



# British Applied College

*Umm El Quwain, UAE*



# Program Catalog

**British Applied College**  
Umm Al Quwain, UAE



**British Applied College**  
الكلية البريطانية التطبيقية

BACU's  
Schools

Levels &  
Degrees

Credit System

## Major Descriptions

Advantages, Careers, Learning  
Outcomes, Course Descriptions, Study  
Plans

# BACU's Schools



School of  
Computing



School of  
Engineering



School of Construction  
& Built Environments



School of  
Business



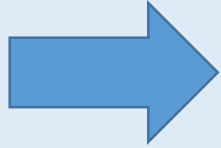
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# Levels & Degrees



UK Level 3 (**YEAR 1**)  
**Foundation Year**



Level 4 & 5 (**YEAR 2 & 3**)/  
UAE Level 5 & 6  
**HND (Pearson)**



Level 6 – Top-up (**YEAR 4**)/  
UAE Level 7  
**Applied Bachelors**  
**With Teeside University, UK**



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# All Programs

## What makes our programs special?

Our Programs offer:

- The essential subject knowledge that students need to progress successfully within or into the world of work or onto further study.
- A Simplified & Flexible structure: students undertake a substantial core of learning, required by all engineers (in the Engineering or Construction & Built Environments Program) or all Computer Scientists (in the Computing Program), with limited specialism (Level 3), building on this in the Higher National Diploma (Levels 4 & 5), with further & advanced specialist and optional units linked to their specialist area of study in Level 6 (Top up).
- With different pathways there is something to suit each student's preference for study and future progression plans.
- Refreshed content that is closely aligned with employer, Professional Body and higher education needs.
- Assessments that consider cognitive skills (what students know) along with effective and applied skills (respectively how they behave and what they can do).
- Unit-specific grading and standardized assignments (Offered by Pearson, For Levels 4/5 and our UK partner universities for Level 6)
- Quality assurance measures – to ensure that all stakeholders can feel confident in the integrity and value of the qualifications.
- A degree designed to meet the needs and expectations of students aspiring to work in an international setting.

**A stimulating and challenging applied program of study that will be both engaging and memorable for students.**



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# Credit System

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# Credit Hours – Level 3

## Guided Learning Hours (GLH)

- Course units (in Level 3 – Year a1) at the British Applied College in Umm Al Quwain (BACU) are worth either 30, 60 or 90 Pearson Guided Learning Hours (GLHs).
- According to Pearson, GLH - Guided Learning Hours represent the **maximum expected time to complete, including all directed study** (classroom, homework, preparation and activity work, plus supervised extracurricular activities).

Comparing GLH Credits to American/USA Credits, note:

- 30 BACU- GLH = 2 US credit hours
- 60-90 BACU- GLH = 3 US credit hours.



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**All major programs at BACU require the student to finish 420 GLHs in Year 1 (Foundation Year).**



# Credit Hours – Level 4, 5, 6

- The majority of course units in Year 2, 3, and 4 (in UK Level 4, 5, or 6) at the British Applied College in Umm El Quwain (BACU) are worth either 10, 15 or 20 UK credits.
- **As a general rule, one UK credit equates to 10 hours of work**; a 15-credit course unit therefore requires 150 hours of study on average.
- Students should note that the number of credits associated with a course does not relate to the number of contact hours (lectures, tutorials etc) a week as is the case in some US education systems.
- The number of formal contact hours varies considerably between subjects. For example, course units within engineering and the sciences will normally have many more contact hours than course units in humanities, but the latter usually require the student to invest more time in library study.

Comparing UK Credits to American/USA Credits, note:

- 10 BACU-UK credits = 3 US credit hours
- 15 BACU-UK credits = 4 US credit hours
- 20 BACU-UK credits = 5 US credit hours



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**All major programs at BACU  
require the student to finish  
120 UK Credits/year in Years  
2, 3, and 4  
(UK Level 4,5, and 6).**



# Major Descriptions

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# Majors & Degrees

## School of Computing:

- BSc (Hons) - *Artificial Intelligence & Analytics*
- BSc (Hons) - *Cybersecurity*
- BSc (Hons) - *Software Engineering*
- BSc (Hons) - *Computing*

## School of Engineering:

- BEng Tech (Hons) - *Mechanical Engineering*
- BEng Tech (Hons) - *Electrical & Electronics Engineering – Robotics Specialization*

## School of Construction & Built Environments:

- BEng Tech (Hons) - *Civil Engineering*
- BA (Hons) - *Interior Architecture & Design*
- BSc (Hons) - *Construction Management*

