3 year BSc (Hons) Full-Time Degree

4 ½ year BSc (Hons) Higher Level Apprenticeship Degree

BSc (Hons) Software, Cloud and Application Development

Validated by The Open University

Contents

Overview of Northern Ireland IT Employment Sector

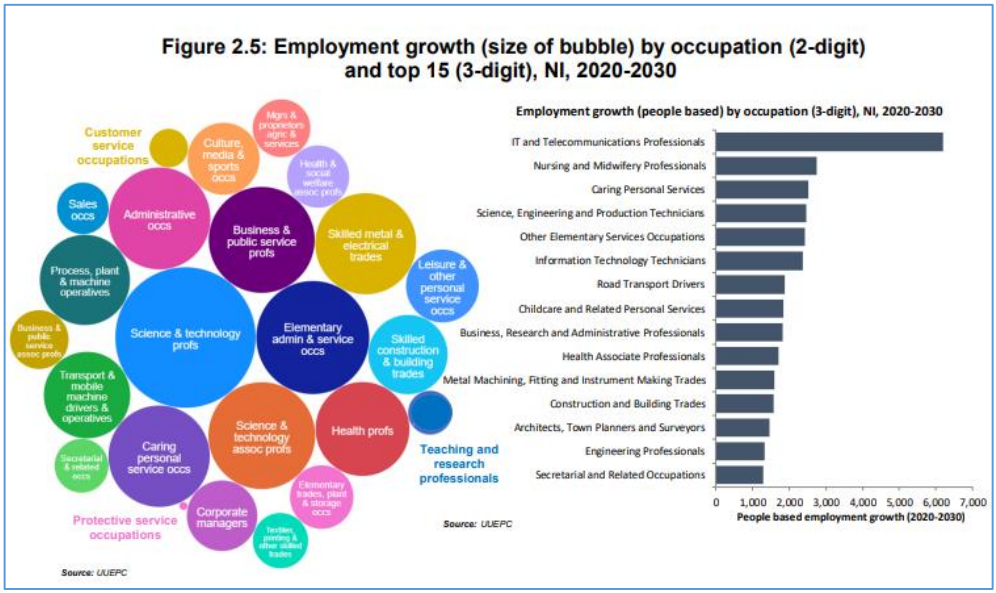
Belfast Met offers two BSc (Hons) Degrees in IT at the Castlereagh Campus. These programmes align themselves to research carried out on the economic and technical future of Northern Ireland.

The Northern Ireland Digital Matrix Report of 2016 (http://matrixni.org/reports/2016-digital-ict/) proposed the following opportunities for Northern Ireland within the digital arena.

Opportunities for Northern Ireland

- **Advanced networking:** the increased capability to move large amounts of data anywhere, quickly and reliably changes where economic activity is located.
- **Applications:** more sophisticated applications are replacing human activity in lower-skilled ICT work.
- **Data analytics:** understanding of transactional data can lead to changes in the location of business functions, from manufacturing to provision of IT services; and automation of data analysis changes the pattern and location of business processes.
- **Cyber security:** as organisations rely increasingly on networks and cloud-based services running on virtualised infrastructure, securing data becomes harder.
- **New ICT service models:** the rise of cloud-based applications mean that IT services are no longer delivered from data centres close to the point of use, and sometimes from unknown locations.

Analysis into employment growth from 2020 to 2030 is reported in the Northern Ireland Skills Barometer Report 2021. The key findings stated in the report are, “the occupation with the largest growth over the next decade is forecast to be IT and telecommunications professionals (6.2k) sector, and indirectly linked to an increased demand for digital skills across the wider economy.”



The report also investigates the expected labour demand by occupation with the biggest demand occupation is science and technology professionals.

