

Digital Technologies (Artificial Intelligence) (Modules)

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1 Programme Structure

1.1 Higher National Diploma

The Pearson BTEC Higher National Diploma (HND) is a Level 5 qualification comprising 240 credits. 120 credits are level 4 Units, 120 credits are level 5 Units.

The HND programme is a two-year programme.

1.2 Key Information of Programme

Title of the final award	Pearson BTEC Higher National Diploma in Digital Technologies (Artificial Intelligence (AI) Solutions and Applications)
Name of awarding organisation	Pearson
Name of teaching institution	Regent Institute Middle East FZ-LLC
Details of accreditation	KHDA
Programme title	Pearson BTEC Higher National Diploma in Digital Technologies (Artificial Intelligence (AI) Solutions and Applications)

1.3 Units

To gain an HND qualification, learners are required to successfully complete and pass 15 units. Nine of these units are mandatory, five are optional.

Level 4 Units

Unit Number and Title	Credit value	Core / Option
Unit 1: Professional Practice in the Digital Economy	15	Core
Unit 2: Innovation and Digital Transformation	15	Core
Unit 3: Cyber Security	15	Core
Unit 4: Programming	15	Core
Unit 5: Big Data & Visualisation	15	Core
Unit 7: Cloud Fundamentals	15	Core
Unit 11: Software Development Lifecycles	15	Core
Unit 15: Fundamentals of Artificial Intelligence (AI) & Intelligent Systems	15	Core

Level 5 Units

Unit Number and Title	Credit value	Core / Option
Unit 19: Business Intelligence	30	Core
Unit 20: Internet of Things	15	Core

Unit 21: Emerging Technologies	15	Core
Unit 28: Risk Analysis and Systems Testing	15	Core
Unit 36: Application Development	15	Core
Unit 37: Application Program Interfaces	15	Core
Unit 41: Digital Sustainability	15	Optional
Unit 42: Pitching and Negotiating Skills	15	Optional

Please access HN Global for additional resources support and reading for all the units mentioned above. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global <https://www.highernationals.com>.

2 Unit Details

Unit 1: Professional Practice in the Digital Economy

This unit provides a foundation for good practice in a variety of contexts and provides an opportunity for students to examine the evolution and impact of digital technologies on work environments. Students will explore the importance of professional development for career success and the benefits of working towards goals for career success. In addition, problem solving extends the need to demonstrate transferable and communication skills. Finally, working with others is an integral part of everyday life and the ability to give and receive feedback is a necessary skill to support professional development planning. Therefore, understanding role responsibilities and how to work with peers and colleagues will ensure that there is a better understanding and awareness to support own professional development.

LEARNING OUTCOMES

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

- Explore the evolution and impact of digital technologies on work environments
- Examine the importance of professional development for career success
- Demonstrate a range of transferable and communication skills used for effective problem solving
- Review ways in which feedback can be used to support professional development planning and role in the workplace.

Unit 2: Innovation & Digital Transformation

In this unit, students will look at a number of tools and techniques that organisations use to transform and become more innovative in their approach. These include frameworks and related elements such as operational agility, culture, leadership, customer experience, and integration of digital technology.

LEARNING OUTCOMES

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

- Investigate the underlying context for digital innovation and market disruption that leads to business transformation
- Explore the different types of digital transformation
- Explain the requirements for a successful digital transformation
- Review the range of methods for protecting ideas as part of digital transformation strategies and their advantages and disadvantages.

Unit 3: Cyber Security

This unit has been designed to develop students' knowledge and understanding in relation to cyber threats and vulnerabilities, cyber defense techniques and incident response. Students will explore fundamental principles and leading-edge concepts, terminologies, models, and hardening methods. Students will assess the types of malicious activity and potential targets, and the role everyone has in maintaining cyber resilience.

LEARNING OUTCOMES

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

- Explore the nature of cybercrime and cyber threat actors

- Investigate cyber security threats and hazards
- Examine the effectiveness of information assurance concepts applied to ICT infrastructure
- Investigate incident response methods to cyber security threats.