## School of Business:

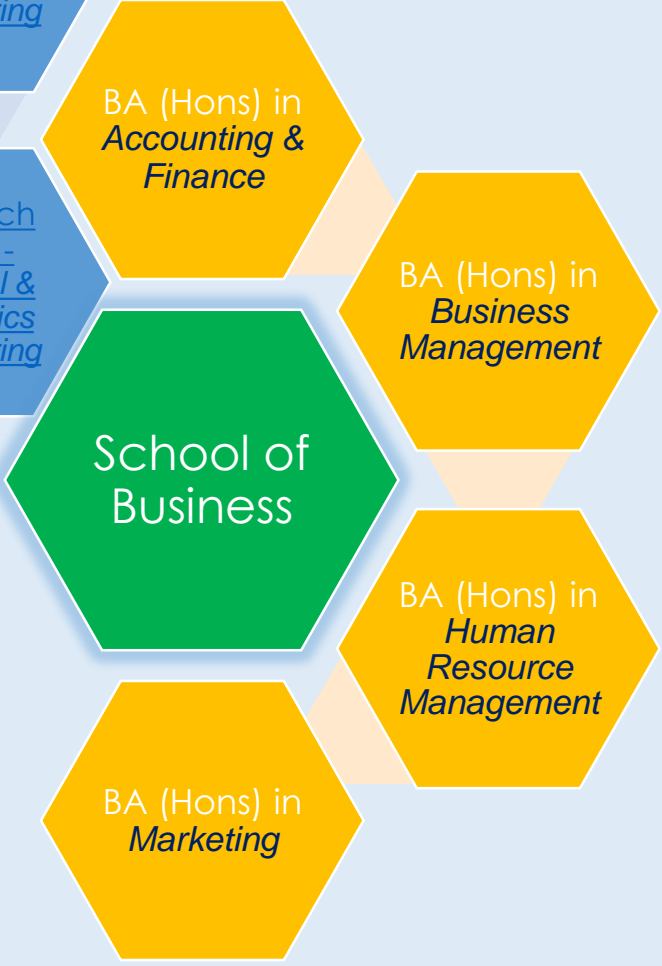
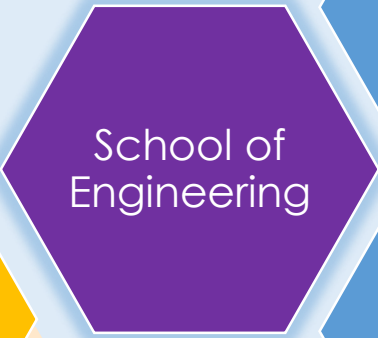
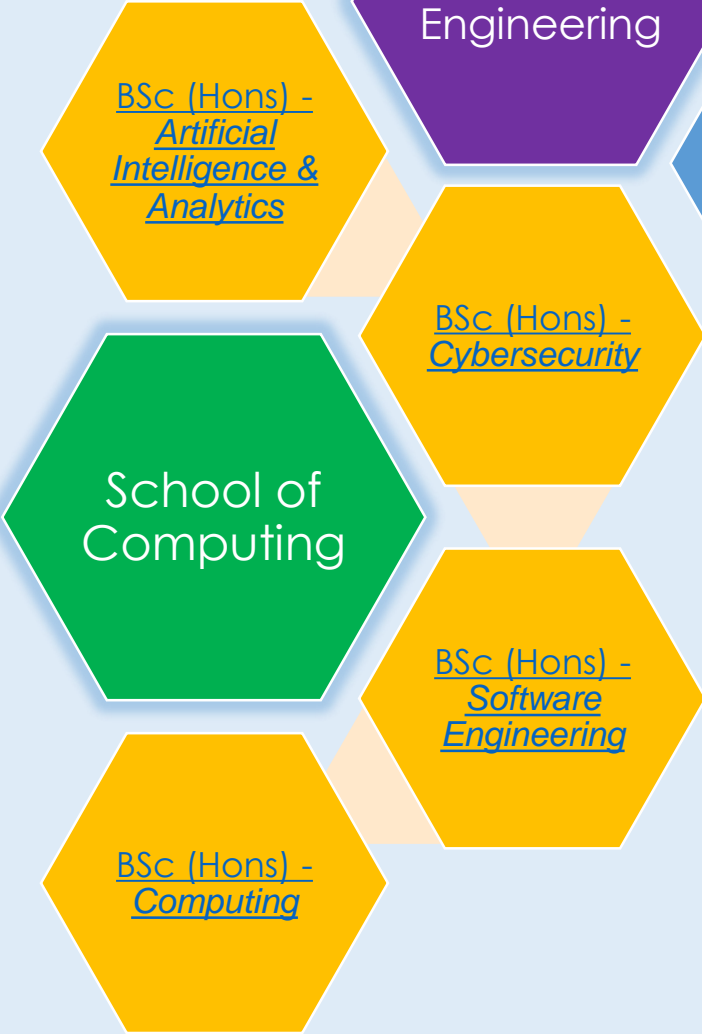
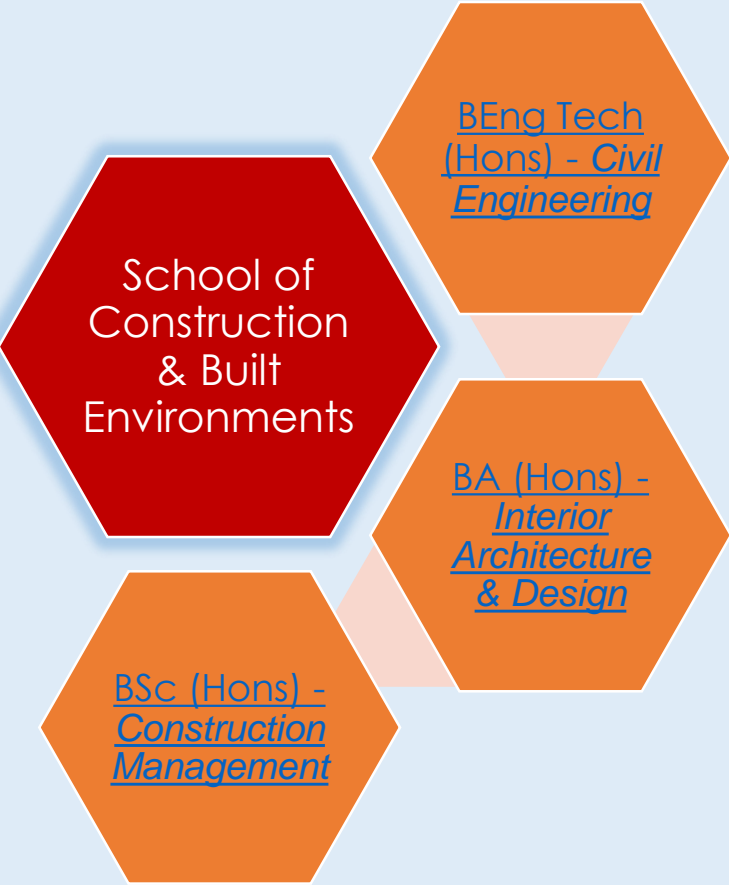
- BA (Hons) in *Accounting & Finance*
- BA (Hons) in *Business Management*
- BA (Hons) in *Human Resource Management*
- BA (Hons) in *Marketing*