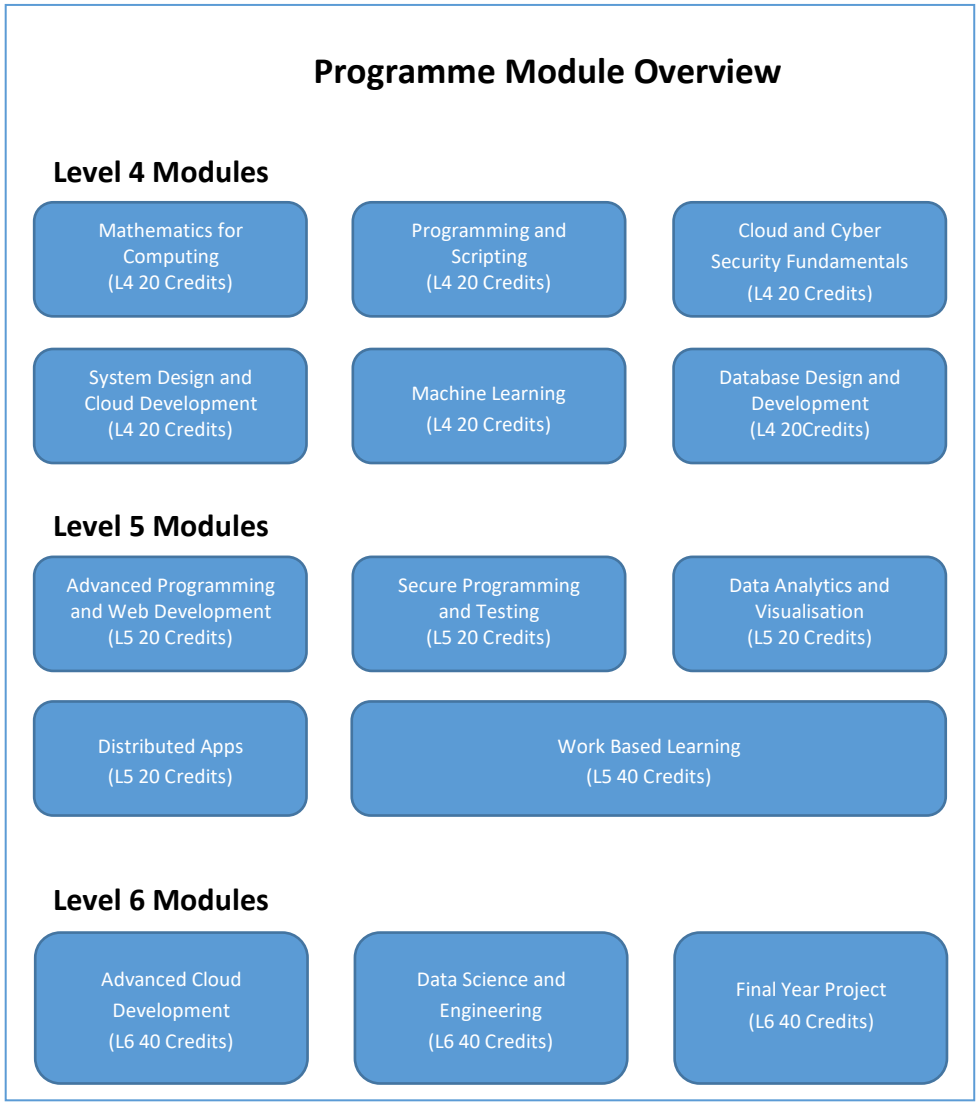
This is directly linked to the growth of the ICT. With this in mind, Belfast Metropolitan College has created Full Time and Higher Level Apprenticeship Degree programmes that addresses the need for a skilled workforce in the areas of Cyber Security, Networking, Data Analytics and Software/Cloud development.

The two Foundation Degrees that aim to cover all of the areas identified in the NI Digital Matrix report and the Skills Barometer are: -

- **Foundation Degree in Cyber Security with Cloud and Network Infrastructure**
- **Foundation Degree in Software and Cloud Development with Data Analysis**

Both these programmes have an optional 1-year BSc (Hons) Top-Up, that students who have successfully achieved an IT related foundation degree can enrol onto.

BSc (Hons) Degree in Software, Cloud and Application Development (validated by The Open University)



Modules Overview

Level 4 Modules

System Design and Cloud Development (20 credits)

This module aims to provide students with an understanding of how information systems are designed to support business's needs. This module introduces the student to tools and techniques used throughout the development lifecycle, the use of tools and languages for cloud-based computing applications and the rationale for using these paradigms. It provides students with the knowledge of different systems development approaches and the justification of their implementation in cloud-based solutions.

Cloud and Cyber Security Fundamentals (20 credits)

This module introduces the core Cloud and Cyber security concepts, skills, and technologies. Candidates will cover a wide range of activities and themes such as Cyber Security, Cloud Computing, in relation to business processes, financial considerations, project management, as well as Cyber security within networking both on/off premises with legal compliance relevant to industry application.

