



SULTANATE OF OMAN
MINISTRY OF EDUCATION



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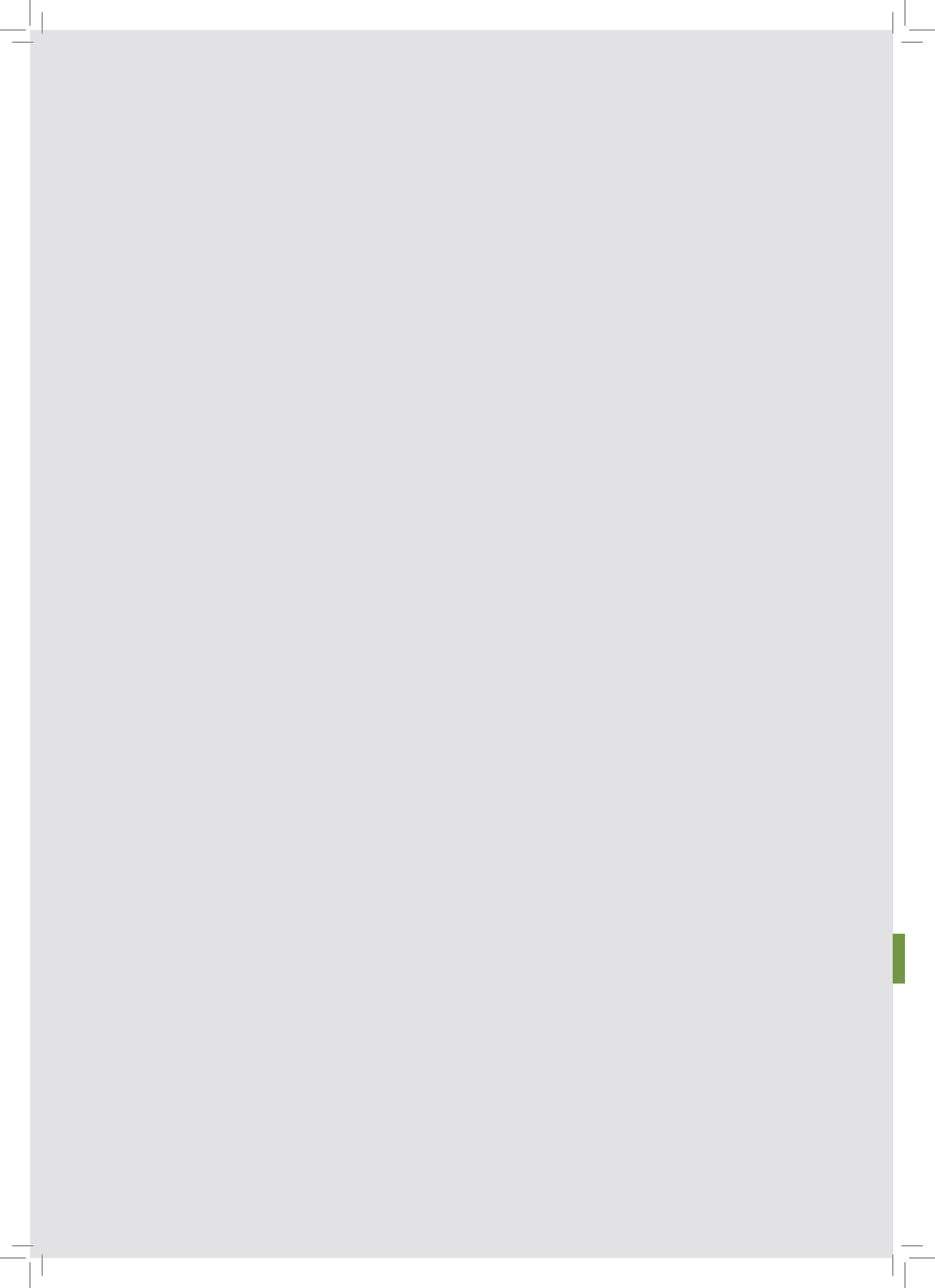
Information Technology Level 3