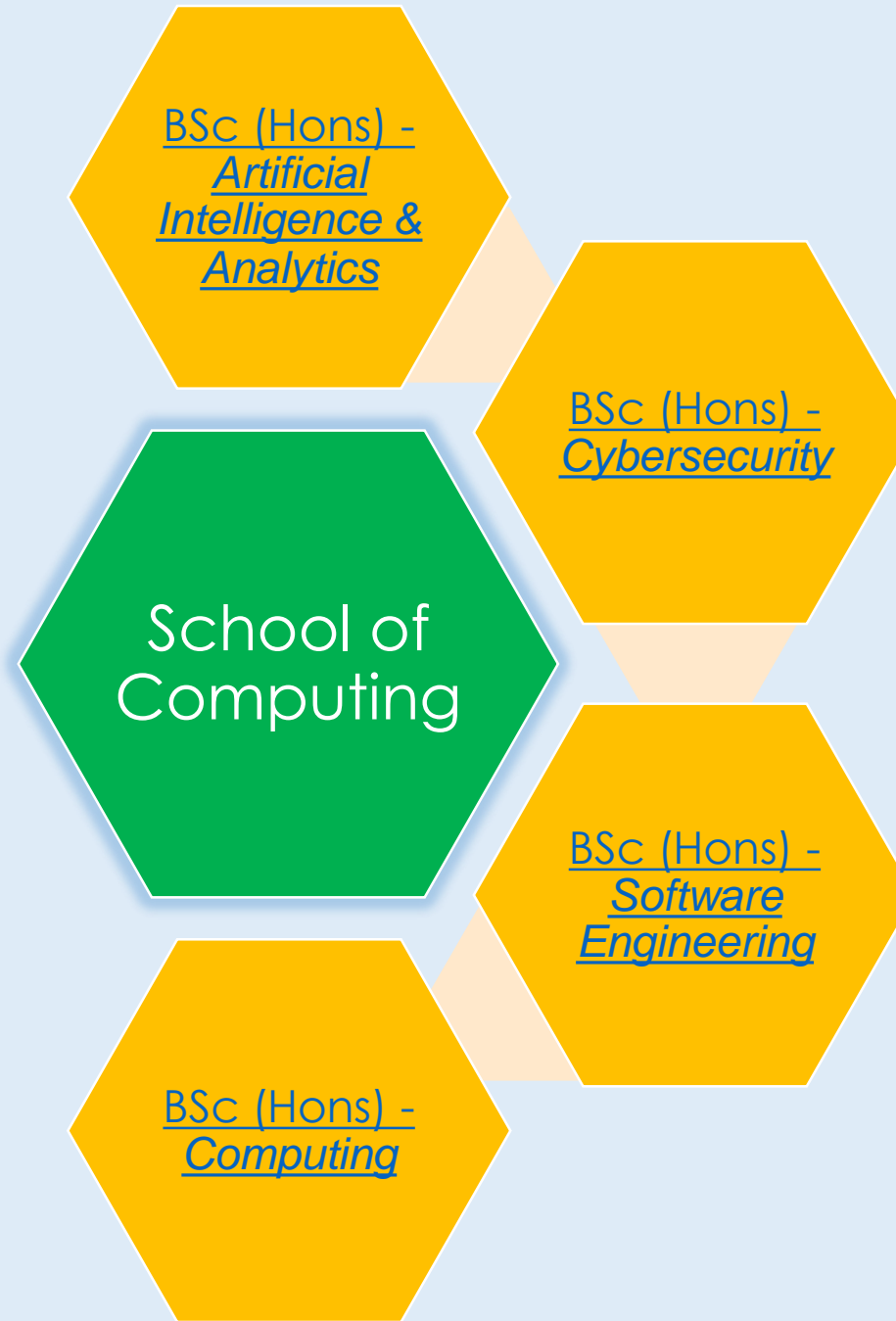
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# Majors & Degrees



# School of Computing



1- Program  
Summary

2- Program  
Advantages &  
Careers

# *CyberSecurity*

BSc (Hons)

***School of Computing***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan

# Cybersecurity

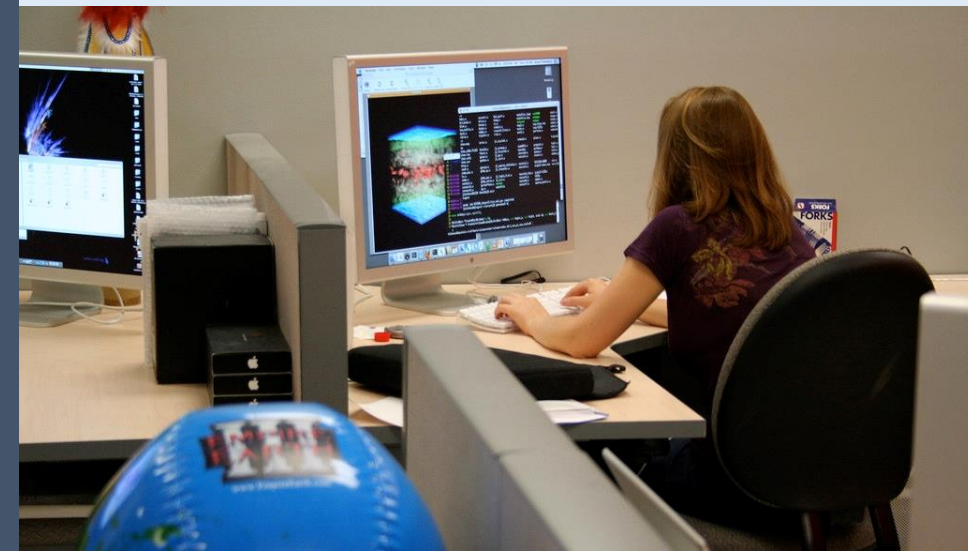
## Computing – Program Summary

- Cyber Security programs prepare students for careers in the network security industry including computer forensics, ethical hacking, applied offensive and defensive security, and human and organizational security.
- Students will learn about evolving threats and the proper use of specific security tools.

**Both security theories and hands-on practice are emphasized in this program.**



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# Cybersecurity

## Computing – Program Advantages / Careers

- With the Smart Cities & Smart Systems tremendous growth and potentials, the need for experts in cyber security to build safeguards needed to protect citizens from cyber thefts and attacks is enormous.

Some jobs include:

- Chief Information Security Officer/Engineer.
- Forensic Computer Analyst.
- Information Security Analyst.
- Penetration Tester and evaluator.
- Security Architect.
- Cyber Security Engineer.
- Security Systems Administrator.
- IT Security Consultant.

**Cyber Security is one of the most in-demand fields in the world.**



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# Cybersecurity

## Computing – Program Aims & Objectives

1. Produce graduates that are enthusiastic and knowledgeable about the rapidly changing discipline of cyber security and networks, and appreciate its growing impact on modern living.
2. Produce graduates that will uphold the legal, ethical and professional standards expected of a cyber security and networks specialist.
3. Enable students to acquire a range of practical, professional and transferable skills to equip them to contribute to their chosen profession in cyber security or computer networks, or to pursue further study.
4. Enable students to engage with current research issues to consolidate their knowledge base and understanding of currently available technologies and emerging trends in cyber security and computer networks.
5. Develop students' cognitive and critical reflection skills to equip them for enterprise, employment and further academic research.
6. Provide an industry and commercially relevant cyber security and computer networks education for students from a variety of subject backgrounds and/or employment experience utilising appropriate modes of study.

# Cybersecurity

## Computing – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

#### PT1

Reflect upon feedback and take responsibility for own personal development planning and implementation.

#### PT2

Recognise own capabilities and limitations, and produce plausible schedules and plans to manage personal workload and meet specified deadlines.

#### PT3

Present, explain and defend work, including any complex underlying theories, effectively to a variety of audiences using the most suitable communication tools and techniques.

#### PT4

Work effectively within a project development team, providing leadership where appropriate.

#### PT5

Act professionally in avoiding or resolving conflict, and take responsibility for choices and mistakes made, when working in a team.

#### PT6

Engage in problem solving to demonstrate a comprehensive knowledge and experience of the technologies employed in cyber security and computer networks.

