

# Empowering Software Innovators

PEARSON BTEC LEVEL 5

Higher National  
Diploma International  
in Computing



# Software Engineering

Awarded by



Pearson

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Dream & Achieve  
with DeMont





### **DeMont Institute of Management and Technology**

is among the first Technical and Vocational Education and Training (TVET) providers in the UAE. DeMont offers NCFE, CMI, and Pearson programs that are accredited by Knowledge and Human Development Authority (KHDA). We have mastered the art, science, and practice of providing quality UK education with optimum result-centric teaching models that include pedagogical and blended forms of learning. Imparting quality education, offering accredited certifications, and delivering lessons that will alter our students' experience for the better is at the core of our institution's value. DeMont aspires to pave a promising career pathway for all those who walk through the doors of the institution with the desire to learn and grow.



## About Pearson

Pearson Education is a British-owned educational publishing and appraisal service for educational institutions and corporations. They offer academic and vocational qualifications that are globally recognized and benchmarked, with educational excellence rooted in names like Edexcel, BTEC, EDI, and LCCL. It integrates world-class educational content and evaluation, driven by services and technology, to allow more efficient teaching and customized learning.

## Introduction to BTEC

BTEC is one of the world's most successful brands, that engages students in practical, interpersonal and thinking skills. BTECs are work-related qualifications for students taking their first steps into employment, or for those already in employment and seeking career development opportunities. BTECs provide progression into the workplace either directly or via study at university and are also designed to meet employer's needs. Therefore, Pearson BTEC Higher National qualifications are widely recognised by industry and higher education as the principal vocational qualification at Levels 4 and 5.

There is now a greater emphasis on employer engagement and work readiness. The new Pearson BTEC Higher National qualifications in Computing are designed to reflect the increasing need for high quality professional and technical education pathways at Levels 4 and 5, thereby providing students with a clear line of sight to employment and to progression to a degree at Level 6.

# Why choose Pearson BTEC Higher Nationals?

Pearson BTEC Higher Nationals are designed to help students secure the knowledge and skills needed to succeed in the workplace. They represent the latest in professional standards and provide opportunities for students to develop behaviours for work, for example by undertaking a group project, or responding to a client brief.

A student may even achieve exemption from professional or vendor qualifications, or student membership of selected professional bodies, to help them on their journey to professional competence.

At the same time, the BTEC Higher Nationals are intended to keep doors open for future study should a student wish to progress further in their education. They do this by allowing space for the development of higher education study skills, such as the ability to research. Clear alignment of level of demand with the Framework for Higher Education qualification descriptors at level 4 and 5 means that students wishing to progress to level 6 study should feel better prepared. The Pearson BTEC Higher Nationals address these various requirements by providing:

- 1 A range of core, and specialist units, each with a clear purpose, so there is something to suit each student's choice of programme and future progression plans.
- 2 Fully revised content that is closely aligned with the needs of employers, professional bodies, vendors and higher education for a skilled future workforce.
- 3 Learning Outcomes mapped against Professional Body standards and vendor accreditation requirements, where appropriate.
- 4 An approach to demand at level 4 and 5 which is aligned with the Framework for Higher Education Qualifications (FHEQ).
- 5 Assessments and projects chosen to help students progress to the next level.
- 6 Support for student and tutors including Schemes of Work and Sample Assessment Briefs.

# BTEC HND International in Computing (Software Engineering)



## Who is this qualification for

The Higher National Diploma (HND) International in Computing with a specialization in Software Engineering is a comprehensive program designed to equip students with the knowledge, skills, and practical experience needed to excel in the dynamic field of software development. This program focuses on preparing students for careers in designing, building, and maintaining software applications that meet modern technological and business demands.

### Key Features

#### Higher National Diploma International in Computing (Software Engineering) offer:

- ▶ An opportunity for students to delve deep into the various aspects of designing, developing, testing, and maintaining software applications and systems.
- ▶ A curriculum that is carefully crafted to cover both theoretical concepts and practical skills essential for software engineering. Students gain a well-rounded education that encompasses programming languages, algorithms, data structures, software design principles, and more.
- ▶ A hands-on learning experience, ensuring that students have ample opportunities to apply theoretical knowledge in practical scenarios. This practical approach helps bridge the gap between theory and real-world application.
- ▶ Students to engage in projects that mirror real-world software development scenarios. This project-based learning allows students to collaborate, solve problems, and develop teamwork skills while working on substantial software projects.
- ▶ A gateway to a successful career in software engineering. Graduates are equipped with the necessary skills and knowledge to seamlessly integrate into technology-driven industries, meeting the demands of employers in the field.