Unit 4: 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:

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

Unit 5: Big Data & Visualisation

This unit introduces students to the concepts of big data and visualisation and how this is used for decision making. Students will explore the industry software solutions available for investigating and presenting data, before assessing the role and responsibility of data specialists in the current environment. Students will examine topics including data-driven decision making, manipulating data and automation, and building ethics into a data-driven culture. Students will demonstrate their use of tools and software to manipulate and prepare a visual presentation for a given data set. They will also assess how data specialists are responsible for adhering to legislation and ensuring data compliance.

LEARNING OUTCOMES

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

- Examine big data and visualisation for decision making
- Investigate statistical and graphical techniques, tools and industry software solutions for big data and visualisation
- Demonstrate the use of industry software to manipulate data and prepare visual presentations for a given data set
- Assess the role, responsibilities and challenges for data specialists.

Unit 7: Cloud Fundamentals

This unit is designed to develop an understanding of the fundamental concepts of cloud computing and cloud deployment models, and the need for cloud computing. Students will develop an appreciation of the issues associated with managing cloud service architecture and develop critical awareness of the ramifications of cloud computing- based projects.

LEARNING OUTCOMES

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

- Examine the fundamentals of cloud computing in relation to areas of application, architecture and platform
- Design a deployment model to be hosted in the cloud for a given scenario
- Explain different Cloud Service Providers' (CSPs) approaches to providing a cloud architecture framework for business use
- Assess the technical challenges and risks inherent in moving IT systems to the cloud.

Unit 11: Software Development Lifecycles

This unit introduces students to lifecycle decision-making at different stages of the software development process. Students will examine various lifecycle models and appreciate their particular characteristics to understand which project environments they are most appropriate for. Theoretical understanding will be translated into practical skills through an actual software development lifecycle project and 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:

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

Unit 15: Fundamentals of Artificial Intelligence (AI) & Intelligent Systems

This unit is designed to introduce the science behind machine intelligence and the philosophical debate around the ambitions of simulating human intelligence to solve real world problems. Students will be guided to appreciate AI types and applications and develop a better understanding of aspects related to intelligent agents. Other topics included in the unit covers Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), Ambient Intelligence, the major differences between top-down and bottom-up approaches to AI, and understanding Machine Learning (ML) algorithms (e.g. SVM, Naïve Bayes, Random Forest and KNN) and processes including dataset preparation.

LEARNING OUTCOMES

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

- Discuss the theoretical foundation of Artificial Intelligence and its impact on users and organisations.
- Analyse the approaches, techniques and tools to deploy Intelligent Systems in an Organisation
- Modify an AI-based system to improve how exhibits intelligence in response to a real-world problem.
- Evaluate the technical and ethical challenges and opportunities of Intelligent Systems.

Unit 19: Business Intelligence

Within this unit students will examine the concept of business processing in terms of data capture, conversion and information output. Students will also be required to define the tools and technologies associated with business intelligence functionality. The use of a business intelligence tool/s and techniques is also required to demonstrate an understanding of a given problem. Finally, students will be expected to evaluate the impact of business intelligence for effective decision-making.

LEARNING OUTCOMES

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

- Discuss business processes and the mechanisms used to support business decision-making.
- Compare the tools and technologies associated with business intelligence functionality
- Demonstrate the use of business intelligence tools and technologies
- Discuss the impact of business intelligence tools and technologies for effective decision-making purposes and the legal/regulatory context in which they are used.

Unit 20: Internet of Things

This unit introduces students to the role, basic concepts and benefits of IoT in the design and development process of computer applications. The aim of the unit is to enhance the student's understanding of the methodology, terminology and benefits of IoT in the design and development of software applications.

LEARNING OUTCOMES

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

- Discuss Analyse what aspects of IoT are necessary and appropriate when designing software applications
- Discuss Outline a plan for an appropriate IoT application using common architecture, frameworks, tools, hardware and APIs
- Develop an IoT application using any combination of hardware, software, data, platforms and services
- Evaluate your IoT application and the problems it might encounter when integrating into the wider IoT ecosystem.

