge and understanding of contemporary tools and technologies to produce solutions relevant to the domain of computer science/data science to meet a set of agreed requirements. |
| 3 | Understand the roles and responsibilities of a professional working within the computing profession. |
| 4 | Appreciate the social, environmental, ethical, economic and commercial considerations that impact on the computer/data science solutions. |
| | **Skills and Other Attributes** |
| 5 | Critically appraise and deploy effectively a range of theories, techniques and tools for the modelling, design and implementation of computer-based systems for the purposes of comprehension, communication, prediction and the understanding of trade-offs. |
| 6 | Specify the requirements and practical constraints of computer/data science solutions |

| | considering a wide range of aspects including legal, ethical and social issues. |
|---|---|
| 7 | Recognise and analyse criteria and specifications appropriate to specific problems, and plan strategies for their solution and future development |
| 8 | Work effectively as a member of a team, and undertake management and planning activities, recognising the different roles within a team and different ways of organising teams. |

| 12 | **Course Requirements** |
|---|---|
| 12a | **Level 4:**<br><br>*In order to complete this course a student must successfully complete all the following CORE modules (totalling 120 credits):* |

| Module Code | Module Name | Credit Value |
|---|---|---|
| CMP4267 | Computer Systems | 20 |
| DIG4166 | Website Design & Development | 20 |
| CMP4272 | Data Structures & Algorithms | 20 |
| CMP4285 | Innovation Project | 20 |
| CMP4266 | Computer Programming | 20 |
| CMP4269 | Network Fundamentals | 20 |

**Level 5:**

*In order to complete this course a student must successfully complete all the following CORE modules (totalling 120 credits):*

| Module Code | Module Name | Credit Value |
|---|---|---|
| CMP5332 | Object Oriented Programming | 20 |
| DIG5127 | Database & Web Application Development | 20 |
| CMP5353 | Introduction to Data Science | 20 |
| CMP5329 | Cyber Security | 20 |
| CMP5354 | Software Design | 20 |
| CMP5352 | Data Visualisation | 20 |

**Professional Placement Year (optional)**

*In order to qualify for the award of Bachelor of Science with Honours Computer and Data Science with Professional Placement, a student must successfully complete all of the Level 6 modules listed below as well as the following Level 5 module:*

| Module Code | Module Name | Credit Value |
|---|---|---|
| PPY5004 | Professional Placement | 120 |

**Level 6:**

*In order to complete this course a student must successfully complete all the following CORE modules (totalling 120 credits):*

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| Module Code | Module Name | Credit Value |
|---|---|---|
| CMP6202 | Artificial Intelligence & Machine Learning | 20 |
| CMP6230 | Data Management and Machine Learning Operations | 20 |
| CMP6228 | Deep Neural Networks | 20 |
| CMP6207 | Modern Data Stores | 20 |
| CMP6200 | Individual Honours Project | 40 |

## 12b   Structure Diagram

### Level 4 – Year 1

| SEMESTER ONE | SEMESTER TWO |
|---|---|
| **Core** | **Core** |
| Computer Programming (20 Credits) | Data Structure and Algorithms (20 Credits) |
| Computer Systems (20 Credits) | Network Fundamentals (20 Credits) |
| Website Design and Development (20 Credits) | Innovation Projects (20 Credits) |

### Level 5 – Year 2

| Core | Core |
|---|---|
| **Core** | **Core** |
| Object Oriented Programming (20 Credits) | Cyber Security (20 Credits) |
| Database and Web Application Development (20 Credits) | Software Engineering Methodology & Project (20 Credits) |
| Introduction to Data Science (20 Credits) | Data Visualisation (20 Credits) |

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| **Professional Placement - Year 3 (optional)** |
| **Professional Placement Module (120 Credits)** |

### Level 6 – Year 4

| Core | Core |
|---|---|
| **Core** | **Core** |
| Artificial Intelligence & Machine Learning (20 Credits) | Modern Data Stores (20 Credits) |
| Data Management and Machine Learning Operations (20 Credits) | Deep Neural Networks (20 Credits) |
| Individual Honours Project (40 Credits) | |

**13 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 exams

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

**Level 4**

**Workload**

**24% time spent in timetabled teaching and learning activity**

| Activity | Number of Hours |
|---|---|
| Scheduled Learning | 288 |
| Directed Learning | 498 |
| Private Study | 414 |
| Total Hours | 1200 |

**Balance of Assessment**

| Assessment Mode | Percentage |
|---|---|
| Coursework | 100% |
| Exam | 0 |
| In-person | 0% |

**Level 5**

**Workload**

**24% time spent in timetabled teaching and learning activity**

| Activity | Number of Hours |
|---|---|
| Scheduled Learning | 288 |
| Directed Learning | 473 |
| Private Study | 439 |
| Total Hours | 1200 |

**Balance of Assessment**

| Assessment Mode | Percentage |
|---|---|
| Coursework | 87% |
| Exam | 13% |
| In-Person | 0 |

**Level 6**

**<u>Workload</u>**

**20% time spent in timetabled teaching and learning activity**

| Activity | Number of Hours |
|---|---|
| Scheduled Learning | 240 |
| Directed Learning | 388 |
| Private Study | 372 |
| **Total Hours** | 1200 |

**<u>Balance of Assessment</u>**

| Assessment Mode | Percentage |
|---|---|
| Coursework | 92% |
| Exam | 0 |
| In-Person | 8 % |