Programming and Scripting (20 credits)

This module will provide students with a basic knowledge of the techniques used in program development. Students will learn the concepts of good program design and subsequent successful implementation. This module will make students aware of the basic building blocks used in developing and testing simple maintainable programs. This module will provide an introduction to programme scripting.

Database Design and Development (20 credits)

This module provides an integrated practical approach to the development of relational database management systems and the application of system methodologies within a software engineering environment. This module evaluates the role of system methodologies, with emphasis on the role of design, in delivering usable and maintainable database systems. The practical nature of the subject material is supported through collaborative work using Rapid Applications Development (RAD) on several small systems development problems and reinforces technical skills taught elsewhere on the course.

Mathematics for Computing (20 credits)

This module provides students with a mathematical background to support and enhance material presented in computer science modules. Students will develop proficiency in the use of fundamental mathematical concepts in the areas of discrete structures, algorithms and complexity. Students will also develop an ability to absorb further specific mathematical knowledge as required for given specialised areas. The analytic skills and conceptual thinking required for competence in areas such as programming, database analysis, formal specification, encryption and systems design are developed in the module.

Machine Learning Fundamentals (Bots and AI) – (20 credits)

This module will equip students with essential knowledge and skills to become efficient machine learning/AI developers. The module will introduce students to machine learning concepts, tools and technologies. The module will also extend students' knowledge and skills for them to be able to implements solutions that meet scalability and performance requirements. The module delivery will be conducted in a practical fashion through exposing the student to one exemplar of modern development platform/technologies in

depth and then requiring them to develop a significant application using the exemplary toolset/development platform, and to reflect on the process and the solution.

NB Students can exit Level 4 with a Certificate in HE on successful completion of the six Level 4 modules.

Level 5 Modules

Advanced Programming and Web Development (20 credits)

This module will equip students with essential knowledge and skills to become efficient web developers. The module will consolidate and integrate programming concepts and techniques which students have learned earlier in the degree for the purpose of web application development for the real world. The module will also extend students' knowledge and skills for them to be able to tackle issues pertinent to realistic web application development projects.

Data Analytics and Visualisation (20 credits)

The rationale of this module is to provide students with the key principles and techniques of data analytics and visualisation. By completing this module students will gain knowledge and skills on how to extract, mine and analyse data along with how to visually represent large datasets by developing methods and techniques with visualisation to improve comprehension, communication, and decision making in big data applications.

Distributed Apps (DApps) (20 credits)

Development of decentralised distributed blockchain applications is central to the concepts of user privacy with encrypted personal information and data being controlled by the user and the ability for users to audit their own data. Therefore the rationale of this module is to provide students with the key principles and techniques of distributed blockchain application (DApp) development. By completing this module students will gain knowledge and skills to build, run, modify and deploy a distributed application (DApp) using blockchain technology for authentication and data storage components of the application's platform.

Secure Programming and Testing (20 credits)

There are software defects which can be easily avoided that are a primary cause of commonly exploited software vulnerabilities. Most vulnerabilities arise from a relatively small number of common programming errors. By identifying insecure coding practices and developing secure alternatives, software developers can take practical steps to reduce or eliminate vulnerabilities before deployment. Employing secure programming techniques and testing before the software is deployed can lead to significant cost savings.

Worked Based Learning (40 credits)

This module will enable students to apply their application development knowledge and skills in their working environment where as employees they will have been exposed to a range of the practices and tools used by the software & application development sector. As they are based in a relevant and supervised employment this will allow them, the opportunity to apply and develop their skills and knowledge gained throughout the course. While working as an application developer they will also have the opportunity to enhance their personal development and interpersonal skills.

NB Students can exit Level 5 with a Foundation Degree on successful completion of the six Level 4 modules and five Level 5 modules.