#### PT7

Make evidence-based decisions when selecting the tools, methods and techniques to develop secure, connected computer-based systems.

#### PT8

Accept accountability for the consequences of decisions regarding development tools, methods or techniques.

### Research, Knowledge & Cognitive Skills

#### RKC1

Demonstrate a comprehensive understanding of industry-standard technologies, theories and concepts used in cyber security and computer networks.

#### RKC2

Demonstrate a complex understanding of the breadth and depth of the cyber security and networks sector and a critical awareness of current problems and issues informed by research findings and professional practice.

#### RKC3

Explore complex data/information and identify patterns and relationships, collect and synthesise ideas to inform a choice of solutions to problems in unfamiliar contexts.

#### RKC4

Apply established and emerging principles, methods and tools to develop secure networked systems that meet business needs.

#### RKC5

Analyse criteria and specifications appropriate to secure networked systems, and contrast potential strategies to reach a solution.

#### RKC6

Critically evaluate to what extent a secure network design meets user requirements or business objectives, considering risks and/or safety issues.

### Professional Skills

#### PS1

Undertake a substantial development project, to deliver a secure, connected computer-based system, with minimal supervision.

#### PS2

Evaluate performance at managing and executing a significant cyber security and networks project.

#### PS3

Incorporate legal, social, ethical and professional practices during the development of a secure networked computer-based system.

1- Program  
Summary

2- Program  
Advantages &  
Careers

***Artificial Intelligence &  
Analytics***

BSc (Hons)

***School of Computing***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan

Year 1 Year 2 Year 3 Year 4

# Artificial Intelligence & Analytics

## Computing – Major Summary



- Computing power has been increasing exponentially, meaning that we can harness this processing power for ever more complex tasks. Three fields that have emerged alongside this rapid growth are **data analytics, machine learning and AI**.
- **Data analytics** applies fundamental scientific principles to the analysis of large, complex data sets. This rapidly growing field needs practitioners with expertise that cuts across core disciplines of computer science, mathematics and statistics, AND highly developed critical thinking, problem-solving and communication skills.
- Combining **Artificial Intelligence** with Data Analytics allows us to use machine learning techniques to discover insights, find new patterns and discover relationships in the data.



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**The application of data analytics to “big data” is revolutionizing the way we understand and interact with the world.**

# Artificial Intelligence & Analytics

## Computing – Program Advantages/Careers

- There's never been a better time to learn AI & data analytics and become a data scientist or an AI expert. The Bureau of Labor Statistics considers data science among the top 20 fastest-growing occupations and has projected 31% growth over the next 10 years.

Data Analysts & AI experts are in great demand and some jobs after they graduate include:

- **Business Intelligence Analyst**
- **AI Engineer**
- **Data Analyst / Data Mining and Analysis**
- **Data Scientist / Research Scientist**
- **Data Engineer**
- **Quantitative Analyst**
- **Data Analytics Consultant**
- **Operations Analyst**
- **Marketing Analyst**
- **Project Manager**
- **IT Systems Analyst**
- **Transportation Logistics Specialist**
- **Natural Language Processing Engineer**



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**The job outlook for AI experts is very promising, and the opportunities span multiple industries.**

# *Artificial Intelligence & Analytics*

## **Computing – Program Aims & Objectives**

1. Enable students to explore the complex body of knowledge associated with computer science and artificial intelligence.
2. Develop the students' cognitive skills essential for analysing, designing and evaluating computer-based and artificial intelligence systems.
3. Equip students with the industry-relevant knowledge and skills required to construct software and artificial intelligence-based systems.
4. Encourage students to seek professional employment or pursue further study.
5. Produce graduates who will uphold the legal, ethical and professional standards expected of a computer scientist or artificial intelligence specialist, whilst appreciating the social, economic and environmental impact of computing on the world.
6. Produce graduates with the skills needed to secure employment and embark upon a professional career within computer science or artificial intelligence.

# Artificial Intelligence & Analytics

## Computing – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

**PT1** Reflect upon feedback and take responsibility for own personal development planning and implementation of an artificial intelligence project.

**PT2** Recognise own capabilities and limitations with respect to AI developments, and produce plausible schedules and plans to manage personal workload and meet specified deadlines.

**PT3** Present, explain and defend work, including any complex underlying theories drawn from artificial intelligence research, effectively to a variety of audiences using the most suitable communication tools and techniques.

**PT4** Work effectively within a software development or artificial intelligence team, providing leadership where appropriate.

**PT5** Act professionally in avoiding or resolving conflict, and take responsibility for choices and mistakes made, when working in a team.

**PT6** Engage in problem solving to demonstrate a comprehensive knowledge and experience of the concepts and principles related to computer programming, artificial intelligence or machine learning.

**PT7** Make evidence-based decisions when selecting the tools, methods and techniques to develop a computer-based system or apply artificial intelligence techniques.

**PT8** Accept accountability for the consequences of decisions regarding development tools, methods or techniques.

### Research, Knowledge & Cognitive Skills

**RKC1** Demonstrate a comprehensive knowledge and experience of industry-standard algorithms, data structures, patterns, protocols, languages, frameworks, platforms and tools used in the development of complex systems.

**RKC2** Critically apply established software development and agent based modelling methods during the creation of computer-based system, informed by professional practice.

**RKC3** Collect and evaluate complex data from analysis of development tools, modelling techniques or system requirements and synthesise information to inform the design of an artefact, or computer-based system.

**RKC4** Apply and justify unfamiliar patterns, algorithms or paradigms to design a model, artefact or computer-based system.

**RKC5** Analyse a component specification and contrast the potential computer hardware, software, machine learning algorithms and/or Cloud-based solutions that would satisfy it.

**RKC6** Evaluate to what extent an artificial intelligence or computer-based system meets its requirements or business objectives, considering risks and/or safety issues, making judgements regarding contradictory user feedback.

### Professional Skills

**PS1** Undertake a substantial development project, to deliver a working artificial intelligence artefact or computer-based system, with minimal supervision supported by technical research papers.

**PS2** Evaluate performance at managing and executing a significant development project.

**PS3** Incorporate professional, social, ethical and legal practices during the development of a software artefact or computer-based system.

1- Program  
Summary

2- Program  
Advantages &  
Careers

# *Software Engineering*

BSc (Hons)

***School of Computing***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan



# Software Engineering

## Computing – Major Summary

- In general, software refers to computer programs; practically, it is a collection of codes, documents, and triggers that perform a certain task and meet a specific set of standards. The best programming approaches, concepts, and procedures are used in the development of software.
- Software engineers are computer science specialists who design software and operate systems using engineering ideas and programming languages.
- Software engineers play a crucial role in ensuring the proper operation of computers and mobile devices. They bring a wide range of skills to jobs that involve programming languages, software development, and computer operating systems. They should also be familiar with engineering concepts as they relate to the development of software systems and applications.