Grades 11 and 12 Public Schools - Oman



الكلية الحديثة للعلوم
والمسؤولية
MODERN COLLEGE
OF BUSINESS & SCIENCE





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Information Technology

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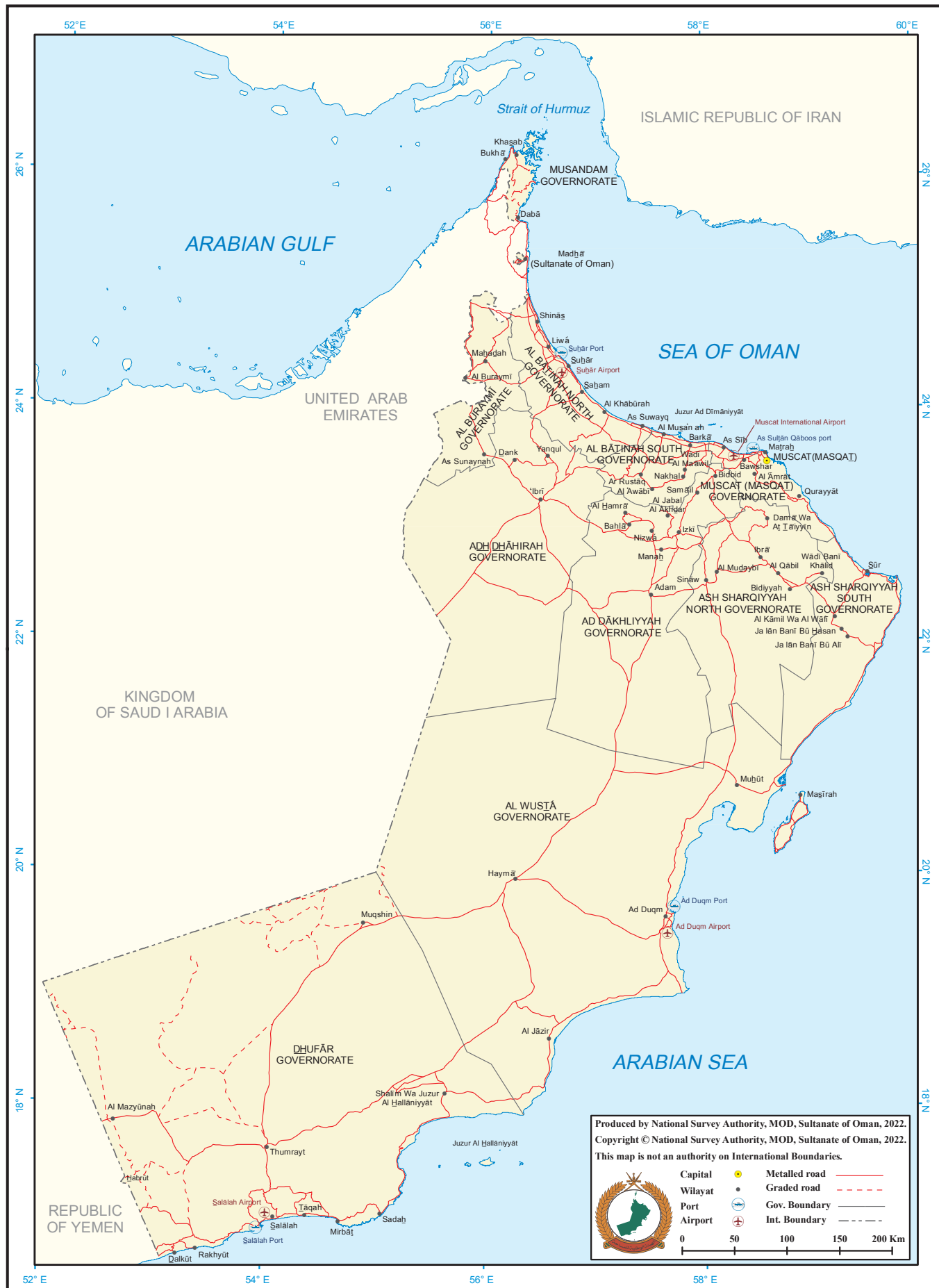


**His Majesty
Sultan Haitham Bin Tarik**



**The Late Sultan,
Qaboos Bin Said**

SULTANATE OF OMAN (Governorates & Wilayats)





النَّشِيدُ الْوَطَنِيُّ



يَا رَبَّنَا احْفَظْ لَنَا
وَالشَّعْبَ فِي الْأَوْطَانِ
وَلِيَدُمُ مَوْيِدًا
جَلَالَةَ السُّلْطَانِ
بِالْعِزِّ وَالْأَمَانِ
عَاهِلًا مُمَجِّدًا

بِالنُّفُوسِ يُفْتَدَى

يَا عُمَانُ نَحْنُ مِنْ عَهْدِ النَّبِيِّ
فَارْتَقِي هَامَ السَّمَاءِ
أَوْفِيَاءُ مِنْ كِرَامِ الْعَرَبِ
وَأَمْلِي الْكَوْنَ الضَّيَاءِ

وَاسْعَدِي وَانْعَمِي بِالرَّخَاءِ

Introduction

The introduction of Vocational and Technical Education in schools for grades 12-11 has received the royal blessing of His Majesty Sultan Haitham bin Tariq Al Said - may Allah protect him. This showed the significance of this type of education, its role in the national economy, its connection to the priorities of economic sectors, and its compatibility with the requirements of Oman's comprehensive development according to Oman Vision 2040.

The Ministry of Education paid a great attention to this type of education. This is reflected by striving to achieve its goal in assisting students to gain professional knowledge and skills that prepare them to engage in the labor market or qualify them to join higher education institutions.

To achieve the partnership with economic sectors the Ministry of Education sign a cooperation agreement with the Modern College of Business & Science (MCBS) as a partner representing the education sector in delivering the vocational and technical education to post-basic level.

The curricula for the selected BTEC programs are combined with essential national core subjects to acquire principles of the philosophy of education in the Sultanate of Oman. It enhances the values of work and production among students, refining their professional skills, and enhancing their abilities and professional inclinations, and empowering them with entrepreneurial and innovation skills.

This booklet provides an overview of the knowledge, skills, values, and professional trends embedded in BTEC programs offered in public schools in collaboration with (MCBS). This partnership, among others, reflects Ministry's determination to expand its educational partnerships locally and globally and provide Omani learners with the best educational programs available.