# Qualification frameworks

Pearson BTEC Higher National qualifications are recognised higher education qualifications in the UK. They are in line with the Framework for Higher Education Qualifications (FHEQ) in England, Wales and Northern Ireland, and Quality Assurance Agency (QAA) Subject Benchmark Statements. These qualifications are part of the UK Regulated Qualifications Framework (RQF).

## Programme Purpose

The Higher National Diploma (HND) International in Computing with a specialization in Software Engineering serves as a platform for students to acquire the knowledge, skills, and practical experiences needed to excel in the field of software development. By aligning with industry demands, promoting independence, and enhancing accessibility, the program aims to produce adept and adaptable software engineering professionals ready to contribute to the advancement of technology and society.



### Units & Credit Structure

The Pearson BTEC Higher National Diploma (HND) is a Level 4 and Level 5 qualification made up of 240 credits.

Unit Name	Credits
Programming	15
Networking	15
Professional Practice	15
Database Design & Development	15
Security	15
Planning a Computing Project (Pearson-set)	15
Software Development Lifecycles	15
Website Design & Development	15
Computing Research Project (Pearson-set)	30
Business Process Support	15
Discrete Maths	15
Data Structures & Algorithms	15
Applied Programming and Design Principles	15
Operating Systems	15
Cloud Computing	15
Total Credits	240



## What could these qualifications lead to?

The Level 4 Higher National Certificate provides a solid foundation in computing, which students can build on if they decide to continue their studies. The Level 5 Higher National Diploma allows students to specialise by committing to specific career paths and progression routes to degree-level study. Once students have achieved the Level 5 Higher National Diploma, they can develop their career in the respective sector by:

- › Entering employment
- › Continuing existing employment
- › Linking with the appropriate professional body
- › Committing to continuing professional development

## Progression to University

The Level 5 Higher National Diploma is recognised by higher education providers as meeting admission requirements to many computing-related courses, for example:

- › **BSc (Hons) Computing**
- › **BSc (Hons) in Applied Computing**
- › **BSc (Hons) in Business and Computing.**

## Programming

This unit introduces students to the core concepts of programming with an introduction to algorithms and the characteristics of programming paradigms. Among the topics included in this unit are: introduction to algorithms, procedural, object-orientated & event-driven programming, security considerations, the integrated development environment and the debugging process.

### LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Define basic algorithms to carry out an operation and outline the process of programming an application.
- 02 Explain the characteristics of procedural, object-orientated and event-driven programming.
- 03 Implement basic algorithms in code using an IDE.
- 04 Determine the debugging process and explain the importance of a coding standard.


## Networking

The aim of this unit is to provide students with wider background knowledge of computer networking essentials, how they operate, protocols, standards, security considerations and the prototypes associated with a range of networking technologies.

### LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Examine networking principles & their protocols.
- 02 Explain networking devices & operations.
- 03 Design efficient networked systems.
- 04 Implement and diagnose networked systems.



Programming  
the Future,  
Networking  
the Present

# Professional Practice

This unit provides a foundation for good practice in a variety of contexts. The ability to communicate effectively using different tools and mediums will ensure that practical, research, design, reporting and presentation tasks are undertaken professionally and in accordance with various communication conventions. In everyday life the ability to apply critical reasoning and solve problems are necessary skills to enable task resolution and facilitate effective decision-making. Working with others in a group environment academically or within the workplace is an integral part of everyday life.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Demonstrate a range of interpersonal and transferable communication skills to a target audience.
- 02 Apply critical reasoning and thinking to a range of problem-solving scenarios.
- 03 Discuss the importance and dynamics of working within a team and the impact of team working in different environments.
- 04 Examine the need for Continuing Professional Development (CPD) and its role within the workplace and for higher level learning.

# Database Design & Development

The aim of this unit is to give students opportunities to develop an understanding of the concepts and issues relating to database design and development, as well as to provide the practical skills to translate that understanding into the design and creation of complex databases.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Use an appropriate design tool to design a relational database system for a substantial problem.
- 02 Develop a fully functional relational database system, based on an existing system design.
- 03 Test the system against user and system requirements.
- 04 Produce technical & user documentation.