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**Software engineering is a branch of engineering concerned with software development.**

# Software Engineering

## Computing – Advantages & Careers

- Students who choose to specialize in software engineering will be able to both **learn and apply knowledge** from a variety of scientific disciplines, including computer science, database systems, algorithms, computational analysis, statistics, data structures, human-computer interaction, computer graphics, data visualization, database management systems, website development, software system control, and software development.

Software developers are in great demand both nationally and internationally in almost any industry and some jobs after they graduate include:

- **Software engineer / Metaverse engineer**
- **Software Programmer / Computer game programmer**
- **IT services support specialist / Database Manager**
- **Specialist in information security / computer research**
- **Research and development manager**
- **Information Systems Analyst**
- **Technology / Computing Teaching**
- **Communications and networks specialist**
- **IT Projects Manager / Websites/ Mobile App developer**
- **Software engineer / Metaverse engineer**
- **Artificial intelligence and Augmented/Virtual reality specialist**



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**Students will be able to both learn and apply knowledge from a variety of scientific disciplines.**

# *Software Engineering*

## **Computing – Program Aims & Objectives**

1. Produce graduates with the skills needed to secure employment and embark upon a professional career within software engineering with understanding of security.
2. Enable students to explore the complex body of knowledge associated with software engineering and security.
3. Develop the students' cognitive skills essential for analysing, designing, and evaluating software and computer-based systems.
4. Equip students with the industry-relevant knowledge and skills required to construct secure software and computer-based systems.
5. Produce graduates who will uphold the legal, ethical, and professional standards expected of a software engineer, whilst appreciating the social, economic, and environmental impact of computing on the world.
6. Encourage students to seek professional employment or pursue further study.

# Software Engineering

## Computing – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

#### PT1

Reflect upon feedback and take responsibility for own personal development planning and implementation.

#### PT2

Recognise own capabilities and limitations, and produce plausible schedules and plans to manage personal workload and meet specified deadlines.

#### PT3

Present, explain and defend work, including any complex underlying theories, effectively to a variety of audiences using the most suitable communication tools and techniques.

#### PT4

Work effectively within a software engineering team, providing leadership where appropriate.

#### PT5

Act professionally in avoiding or resolving conflict, and take responsibility for choices and mistakes made, when working in a team.

#### PT6

Engage in problem solving to demonstrate a comprehensive knowledge and experience of the concepts and principles related to computer programming and software engineering.

#### PT7

Make evidence-based decisions when selecting the tools, methods and techniques to engineer a software artefact or computer-based system.

#### PT8

Accept accountability for the consequences of decisions regarding development tools, methods or techniques.

### Research, Knowledge & Cognitive Skills

#### RKC1

Demonstrate a comprehensive knowledge and experience of industry-standard algorithms, data structures, patterns, protocols, languages, frameworks, platforms and tools used in the engineering of software artefacts or computer-based systems.

#### RKC2

Critically use established software engineering processes during the creation of a software artefact or computer-based system, informed by professional practice.

#### RKC3

Collect complex data from surveys of development tools, techniques or system requirements and synthesise information to inform the design of a software artefact or computer-based system.

#### RKC4

Apply and justify unfamiliar patterns or paradigms to design or model a software artefact or computer-based system.

#### RKC5

Analyse a component specification and contrast the potential computer hardware, software and/or Cloud-based solutions that would satisfy it.

#### RKC6

Evaluate to what extent a software artefact or computer-based system meets its requirements or business objectives, considering risks and/or safety issues, making judgements regarding contradictory user feedback.

### Professional Skills

#### PS1

Undertake a substantial development project, to deliver a working software artefact or computer-based system, to agreed business objectives.

#### PS2

Evaluate performance at managing and executing a significant development project.

#### PS3

Incorporate legal, social, ethical and professional practices and behaviour during the development of a software artefact or computer-based system.

1- Program  
Summary

2- Program  
Advantages &  
Careers

# *General Computing*

BSc (Hons)

***School of Computing***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan

# General Computing

## Computing – Major Summary

Unlike other specific pathways such as Software Engineering, Cyber Security & Data Analytics & AI, a General Computing pathway allows the student to explore all pathways combined with a general understanding of all.

It is the study of computers and computational systems.

**Deals mostly with the theory, design, development, and application of software and software systems.**



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# General Computing

## Computing – Advantages / Careers

There are many interesting jobs available to general computing degree holders:

- Artificial intelligence and machine learning engineer
- Chief information security officer
- Cloud computing engineer
- Researcher
- Data scientist / Database administrator
- Business analyst
- Full-stack developer
- Information security analyst / specialist
- Mobile application designer or developer
- Network architect / Product manager
- Software developer / Software engineer
- Software quality assurance manager
- Software tester / Systems analyst
- User interface designer / Web developer

**Given its general structure, computing positions are plentiful.**



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# General Computing

## Computing – Program Aims & Objectives

1. Produce graduates with the skills to be involved in the planning, development and management of computer-based systems.
2. Produce graduates who are competent and confident users of IT, who can make efficient, effective and creative use of application software in their everyday activities.
3. Encourage students to become critical and reflective computing professionals, who can evaluate the capabilities and limitations of the technology and of the social, technical, ethical, organisational and economical principles associated with its use.
4. Enable students to engage with current research issues and to consolidate their knowledge base and understanding of currently available technologies and emerging trends in the rapidly changing discipline of Computing.
5. Enable students to acquire a range of practical, professional and transferrable skills, to equip them to contribute to their chosen profession or to pursue further study.
6. Provide opportunities for industrial or commercial learning experiences in a variety of subject backgrounds, utilising appropriate modes of study.



# General Computing

## Computing – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

#### PT1

Demonstrate the ability to learn independently and reflect on experiences and feedback to inform personal development.

#### PT2

Evaluate personal development through self-direction, plan and implement actions to inform professional development.

#### PT3

Communicate clearly, fluently and effectively using a range of styles and present arguments in a professional manner appropriate to the computing profession.

#### PT4

Work as a member of a computing team, recognising the different roles and the different ways of organising and/or leading teams.

#### PT5

Recognise and evaluate factors that enhance group processes and team working. Evaluate and modify own personal contribution to effectively work with or lead a team of professionals.

#### PT6

Demonstrate a complex understanding of a range of digital environments and operate responsibly within them.

#### PT7

Make evidence-based decisions and deploy appropriate theory, practices and tools for a specification, design, implementation and evaluation of a computing system.

#### PT8

Accept full accountability for the outcome and impact of the evidence-based decisions.