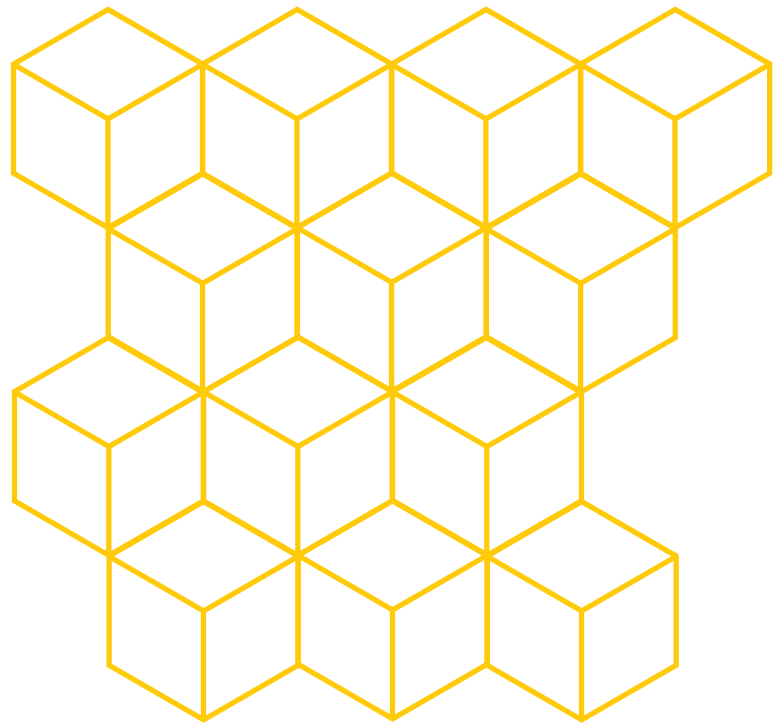
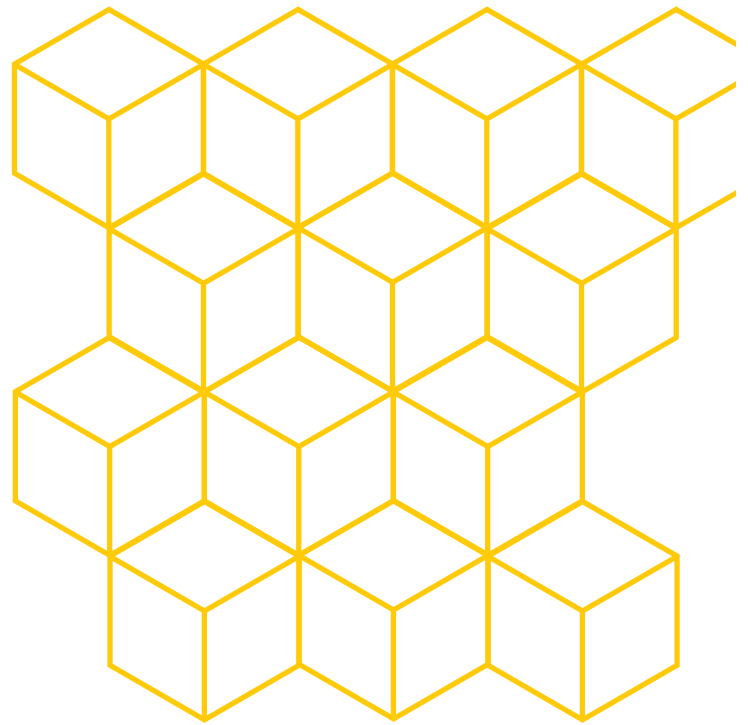


Table of Content



I. Information Technology, Systems	16
II. Creating Systems to Manage Information	17
III. Using Social Media in Business	18
IV. Programming	19
V. Data Modelling	20
VI. Website Development	21
VII. Mobile Apps Development	22
VIII. Computer Games Development	23
IX. IT Technical Support and Management	24
X. Robotics and Automation	25





1. Information Technology, Systems

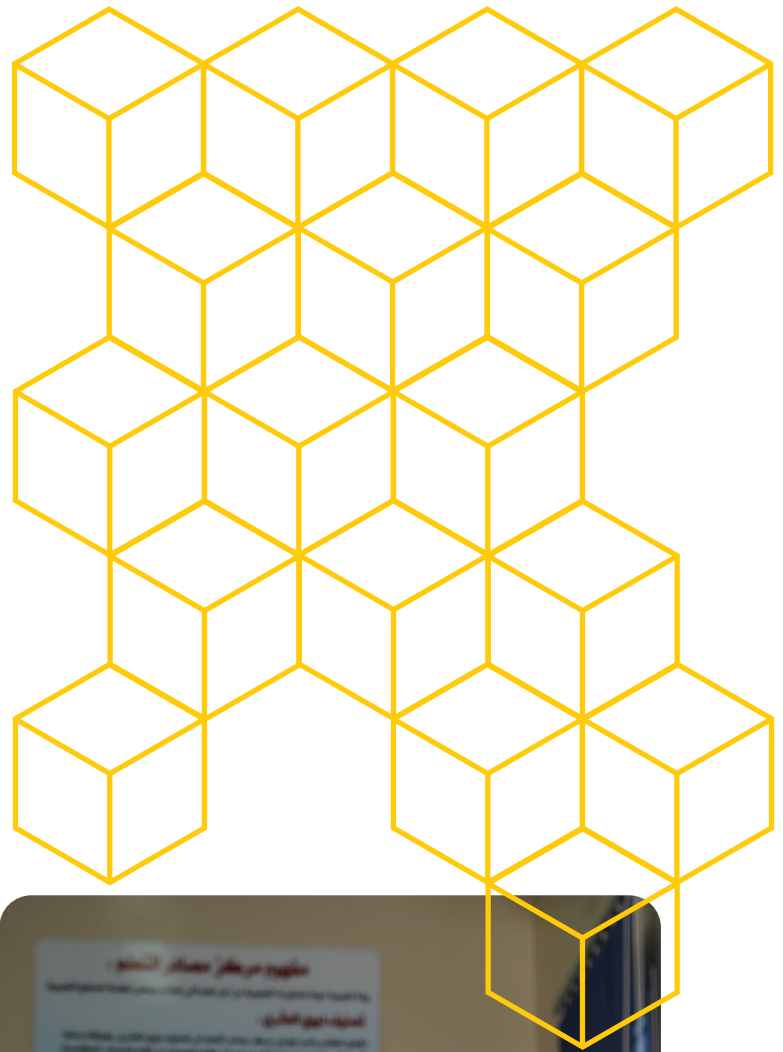
- ◇ *Functions of organisations*
- ◇ *Digital devices, their functions and Peripheral devices and media*
- ◇ *Computer software in an IT system,*
- ◇ *Connectivity and Networks*
- ◇ *Transmission of data*
- ◇ *Online systems*
- ◇ *Emerging technologies*
- ◇ *Data and information in an organisation*
- ◇ *Online communities*
- ◇ *Using and manipulating data*
- ◇ *Threats to data, information and systems*
- ◇ *Moral and ethical and Legal issues*
- ◇ *Professional guidelines and codes of practice*

This unit provides an opportunity to build core skills which will underpin the whole qualification. learners will explore how computer hardware, digital devices and relevant software combine to form small- and large-scale systems. This unit focuses on developing learners' understanding of how Information Technology systems (IT systems) can be used in vocational contexts to solve problems and/or meet the needs of organizations and users. Learners will need to be able to analyze the impact of IT systems, evaluate the effectiveness of systems in a range of contexts and, where appropriate, suggest and plan improvements to current solutions. Learners should be able to justify the solutions they propose.