Unit 21: Emerging Technologies

This unit introduces students to the role, benefits, disadvantages and potential outcomes that emerging technologies have in the development of software applications and business practices. The aim of the unit is to enhance students' understanding of the current types, terminology, advantages, disadvantages, potential impact and benefits of emerging technologies.

LEARNING OUTCOMES

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

- Review which emerging technologies are necessary and appropriate when designing software applications for the future
- Research an emerging technology and its impact on a given end-user group
- Develop multiple iterations of an emerging technology solution based on requirements
- Consider the ethical, social, economic and legal factors that play a role in the success of emerging technologies.

Unit 28: Risk Analysis & Systems Testing

This unit introduces students to prioritising testing software features according to risk of failure, evaluated as a function of criticality or importance and impact of failure. Risk of software failure determines the priority of tests within a Test Plan, strategically carrying out testing over multiple test cycles.

LEARNING OUTCOMES

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

- Examine risk-based testing and requirements
- Create a customised risk-based test strategy, plans and techniques for a given specification
- Demonstrate a risk-based Test Plan, producing associated outcomes
- Evaluate a risk-based Test Plan and its associated outcomes.

Unit 36: Application Development

This unit introduces students to Application Development and is designed to simulate the roles and responsibilities of a commercial developer working in a suitable business environment with access to a small team of colleagues. Initially, students are introduced to a business-related problem and will need to adopt and use appropriate methods and practices to analyse, break down and discuss the issues – then, decide, design, create and test a possible solution. Students should be free to debate, evaluate and select different design and development methodologies depending on their own judgement and consideration. On completion, students will be expected to formally evaluate their final application against their design plans and initial requirements.

LEARNING OUTCOMES

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

- Produce a Software Design Document by analysing a business-related problem and deduce an appropriate solution including a set of initial requirements
- Use design and development methodologies with tools and techniques associated with the creation of a business application
- Work individually and as part of a team to plan and produce a functional business application with support documentation
- Evaluate the performance of a business application against its Software Design Document and initial requirements.

Unit 37: Application Program Interfaces

This The aim of this unit is to introduce students to the nature of APIs by developing proof of-

concept application that utilises existing APIs for common tasks that can include communication, displaying interactive visuals, audio playback and handling a range of user inputs.

LEARNING OUTCOMES

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

- Examine what an API is, the need for APIs and types of APIs
- Apply the knowledge of API research to design an application that incorporates relevant APIs for a given scenario or a substantial student chosen application
- Implement an application in a suitable development environment
- Document the testing of the application, review and reflect on the APIs used.

Unit 41: Digital Sustainability

On successful completion of this unit, students will have gained a wide range of knowledge and understanding of the issues and topics associated with sustainability and low impact digital technology solutions. They will have explored the interdisciplinary context of sustainability and how the development of a low carbon economy is essential in the digital technology sector. Students will have explored a current digital technology solution and evaluated its impact and potential sustainability, evaluating a range of solutions and data sources.

LEARNING OUTCOMES

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

- Determine the nature and scope of the technical challenges, ensuring sustainability, in the digital technologies sector
- Explore the importance of collaborating with other disciplines in developing digital technical solutions to sustainability problems
- Evaluate the use of sustainable techniques in relation to their contribution to a low carbon economy
- Calculate the carbon footprint of a digital technologies' solution.

Unit 42: Pitching and Negotiating Skills

This unit gives students a comprehensive overview of the essential pitching and negotiation skills required to win new contracts on agreeable terms. Good pitching skills for a new product or service will generate sales and networking opportunities, while negotiating with different people and in different business transactions will secure more favourable deals. These transferable skills can be applied in various contexts to add value to a business.

LEARNING OUTCOMES

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

- Evaluate the context of a negotiation and identify the key considerations to prepare for a negotiation
- Manage information and documentation relevant to tenders and contracts
- Develop a pitch to achieve a sustainable competitive edge

- Assess the outcome of a pitch and negotiation.

Note: The unit details are derived from Pearson Specification – Issue 2 – March 2021