### Research, Knowledge & Cognitive Skills

#### RKC1

Work with and articulate abstract ideas, arguing from competing perspectives, and recognise the possibility of new concepts within existing knowledge frameworks.

#### RKC2

Demonstrate an understanding of the current problems and issues within the IT sector informed by research findings and professional practice.

#### RKC3

Explore complex information and identify patterns and relationships, collecting and synthesising ideas, to inform a choice of solutions to problems in unfamiliar contexts.

#### RKC4

Apply principles, methods and tools to develop information systems that meet business needs.

#### RKC5

Recognise and analyse criteria and specifications appropriate to specific problems, and plan strategies for their solution within the IT sector.

#### RKC6

Define a problem, research its background, understand the social context, identify the constraints, understand the user needs, ensure fitness for purpose, manage the design process, and evaluate the outcome.

### Professional Skills

#### PS1

Act autonomously to specify, analyse, design and construct solutions to problems using appropriate IT methods and solutions.

#### PS2

Evaluate systems in terms of performance using a range of techniques and processes within the given problem.

#### PS3

Incorporate a professional, ethical and legal working approach, particularly regarding IT issues.

# *School of Computing*

Study Plan

# School of Computing (CMP)

## YEAR 1 – UK LEVEL 3 – For all Pathways in Computing

### ➤ 2 Mandatory core Units + 3 Optional Units + General Education Subjects

#### 2 x Mandatory Core Units/Subjects

1. Unit 1: [CMP101](#) Information Technology Systems – Strategy, Management and Infrastructure (120 GLH)
2. Unit 6: [CMP106](#) Website Development (60 GLH)

#### 3 x Optional Units/Subjects

*Students can choose any 3 Units/subjects from the optional list below:*

1. Unit 2: [CMP102](#) Creating Systems to Manage Inforion (90 GLH)
2. Unit 3: [CMP103](#) Using Social Media in Business (90 GLH)
3. Unit 4: [CMP104](#) Programing (90 GLH)
4. Unit 5: [CMP105](#) Data Modelling (60 GLH)
5. Unit 7: [CMP107](#) Mobile Apps Development (60 GLH)
6. Unit 8: [CMP108](#) Computer Games Development (60 GLH)
7. Unit 9: [CMP109](#) IT Project Management (60 GLH)
8. Unit 10: [CMP110](#) Big Data and Business Analytics (60 GLH)
9. Unit 12: [CMP112](#) IT Technical Support and Management (60 GLH)
10. Unit 13: [CMP113](#) Software Testing (60 GLH)
11. Unit 14: [CMP114](#) Customising and Integrating Applications (60 GLH)
12. Unit 15: [CMP115](#) Cloud Storage and Collaboration Tools 60 Optional Internal (60 GLH)
13. Unit 16: [CMP116](#) Digital 2D and 3D Graphics (60 GLH)
14. Unit 17: [CMP117](#) Digital Animation and Effects (60 GLH)
15. Unit 18: [CMP118](#) The Internet of Things (60 GLH)
16. Unit 19: [CMP119](#) Enterprise in IT (60 GLH)
17. Unit 20: [CMP120](#) Business Process Modelling Tools (60 GLH)
18. Unit 21: [CMP121](#) Introduction to Artificial Intelligence (AI) (60 GLH)
19. Unit 22: [CMP122](#) Introduction to Robotics and Automation (60 GLH)
20. Unit 23: [CMP123](#) Emerging Trends and Technologies (60 GLH)
21. Unit 24: [CMP124](#) Technical Fundamentals for Computing Professionals (60 GLH)
22. Unit 25: [CMP125](#) Full Stack Development (60 GLH)



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# School of Computing (CMP)

## YEAR 2 – UK LEVEL 4

- **6 Mandatory core Units + 1 Mandatory specialist Unit + 1 Optional Unit + General Education Subjects**

### **6 x Mandatory Core Units/Subjects**

1. Unit 1: [CMP201](#) Programming (15 UK Credits)
2. Unit 2: [CMP202](#) Networking (15 UK Credits)
3. Unit 3: [CMP203](#) Professional Practice (15 UK Credits)
4. Unit 4: [CMP204](#) Database Design & Development (15 UK Credits)
5. Unit 5: [CMP205](#) Security (15 UK Credits)
6. Unit 6: [CMP206](#) Planning a Computing Project (15 UK Credits)

### **1 x Mandatory Specialist Unit/Subject – Depending on the selected Pathway/Major (15 UK Credits)**

#### ***Computing(General) / Software Engineering***

1. Unit 7: [CMP207](#) Software Development Lifecycles (15 UK Credits)

#### ***Artificial Intelligence / Data Analytics***

1. Unit 8: [CMP208](#) Data Analytics (15 UK Credits)

#### ***Cybersecurity***

1. Unit 10: [CMP210](#) Cybersecurity (15 UK Credits)

### **1 x Optional Units/Subjects Students can choose ONE Unit/subject from the optional list below:**

1. Unit 11: [CMP211](#) Strategic Information Systems (15 UK Credits)
2. Unit 12: [CMP212](#) Management in the Digital Economy (15 UK Credits)
3. Unit 13: [CMP213](#) Website Design & Development (15 UK Credits)
4. Unit 14: [CMP214](#) Maths for Computing (15 UK Credits)
5. Unit 15: [CMP215](#) Fundamentals of Artificial Intelligence (AI) & Intelligent Systems (15 UK Credits)



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# School of Computing (CMP)

## YEAR 3 – UK LEVEL 5

### 2 Mandatory core Units + 5 Optional/Mandatory Specialist Units + General Education Subjects

#### 2 x Mandatory Core Units/Subjects

1. Unit 16: [CMP316](#) Computing Research Project (30 UK Credits)
2. Unit 17: [CMP317](#) Business Process Support (15 UK Credits)

**5 x (Optional Units/Subjects + Mandatory Specialist Units/Subjects) - For General Computing Pathway, students can choose any FIVE Units/subjects from the list below. - For all other pathways, students MUST take the 3 x Mandatory specialist Units (in their Group) + any 2 x Optional Units/subjects from the remaining list of subjects below.**

#### ***Group A: Software Engineering***

1. Unit 18: [CMP318](#) Discrete Maths (15 UK Credits)
2. Unit 19: [CMP319](#) Data Structures & Algorithms (15 UK Credits)
3. Unit 20: [CMP320](#) Applied Programming and Design Principle (15 UK Credits) ☒

#### ***Group B: Data Analytics & Artificial Intelligence***

4. Unit 24: [CMP324](#) Advanced Programming for Data Analysis (15 UK Credits)
5. Unit 25: [CMP325](#) Machine Learning (15 UK Credits)
6. Unit 26: [CMP326](#) Big Data Analytics and Visualisation (15 UK Credits)