This unit prepares learners to use IT systems effectively and help them to think about the wider implications of each application and use, by giving them opportunities to develop analytical and decisionmaking skills. Such skills will be beneficial in a managerial or project management role. learners should be able to analyse problems and make justified suggestions as to how IT systems can be used in various settings, with comparison to alternatives where appropriate.

Assessment:

Learners will produce formal reports that containing an exploration of information technology and related data and procedures that could be implemented by an organization and an evaluation of choices made when developing policies.



2. Creating Systems to Manage Information

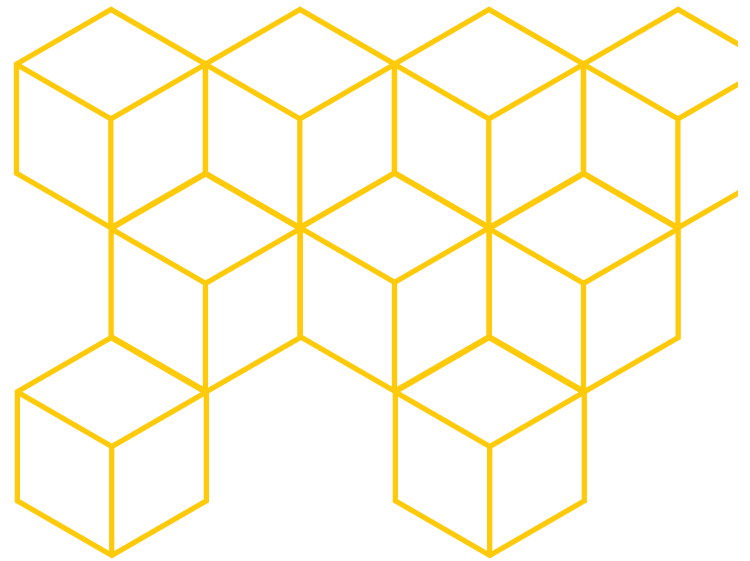
- ◇ *Relational database management systems*
- ◇ *Manipulating data structures and data in relational databases*
- ◇ *Normalisation*
- ◇ *Relational database design*
- ◇ *Design the documentation.*
- ◇ *Producing a database solution*
- ◇ *Testing and refining the database solution*

This unit introduces the concept of database systems and how they store, manipulate and present data. learners will need to investigate how databases are used, and how they are designed, developed and maintained. In addition, learners should investigate relational database management systems; how they are used and how they are developed. Then produce their own relational database in accordance with a brief.

Learners should understand that databases are very widely used in a huge range of applications with which people interact on a daily basis (including e-commerce, customer billing, stock management, manufacturing processes, logistics, healthcare, banking and the creative industries).

Learners will examine the structure of data and its origins, and how an efficient data design follows through to an effective and useful database. They will examine a given scenario and develop an effective design solution to produce a database system. They will then test the solution to ensure that it works correctly. Finally, they will evaluate each stage of the development process and the effectiveness of the database solution. To complete the assessment tasks in this unit, learners will need to draw on their learning from across the programme.

The skills learners gain in this unit support progression to IT-related, higher-education courses and to employment in a role that requires computing-related expertise.



Assessment:

1. Produce a presentation or report evaluating the role of relational database management systems in the decision-making process.
2. A practical activity involving the design of a relational database and producing a functional solution to fulfil client requirements.



3. Using Social Media in Business

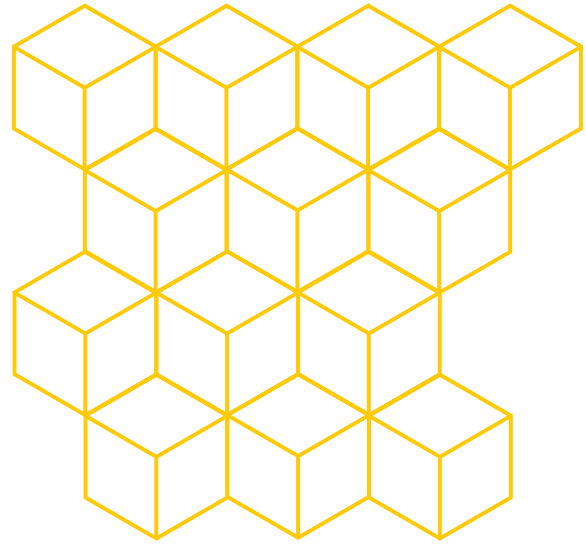
- ◇ *Business uses of social media*
- ◇ *Risks and issues*
- ◇ *Social media planning processes*
- ◇ *Content planning*
- ◇ *online community*
- ◇ *social media policy*
- ◇ *Creating accounts and profiles*
- ◇ *Content creation and publication*
- ◇ *Implementation of an online community building*
- ◇ *Data gathering and analysis.*
- ◇ *Skills, knowledge and behaviors*

Learners explore how businesses use social media to promote their products and services internationally. Learners also implement social media activities in a business to meet these demanding requirements. Learners will explore different social media websites, the ways in which they can be used and the potential pitfalls when using them for business purposes. They will develop a plan to use social media strategies for business purposes to achieve specific aims and objectives. They will then implement the plan, developing and posting content and interacting with others. Finally, learners will collect data on the business use of social media and review the effectiveness of their efforts.