A woman with long dark hair, wearing a red and white striped long-sleeved shirt, is sitting at a desk in a bright, modern office. She is looking towards the camera with a slight smile, her hand resting near her chin. In the background, a man is blurred, working at a computer. Large windows let in natural light. A large, semi-transparent orange arrow graphic points from the left towards the right, partially covering the bottom half of the image.

# Unlocking Data's Potential with Professional Precision

# Planning a Computing Project

This unit aims to allow students to demonstrate the research skills required for developing a deeper understanding of a subject and the ability to use evidence to inform decisions. Students will undertake independent research, and investigation of a theme set by Pearson. They will investigate and research an industry sector as outlined in the centre-set project brief. Additionally, they will use the outcomes of their research to plan a computer-based project and to support recommendations for how the identified business could use the tools and technologies identified as part of their research.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Conduct small-scale research, information gathering and data collection to generate knowledge on an identified subject.
- 02 Explore the features and business requirements of organisations in an identified sector.
- 03 Produce project plans based on research of the chosen theme for an identified organization.
- 04 Present your project recommendations and justifications of decisions made, based on research of the identified theme and sector.

# UNIT DETAILS

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# Security

The aim of this unit is to give students knowledge of security, the associated risks and how it has an impact on business continuity. Students will examine security measures involving access authorisation and regulation of use. They will implement contingency plans and devise security policies and procedures. The unit also introduces students to detection of threats and vulnerabilities in physical and IT security, and how to manage risks relating to organisational security.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Assess risks to IT security.
- 02 Describe IT security solutions.
- 03 Review mechanisms to control organisational IT security.
- 04 Manage organisational security.



# Operating Systems

This unit introduces students to different operating systems such as DOS, Windows, UNIX and Linux. The topics covered are the tasks of operating systems such as controlling and allocating memory, prioritising system requests, controlling input and output devices, facilitating data networking and managing files, including security and protection. Among the topics included in this unit are: the history and evolution of operating systems; the definition of an operating system; why operating systems are needed; how operating systems started and developed; operating systems management roles; management of memory, processes, processors, devices and files; security and protection: user security, device, application and process protection; inter-process communication; comparison of operating systems; distributed and networked systems; concurrent systems; multi-user systems; graphical interface systems; and practical application of operating systems: user interface commands of major operating systems; installations and extensions of operating systems.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Investigate different operating systems, their functions and user interfaces.
- 02 Explore the processes managed by an operating system.
- 03 Demonstrate the use of DOS, Windows, UNIX and Linux.
- 04 Analyse appropriate techniques and technologies used in distributed and concurrent systems.

# Cloud Computing

This unit is designed to develop an understanding of the fundamental concept of Cloud Computing, cloud segments, cloud deployment models, and the need for Cloud Computing. Students will gain appreciation of issues associated with managing cloud service architecture and to develop a critical awareness of Cloud Computing based projects. Topics included in the unit are the paradigms of networking, fundamentals of cloud computing, cloud computing architecture, deployment models, service models, security, technological drivers and cloud service providers.



## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Demonstrate an understanding of the fundamentals of Cloud Computing and its architectures.
- 02 Evaluate the deployment models, service models and technological drivers of Cloud Computing and validate their use.
- 03 Develop Cloud Computing solutions using service provider's frameworks and open source tools.
- 04 Analyse the technical challenges for cloud applications and assess their risks.

# Website Design & Development

This unit introduces students to the underpinning services required to host, manage and access a secure website before introducing and exploring the methods used by designers and developers to blend back-end technologies (server-side) with front-end technologies (client-side). To help ensure new designers are able to design and deliver a site that offers an outstanding User Experience (UX) supported by an innovative User Interface (UI) this unit also discusses the reasons, requirements, relationships, capabilities and features of the systems they will be using and gives them an opportunity to explore various tools, techniques and technologies with 'good design' principles to plan, design and review a multipage website.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Explain server technologies and management services associated with hosting and managing websites.
- 02 Categorise website technologies, tools and software used to develop websites.
- 03 Utilise website technologies, tools, and techniques with good design principles to create a multipage website.
- 04 Create and use a Test Plan to review the performance and design of a multipage website.