#### ***Group C: Cyber Security***

7. Unit 30: [CMP330](#) Applied Cryptography in the Cloud (15 UK Credits)
8. Unit 31: [CMP331](#) Forensics (15 UK Credits)
9. Unit 32: [CMP332](#) Information Security Management (15 UK Credits)



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# School of Computing (CMP)

## YEAR 4 – UK LEVEL 6 (Top-Up)

*With Teeside University, UK*

### 2 Mandatory core Units + 3 Mandatory Specialist Units + General Education Subjects

#### Subjects 2 x Mandatory Core Units/Subjects

1. Unit 1: CMP401/ CIS3004-N Computing Project (Part 1 & Part 2) (40 UK Credits)
2. Unit 2: CMP402/ CIS3011-N Internet of Things (20 UK Credits)

#### 3 x Mandatory Specialist Units/Subjects – Depending on the selected Pathway/Major

##### **Group A: Data Analytics & Artificial Intelligence**

1. Unit 3: CMP403/ CIS3022-N Applied Machine Learning (20 UK Credits)
2. Unit 4: CMP404/ CIS3021-N Agent Based System (20 UK Credits)
3. Unit 5: CMP405/ CIS3025 Deep Learning and Applications (20 UK Credits)

##### **Group B: Computing (General)**

1. Unit 6: CMP406/ CIS3014-N Software Reliability (20 UK Credits)
2. Unit 7: CMP407/ CIS3003-N Cloud System DevOps (20 UK Credits)
3. Unit 8: CMP408/ CIS3002-N Knowledge Based AI (20 UK Credits)



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# *School of Engineering*

School of  
Engineering

BEng Tech  
(Hons) -  
Mechanical  
Engineering

BEng Tech  
(Hons) -  
Electrical &  
Electronics  
Engineering

1- Program  
Summary

2- Program  
Advantages &  
Careers

## *Mechanical Engineering*

BEng Tech (Hons)

***School of Engineering***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan



# Mechanical Engineering

## Engineering – Major Summary

- Mechanical engineering **impacts almost every area of contemporary life**, including the human body, which is a highly complicated mechanism.
- A mechanical engineer's job is to take an idea from concept to market. To do so, a mechanical engineer should be able to identify the forces and thermal atmosphere that a product, its pieces, or its subsystems will experience; design them for functionality, visual appeal, and durability; and determine the best production method that will ensure failure-free operation.
- Mechanical engineers play a significant role in many sectors, including automotive, aerospace, nanotechnology, electronics, computing, microelectronic systems, energy conversion, automation and robotics, and production.

**Mechanical engineering is the study of things and systems in motion.**



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# Mechanical Engineering

## Engineering – Advantages & Careers

- Mechanical engineering, unlike other degree programs, has a broad curriculum that allows you to acquire several skills that apply to a wide range of industries. A certified professional constructs anything with mechanical components using math and scientific ideas.

The most important work areas for mechanical engineering graduates include, but are not limited to:

- **Mechatronics / Robotics**
- **Aerospace**
- **Automotive**
- **Biotechnology**
- **Automation / Smart Cities / Smart Homes**
- **Autonomous Systems**
- **Computer-Aided Design (CAD)**
- **Control Systems**
- **Energy / Medical Machinery**
- **Manufacturing and additive manufacturing.**
- **Mechanics**
- **Nanotechnology**
- **Structural analysis**

**They could work on everything from automobiles to heating systems.**



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# *Mechanical Engineering*

## **Engineering – Program Aims & Objectives**

### **Educational Aims of the Programme**

The objective of the programme of study is to produce graduates who possess a rounded knowledge and understanding of mechanical engineering and the skills to analyse complex problems appropriate to the discipline.

The overall aims of the programme are:

1. To produce graduates with an enthusiasm for mechanical engineering, an appreciation of its application in different contexts and to involve them in an intellectually stimulating and satisfying experience of learning and studying.
2. To produce graduates with the ability to apply their knowledge and understanding in order to be competitive and creative.
3. To produce graduates with the ability to apply a variety of methods and skills in the investigation and solution of real mechanical engineering problems.
4. To produce graduates with the qualities and skills for employability, enabling them to either pursue programmes of further study or to move directly into their chosen employment in industry and manage their own continuous professional development.
5. To meet the educational requirements (in compliance with UK-SPEC), at degree level, to permit progression to Incorporated Membership of the appropriate Engineering Institution

# Mechanical Engineering

## Engineering – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

#### PT1

Plan, manage and evaluate the application of new knowledge and skills as part of a lifelong learning strategy.

#### PT2

Demonstrate both employment potential and ability to manage future professional development.

#### PT3

Communicate clearly, fluently and effectively in a range of styles appropriate to the engineering profession. Engage effectively in academic discussion and present arguments in a professional manner.

#### PT4

Select, apply and evaluate appropriate numerical and statistical methods for complex and open ended engineering tasks.

#### PT5

Select and evaluate software applications for engineering tasks.

#### PT6

Recognise and evaluate factors which enhance group processes and team working and modify and evaluate own personal effectiveness within a team.

#### PT7

Select and use the relevant practical skills needed to operate equipment and measurement devices safely and effectively.

### Research, Knowledge & Cognitive Skills

#### RKC1

Demonstrate a comprehensive and detailed knowledge and understanding of the scientific principles underpinning Mechanical Engineering technologies, and their evolution.

#### RKC2

Demonstrate a comprehensive and detailed knowledge and understanding of the mathematics necessary to support the application of key engineering principles in Mechanical Engineering.

#### RKC3

Demonstrate knowledge of and the ability to selectively apply relevant equipment, tools, processes and products relevant to Mechanical Engineering.

#### RKC4

Demonstrate detailed knowledge of contexts in which engineering knowledge can be applied.

#### RKC5

Demonstrate the ability to apply a systems approach to Mechanical Engineering problems through knowledge of, and know-how of the application of, the relevant technologies.

#### RKC6

Demonstrate an ability to monitor, critically evaluate and apply the results of analysis and modelling to solve engineering problems, apply new technology, or implement new engineering processes in order to improve mechanical engineering designs or processes.

#### RKC7

Define the range and scope of Mechanical Engineering problems and identify constraints.

#### RKC8

Use creativity and intellectual flexibility to establish innovative solutions within a Mechanical Engineering context.

#### RKC9

Demonstrate an ability to use and apply technical literature and other information sources.

### Professional Skills

#### PS1

Design solutions according to customer and user needs and ensure fitness for purpose.

#### PS2

Demonstrate the ability to use the codes of practice and industry standards used in Mechanical Engineering and related disciplines.

#### PS3

Demonstrate an awareness of quality issues and their application to continuous improvement.