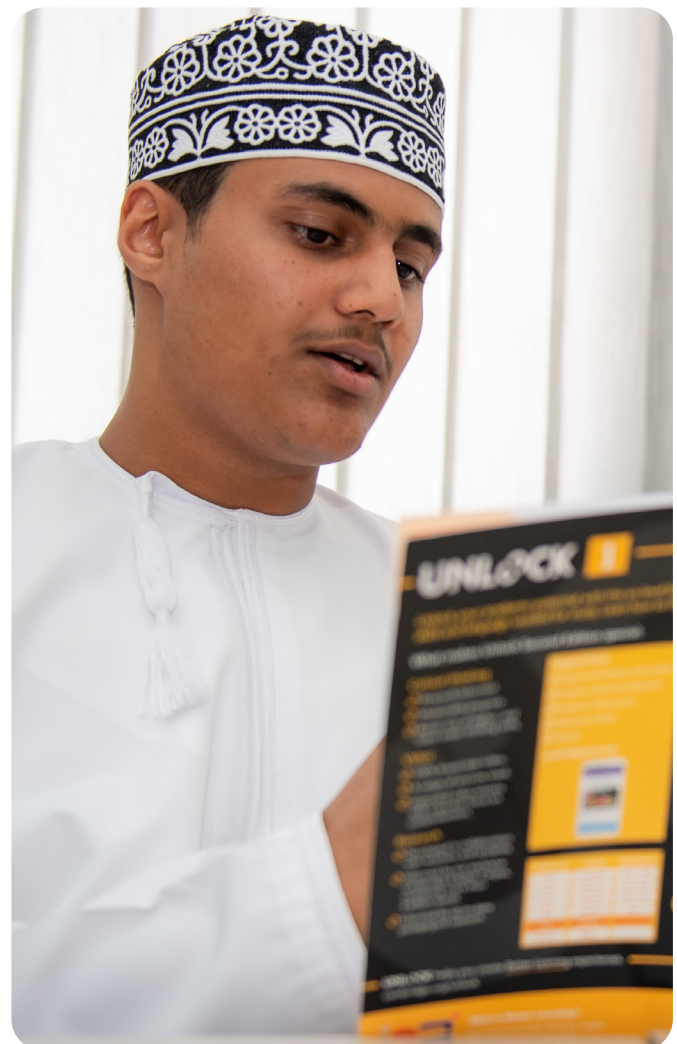
Understanding how to use social media for business purposes is useful for employment in information technology and in a variety of business sectors. Also, social media skills are closely linked with web and mobile applications development. This unit gives learners a starting point for progression to roles such as social media specialist, content developer and web developer.

Assessment:

1. A report that explores how a business can use social media to raise its profile and promote products and services.
2. Planning, preparation and implementation of the use of social media in a business.



3. Establish social media pages dedicated to the business, which fulfil the requirements given in the plan, accompanied by supporting documentation.
4. Analysis of statistical data generated by social media websites.
5. A report evaluating the use of social media in a business against the plan.



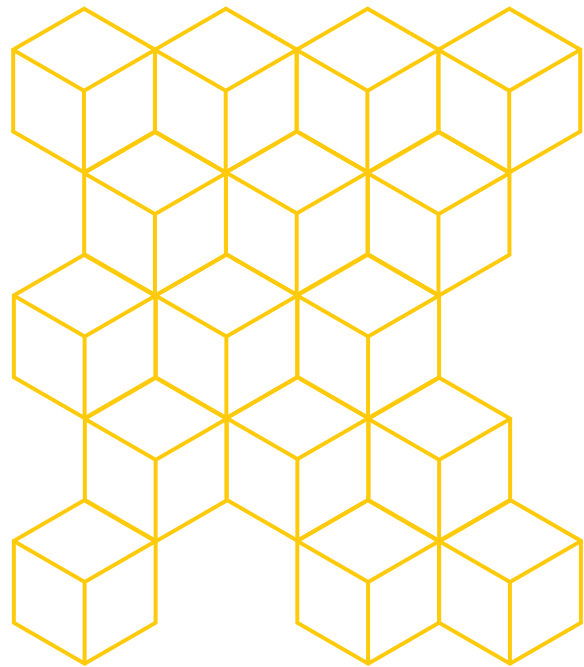
4. Programming

- ◇ *Uses of software applications*
- ◇ *Features and characteristics of programming languages*
- ◇ *Constructs and techniques and their implementation in different languages*
- ◇ *Principles of logic applied to program design.*
- ◇ *Software development life cycle*
- ◇ *Software solutions design*
- ◇ *Software solutions development*
- ◇ *Testing software solutions*
- ◇ *Improvement, refinement and optimisation of software applications*
- ◇ *Review of software solutions*

The learners are given the opportunity to explore the concepts of computer programming as well as its implications and applications in a vocational context. This unit helps learners in understanding the concepts of high-quality software application design and development as key to ensuring that products are effective. As a programmer, learners will need to understand the characteristics of different programming languages in order to select and apply appropriate methodologies to meet a client's needs. Learners will learn about computational thinking skills and the principles of designing and developing computer programs. They will apply computational thinking skills to design, develop, test, refine and review computer programs for a given range of purposes. By developing learners analytical, problem-solving and programming skills, this unit will help them to progress to higher education or to employment as a software developer. By the end of the unit, learners should be able to consider the needs of a client and develop solutions to meet a set of identified requirements.