# Computing Research Project

The aim of this unit is to give students the opportunity to engage in sustained research in a specific field of study. Students will be able to demonstrate the capacity and ability to identify a research theme, to develop research aims, objectives and outcomes, and to present the outcomes of such research in both written and verbal formats. Students are encouraged to reflect on their engagement in the research process, during which recommendations for personal development are key learning points.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Examine appropriate research methodologies and approaches as part of the research process.
- 02 Conduct and analyse research relevant to a computing research project.
- 03 Communicate the outcomes of a research project to identified stakeholders.
- 04 Reflect on the application of research methodologies and concepts.

# Software Development Lifecycles

The unit introduces students to lifecycle decision making at different stages of the software development process. They will examine various lifecycle models and learn to appreciate their particular characteristics in order to understand for which project environments they are most appropriate. Theoretical understanding will be translated into practical skills through an actual software development lifecycle project. Students will become confident in the use of particular tools and techniques relevant to a chosen methodology.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Describe different software development lifecycles.
- 02 Explain the importance of a feasibility study.
- 03 Undertake a software development lifecycle.
- 04 Discuss the suitability of software behavioural design techniques.

A woman with blonde hair and glasses is looking at a laptop screen. The screen displays code and various digital icons like gears, a smartphone, and a lock. The text 'Building Secure Foundations for Project Brilliance' is overlaid on the left side of the image.

Building Secure  
Foundations for  
Project Brilliance

UNIT DETAILS





# Transforming Passion into Proficiency with Software Engineering



# Business Process Support

This unit introduces students to a range of tools, techniques and technologies used for acquiring data and processing it into meaningful information that can be used to support business functions and processes. Students will examine how data and information support business processes, and the mechanisms to source and utilise data and turn it into usable, and valuable, information output. Students will explore real-world business problems, the emergence of data science and how the application of data science can be used to support business processes. Finally, students will demonstrate the practical application of data science techniques to support real-world business problems.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Discuss the use of data and information to support business processes and the value they have for an identified organization.
- 02 Discuss the implications of the use of data and information to support business processes in a real-world scenario.
- 03 Explore the tools and technologies associated with data science and how it supports business processes.
- 04 Demonstrate the use of data science techniques to make recommendations to support real-world business problems.

# Discrete Maths

This unit introduces students to the discrete mathematical principles and theory that underpin software engineering. Through a series of case studies, scenarios and task based assessments, students will explore set theory and functions in a variety of scenarios, perform analysis using graph theory, apply Boolean algebra to applicable scenarios and, finally, explore additional concepts in abstract algebra.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Examine set theory and functions applicable to software engineering
- 02 Analyse mathematical structures of objects using graph theory
- 03 Investigate solutions to problem situations using the application of Boolean algebra
- 04 Explore applicable concepts within abstract algebra.

# Data Structures & Algorithms

This unit introduces students to data structures and how they are used in algorithms, enabling them to design and implement data structures. Students are introduced to the specification of abstract data types and will explore their use in concrete data structures. Using this knowledge, students should be able to develop solutions by specifying, designing and implementing data structures and algorithms in a variety of programming paradigms for an identified need.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Examine abstract data types, concrete data structures and algorithms
- 02 Specify abstract data types and algorithms in a formal notation
- 03 Implement complex data structures and algorithms
- 04 Assess the effectiveness of data structures and algorithms.

# Applied Programming and Design Principles

This unit aims to familiarise students with concepts and best practices to ensure that their code is in line with industry standards. Among the topics included in this unit are object-oriented programming, introduction to design patterns and SOLID, including its version of five principles of object-oriented programming and automated software testing. The unit is especially useful for those intending to move into computer science, software development, programming, systems analysis and software testing.

## LEARNING OUTCOMES

By the end of this unit students will be able to:

- 01 Investigate the impact of SOLID development principles on the OOP paradigm
- 02 Design a large dataset processing application using SOLID principles and clean coding techniques
- 03 Build a data processing application based on a developed design
- 04 Perform automatic testing on a data processing application.



DeMont Institute of Management and Technology prides itself on associating and collaborating with the best in the industry of higher education.

The Knowledge and Human Development Authority (KHDA) is responsible for the progress and quality of private education offered in Dubai. They support the growth of universities, students, parents, and educators, and create a platform for high-quality education focused on happiness and well-being.

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Knowledge

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