Level 6 Top-Up Modules

Advanced Cloud Development (40 credits)

This module covers the areas of DevOps, Cloud source control, and Containers. The module will cover the following: -

- Integration of the Cloud and source control
- DevOps
- Facilitate communication and collaboration
- Define and implement continuous integration
- Define and implement a continuous delivery and release management strategy
- Containers

Data Science and Engineering (40 credits)

The aims of this module are: -

- Preparing Data
- Design and create data models
- Manage data models
- Data Design
- Monitor data storage, data processing
- Optimise Data for high availability, latency, and throughput, disaster recovery, and global distribution (multi-region)

Final Year Project (40 credits)

This module will enable students to apply their knowledge and skills gained throughout the course and combine them into industry relevant projects as seen in the working environment. Combining different aspects of the subject areas previously studied in the course will empower students to develop skills that suit their preferred interests and will present the opportunity for students to be exposed to a range of the practices and tools used by relevant industry.

NB Students successfully completion the three Level 6 modules will be awarded the BSc (Hons) in Software, Cloud and Application Development Top-Up Degree.

Additional qualifications offered with programme

The following vendor qualifications are offered along with the course modules.

Microsoft Azure Fundamentals (AZ-900)

This exam measures students' ability to accomplish the following technical tasks: develop Azure Infrastructure as a Service compute solutions; develop Azure Platform as a Service compute solutions; develop for Azure storage; implement Azure security; monitor, troubleshoot, and optimize solutions; and connect to and consume Azure services and third-party services.

Microsoft Azure Data Fundamentals (DP-900)

This exam measures students' ability to accomplish the following technical tasks: describe core data concepts; describe how to work with relational data on Azure; describe how to work with non-relational data on Azure; describe an analytics workload on Azure.

Microsoft Power Platform Fundamentals (PL-900

This exam measures students' ability to accomplish the following technical tasks: describe the business value of Power Platform; identify the core components of Power Platform; demonstrate the capabilities of Power BI; describe the capabilities of Power Apps; demonstrate the capabilities of Power Automate; demonstrate the business value of Power Virtual Agents.

Certified Tester Foundation Level in Software Testing

This certification provides students with the knowledge to evaluate static testing, utilise test design techniques, incorporate test management practices within an organisation, and build testing methods to correctly design functional and maintainable products.

Microsoft Azure AI Fundamentals (AI-900)

This course introduces fundamentals concepts related to artificial intelligence (AI), and the services in Microsoft Azure that can be used to create AI solutions. The course is not designed to teach students to become professional data scientists or software developers, but rather to build awareness of common AI workloads and the ability to identify Azure services to support them. Topics covered include: Describe fundamental principles of machine learning; features of computer vision workloads; features of Natural Language Processing (NLP) workloads on Azure; features of conversational AI workloads on Azure.

AZ-400: Designing and Implementing Microsoft DevOps Solutions

This exam measures your ability to accomplish the following technical tasks: develop an instrumentation strategy; develop a Site Reliability Engineering (SRE) strategy; develop a security and compliance plan; manage source control; facilitate communication and collaboration; define and implement continuous integration; and define and implement a continuous delivery and release management strategy.

DP-100: Designing and Implementing a Data Science Solution on Azure

This exam measures your ability to accomplish the following technical tasks: set up an Azure Machine Learning workspace; run experiments and train models; optimize and manage models; and deploy and consume models.

DP-203: Azure Data Engineer Associate

This exam measures your ability to accomplish the following technical tasks: design and implement data storage; design and develop data processing; design and implement data security; and monitor and optimize data storage and data processing.

Cisco Certified DevNet Associate

The Cisco Certified DevNet Associate certification validates skills and knowledge in understanding and using APIs, Cisco platforms and development, application development and security and infrastructure and automation.

Entry Requirements

Applicants must:

Hold 200 UCAS points or 80 tariff points (e.g. CDD or BB at A-Level or MPP at Level 3 Extended Diploma), GCSEs at C or above in English and Mathematics, or equivalent qualifications, such as Level 2 Essential Skills in Numeracy and Literacy.

Full-Time Costs and Duration

Course Fees: - £2765 (each year). Subject to change. Student finance available

Applications open November 2022

Duration: 3 years

Start Date – September 2023

End Date - June 2026

Hours per Week – 16 hours per week.

Campus - Castlereagh

Higher Level Apprenticeship Costs and Duration

Course Fees: - £0

Recruitment/Applications open 28th April 2023

Duration: 4 ½ years

Start Date – November 2023

End Date - May 2028

Hours per Week – 7 hours day release at the college, 2-4 days a week at employer.

Campus - Castlereagh

Contact Details

Software, Cloud and Application Development (Full-Time)

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Software, Cloud and Application Development (Apprenticeship)

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