Assessment

1. A report evaluating computational thinking skills and how the principles of software design and computer programming are applied to create effective, highquality software applications
2. A project brief identifying the scope of the problem and user/client requirements. Design documentation for the suggested solution. User feedback and design



refinement documentation. Development and support documentation, including development and testing logs, meeting notes and a report that evaluates the outcomes and development of the project.



5. Data Modelling

- ◇ *Stages in the decisionmaking process*
- ◇ *Spreadsheet features used to support data modelling*
- ◇ *Using data modelling to consider alternatives*
- ◇ *Evaluating models*
- ◇ *Documenting and justifying decisions*
- ◇ *Functional specification*
- ◇ *Spreadsheet model design*
- ◇ *Developing, testing , reviewing and refining a data model solution*

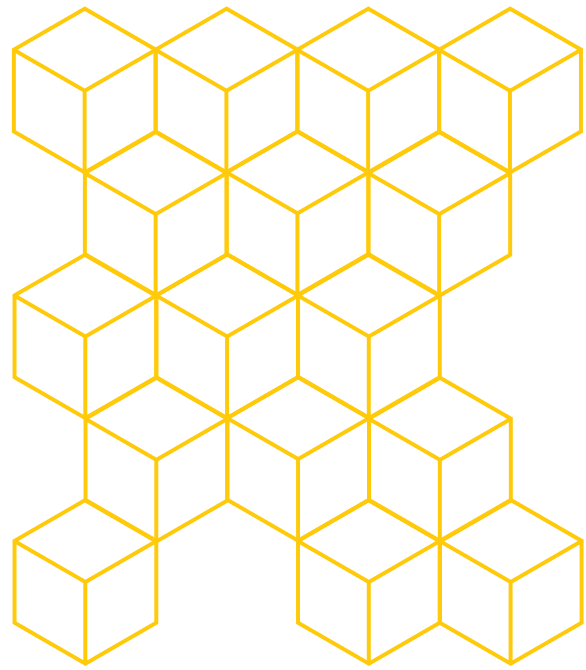
In this unit, learners will need to use analytical thinking to analyse the various factors that affect a given scenario in order to develop a data modelling solution that will allow a client to consider a range of possibilities and make an informed decision.

They will investigate the fundamentals of the decision-making process. They will find out how using data modelling provides the computational ability to compare consequences, and determine a preferred course of action.

Learners will develop the skills and techniques necessary to create complex spreadsheets in order to produce accurate information that informs decision making. They will examine a scenario and then design, develop and test a spreadsheet and review spreadsheet and make refinements based on user feedback, providing an evaluation of the effectiveness of the alternatives produced. The skills developed in this unit are useful for progression to computing or businessrelated higher education courses and for use in decision making in the workplace.

Assessment

1. A presentation or report evaluating the role of data modelling in the decision-making process.
2. A practical activity, involving the design and development of a data model to fulfil identified client requirements. A report that evaluates the effectiveness of the alternatives considered, and suggests ways in which the alternatives could be improved if the task were to be repeated.



6. Website Development

- ◇ *Purpose and principles of website products*
- ◇ *Factors affecting website performance*
- ◇ *Website design*
- ◇ *Common tools and techniques used to produce websites*
- ◇ *Client-side scripting languages*
- ◇ *Website development*
- ◇ *Website review*
- ◇ *Website optimisation*
- ◇ *Skills, knowledge and behaviour*

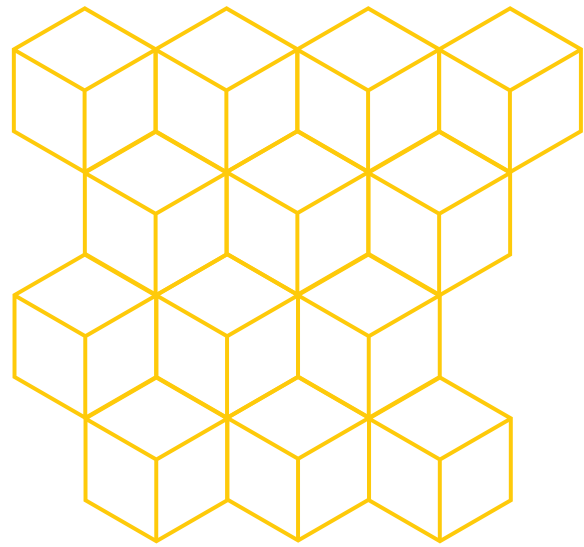
This practical-based unit allows learners to understand the principles of designing and creating a functional website to meet the requirements of a client. Learners will be encouraged to seek out real-life situations where a website is required. They will then explore the specific requirements and begin to design and develop a website for that particular business. By using real-life scenarios, learners will be encouraged to design and develop interesting and creative websites.

In this unit, learners will review existing websites – commenting on their overall design and effectiveness. They will use scripting languages such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript® and a simple text editor, or rapid application development tools. Finally, they will reflect on the website design and functionality using a testing and review process. Many software developers, database experts and systems managers need web-client development skills as an integral part of their overall portfolio of expertise.

This unit will prepare learners for employment as a website developer or as a website development apprenticeship. The unit will benefit them if they want to go on to higher education to develop their studies.

Assessment:

A report describing the different types and purposes of websites. This will include an explanation of the factors that affect website performance and mathematical principles used in website development.



A digital version of the website product, including an observation record sheet and supporting documentation, such as scripts and annotated screenshots, to justify design decisions



7. Mobile Apps Development

- ◇ *Types of mobile apps*
- ◇ *Context of mobile apps*
- ◇ *Mobile device integration*
- ◇ *Mobile app programming*
- ◇ *Requirements for an app*
- ◇ *Designing a mobile app*
- ◇ *Content preparation for mobile apps*
- ◇ *Developing a mobile app*
- ◇ *Testing a mobile app*
- ◇ *Lessons learned from developing a mobile app*
- ◇ *Reviewing own skills, knowledge and behaviours*

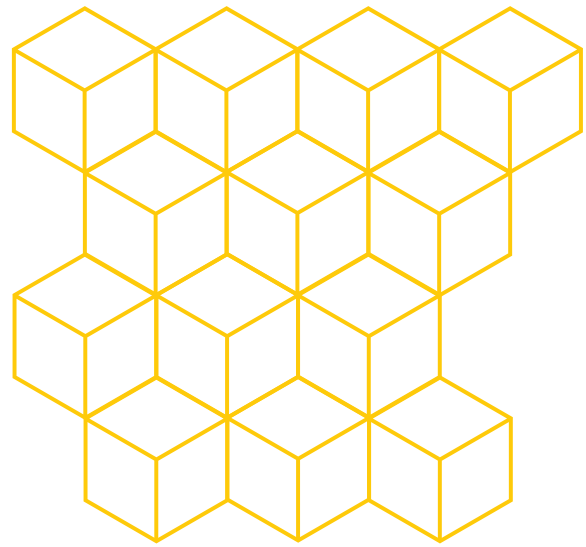
In this unit, learners will investigate mobile apps, the devices that they run on and the uses of apps in society. They will then go on to design and develop their own apps to run on mobile devices.

In this unit learners will investigate mobile apps, how they are used, why they are created, the differences between devices and the implications of creating and using software on mobile devices. Learners will study the design considerations inherent in mobile apps and general software design. Learners will design, develop, test and review a mobile app to fulfil a specific set of client requirements. With over a million apps on both Apple App Store™ and Google Play Store™, and the growing popularity of Microsoft Windows® mobile devices, the mobile app development industry is highly competitive and continually expanding. Many organisations use mobile apps to support their operations in one way or another.

Mobile app development is an important skill for software developers who wish to retain their competitive edge. This unit will help learners to progress to an app development role and gives them a basis for further study of the design and development of mobile apps and services.

Assessment:

1. A report evaluating bespoke mobile apps running on different mobile devices. An analysis of mobile



device functions and the context in which mobile apps are used

2. Product design documents. A log of the development process, annotated code, screenshots of running app or demonstration of app running on a mobile device. Testing documentation, including a test log, log of errors and any resolutions made.



8. Computer Games Development

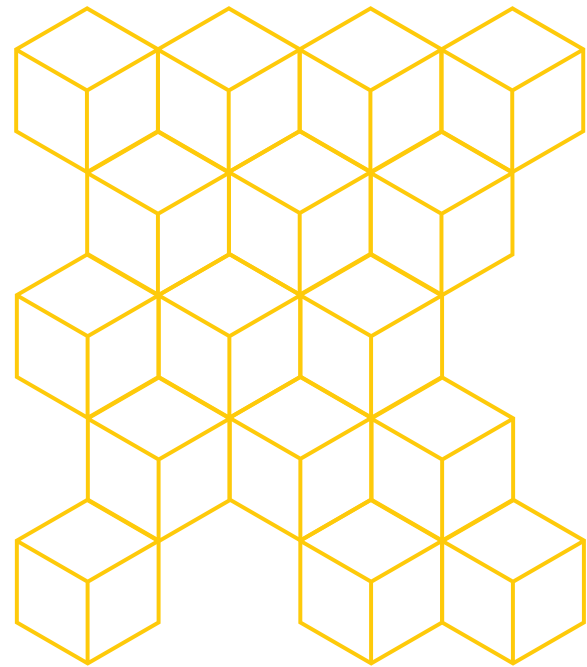
- ◇ *Social trends in computer gaming*
- ◇ *Technologies used in computer gaming*
- ◇ *Computer games design processes and techniques*
- ◇ *Design documentation and Reviewing and refining designs*
- ◇ *Principles of computer games development*
- ◇ *Developing, testing and reviewing computer games*
- ◇ *Quality characteristics*

This unit will give learners practical experience of designing and developing computer games. Learners will spend time investigating the computer games industry before assuming the role of a software developer within the games industry and analysing popular genres to design and develop their own computer game.

As a game's developer, learners will analyse the needs of a client and understand the potential and limitations of different gaming solutions. They will investigate the technologies used in the computer gaming industry and the implications they have for users, developers and organisations.

Learners will analyse how user needs and preferences impact on game design and how target technologies affect the design and development of a computer game. They will design, create and review a computer game to meet requirements and reflect on the skills and understanding applied during the design and development process.

Learners will apply analytical skills that would be used by any software developer to investigate the available technologies and current trends in order to design and develop appropriate software solutions. The skills they gain through this unit will benefit them as they progress to employment in the computer gaming industry, for example in computer games developer and software developer roles.



Assessment:

1. A report investigating and evaluating social and technological trends in gaming and how they would influence the development of new computer games.
2. A design specification showing the design and development of a computer game to meet identified client requirements.



9. IT Technical Support and Management

- ◇ *Purpose and nature of IT system support and management*
- ◇ *Safe working practices in IT support and management*
- ◇ *Job roles in IT technical support and management*
- ◇ *Management of user support requests*
- ◇ *Routine support activities and System management and implementation activities*
- ◇ *Performance of IT systems and Personal behaviours*
- ◇ *IT system diagrams*
- ◇ *Incident response and disaster recovery planning*
- ◇ *Capacity planning*
- ◇ *Sustainability and environmental waste planning*
- ◇ *An IT technical support and management plan*

This unit offers learners a rich mix of potential activity types, but primarily the core skills being targeted are those relying on investigation and problem-solving, whether this is examining the IT system support needs of an organisation or carrying out a routine support activity on a problematic IT system. Ideally, learners should progress through this unit observing professional work practices such as following procedures correctly, documenting findings and actions accurately, and communicating these confidently and appropriately to other stakeholders. Offering a high degree of 'hands-on' practical activity, the unit will help learners explore and resolve a range of technical issues covering hardware, software (applications and operating systems), administration and networking. As such, it offers many opportunities to complement theoretical content covered in many other units in the programme.

This unit will help to prepare learners for progression to higher education, and in particular it will develop their communication, problem-solving and planning

skills, which are valued by higher education providers. It will also prepare them for employment in the IT sector or for an IT apprenticeship.

Assessment

1. A research study of at least two different organisations' IT support and management needs and characteristics. The study should cover four IT support and management characteristics: purpose of the system, safe working practices, job roles, and system and network management tools.
2. Diary or blog of a range of different completed IT support and management activities and other evidence, including customer service response logs, screenshots and photos.
3. An IT support and management plan for a new IT system.



10. Robotics and Automation

- ◇ *Robotics and automation fundamentals*
- ◇ *Uses and applications of robotics and automation*
- ◇ *Design documentation for automated solutions*
- ◇ *Coding and connecting an automated solution*
- ◇ *Testing an automated solution*

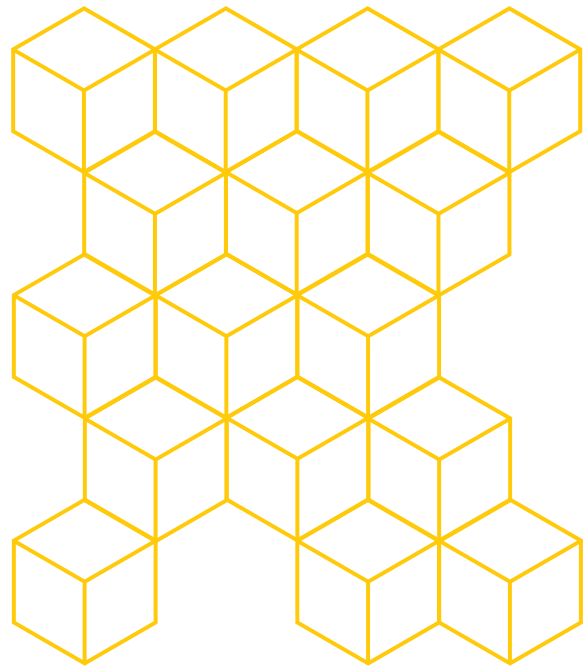
This unit provides an opportunity to explore different uses of robotics and automation and their impact on society, and develop an automated solution to meet an identified need.

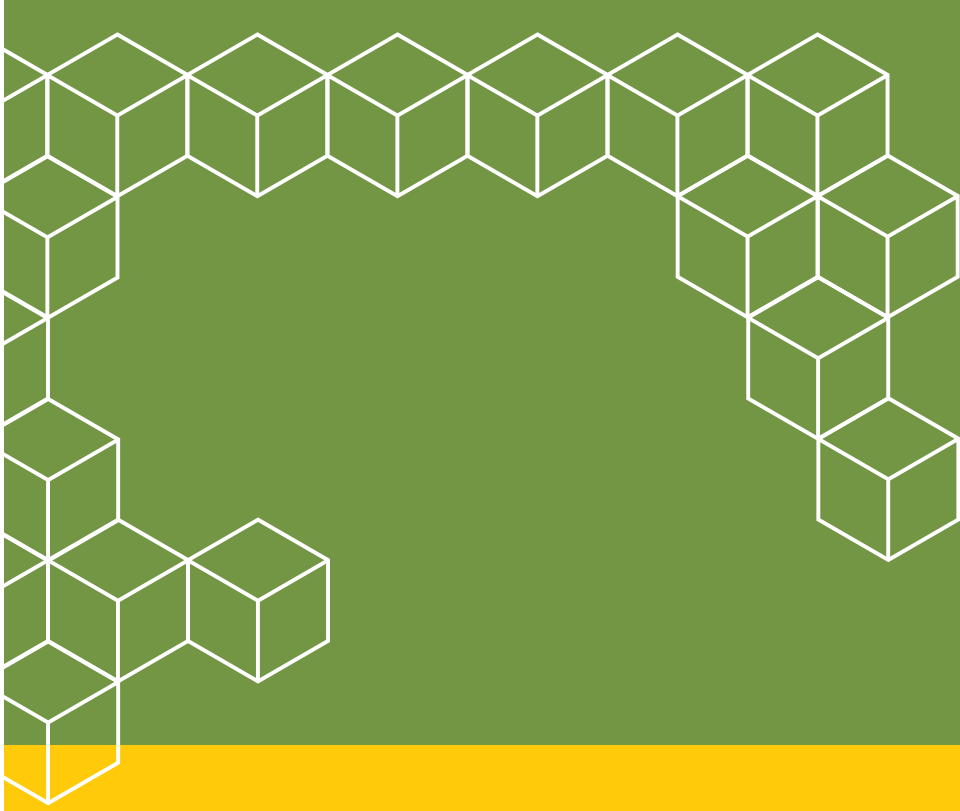
Learners will need to access a range of input and output devices (including sensors, motors, actuators etc) which allow them to explore some of the endless possibilities of physical computing. Learners will be encouraged to experiment and prototype. They will explore how robotics and automation are used in different industries to solve problems and meet a range of needs and will explore physical and non-physical 'robots' and how the different hardware, software and data components of a system are used to automate processes.

Learners will design and build a physical robot in response to an identified problem. The analytical and problem-solving skills and knowledge that they develop in this unit will prepare them for entry to higher education to study a range of degrees. This unit will also help them to progress to an IT apprenticeship or to employment.

Assessment:

1. A written report exploring how and why robotics and automation have integrated into different industries and society, the benefits they can bring, and any associated drawbacks and wider concerns.
2. A portfolio of evidence detailing the creation of an automated solution to the clients requirements.





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