#### PS4

Effectively adapt designs to meet new purposes or applications and identify and manage the cost drivers that influence the mechanical engineering processes.

#### PS5

Demonstrate a critical understanding of the principles of managing engineering processes.

#### PS6

Act autonomously with limited supervision or direction within agreed guidelines.

1- Program  
Summary

2- Program  
Advantages &  
Careers

***Electrical & Electronics  
Engineering***

**BEng Tech (Hons)**

***School of Engineering***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan

# *Electrical & Electronics Engineering*

## *Engineering – Major Summary*

- Electronics engineering is a branch of electrical engineering that focuses on the **design and repair of circuits and the systems that support them**. To build the networks, various nonlinear and active electrical components are employed, and communication mechanisms are built to send the information to other systems.
- Electrical engineers design and develop all electrical systems, including aircraft engines, radar and GPS systems, generators, and so on.



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***Electrical engineering is  
the design and  
application of any  
electrical energy-related  
system.***

# Electrical & Electronics Engineering

## Engineering – Advantages / Careers

- It's obvious that in a future expected to be filled with new electric technology, this might be to an extremely important degree.
- Your degree studies will provide you with a solid technical understanding of a wide range of fields, including electronics, signal processing, power engineering, mechatronics, and engineering management.

Here is a list of the most important jobs that graduates in electrical and electronic engineering can work in:

- **Energy Systems Engineering**
- **Sustainable Engineering**
- **Telecommunications**
- **Controlling systems**
- **Manufacturing electrical equipment**
- **Programming and controlling design companies**
- **Computer companies**
- **Electrical medical machinery manufacturers**
- **Electric Vehicles Charging / Infrastructures**
- **Signal processing**
- **Nuclear engineering**



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***A degree in this field will provide you with great insight into the operation of electrical equipment and technologies.***

# *Electrical & Electronics Engineering*

## **Engineering – Program Aims & Objectives**

The overall aims of the programme are to:

1. produce graduates with an enthusiasm for electrical and electronic engineering, an appreciation of its application in different global contexts and to involve them in an intellectually stimulating and satisfying experience of learning and studying
2. produce graduates with the ability to apply their knowledge and understanding in order to be competitive and creative with due regard for risk.
3. produce graduates with the electrical and electronic engineering knowledge and skills required to critically evaluate information, assumptions, arguments and concepts for solving real engineering problems.
4. produce graduates with the qualities and skills for employability enabling them to either pursue courses of further study and research, or to move directly into their chosen employment in industry and/or consulting/research organisation where they will manage their own continuous professional development.
5. meet the educational requirements (in compliance with UK-SPEC), at degree level to permit progression to Incorporated Membership of the Institution of Engineering and Technology and registration with ECUK as an Incorporated Engineer.

In this respect the course aims to enable the students to demonstrate:

1. knowledge and understanding of the essential facts, concepts, theories and principles of electrical and electronic engineering, have an appreciation of the wider multidisciplinary engineering context, and appreciate the social, environmental, ethical, and economic considerations affecting the exercise of their engineering judgement.
2. ability to apply appropriate quantitative and engineering tools to the analysis of problems, be creative and innovative in the synthesis of sustainable solutions and in formulating designs, and to work with an appropriate level of detail.
3. practical engineering skills through work carried out in laboratories, in individual and group project work, in design work, and in the development and use of computer software.
4. transferable skills that will be of value in a wide range of situations. Including problem solving, communication, working with others, the effective use of general IT facilities, and the planning of self-learning and improving performance, as the foundation for lifelong learning/CPD
5. ability to complete a final year independent design project.



# Electrical & Electronics Engineering

## Engineering – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

#### PT1

Plan, manage and evaluate the application of new knowledge and skills as part of a lifelong learning strategy.

#### PT2

Demonstrate both employment potential and the ability to manage future professional development.

#### PT3

Communicate clearly, fluently and effectively in a range of styles appropriate to the engineering profession. Engage effectively in academic discussion and present arguments in a professional manner.

#### PT4

Select, apply and evaluate appropriate numerical and statistical methods for complex and open ended engineering tasks.

#### PT5

Select and evaluate software applications for engineering tasks.

#### PT6

Recognise and evaluate factors which enhance group processes and team working and modify and evaluate own personal effectiveness within a team.

#### PT7

Select and use the relevant practical skills needed to operate equipment and measurement devices safely and effectively.

### Research, Knowledge & Cognitive Skills

#### RKC1

Demonstrate a comprehensive and detailed knowledge and understanding of the scientific principles underpinning electrical and electronic engineering technologies, and their evolution.

#### RKC2

Demonstrate a comprehensive and detailed knowledge and understanding of the mathematics necessary to support the application of key engineering principles in electrical and electronic engineering.

#### RKC3

Demonstrate knowledge of and the ability to selectively apply appropriate equipment, tools, processes and products relevant to electrical and electronic engineering.

#### RKC4

Demonstrate detailed knowledge of contexts in which engineering knowledge can be applied.

#### RKC5

Demonstrate the ability to apply a systems approach to electrical and electronic engineering problems through knowledge and understanding of the relevant technologies.

#### RKC6

Demonstrate an ability to monitor, critically evaluate and apply the results of analysis and modelling to solve engineering problems, apply new technology, or implement new engineering processes in order to improve electrical and electronic engineering designs or processes.

#### RKC7

Define the range and scope of electrical and electronic engineering problems and identify constraints.

#### RKC8

Use creativity and intellectual flexibility to establish innovative solutions within an electrical and electronic engineering context.

#### RKC9

Demonstrate an ability to use and apply technical literature and other information sources.

### Professional Skills

#### PS1

Design solutions according to customer and user needs and ensure fitness for purpose.

#### PS2

Demonstrate the ability to operate ethically utilising the codes of practice and industry standards used in electrical and electronic engineering and related disciplines.

#### PS3

Demonstrate an awareness of quality issues and their application to continuous improvement.

#### PS4

Effectively adapt designs to meet new purposes or applications and identify and manage the cost drivers that influence the process.

#### PS5

Demonstrate a critical understanding of the principles of managing engineering processes.

#### PS6

Act autonomously and with limited supervision or direction within agreed guidelines.

# *School of Engineering*

Study Plan

# School of Engineering (ENG)

## YEAR 1 – UK LEVEL 3 – For all Pathways

### 2 Mandatory core Units + 1 Mandatory specialist Units + 2 Optional Units + General Education Subjects

#### 2 x Mandatory Core Units

1. Unit 2: [ENG102](#) - Delivery of Engineering Processes Safely as a Team (60 GLH)
2. Unit 3: [ENG103](#) - Product Design and Manufacture in Engineering (120 GLH)

#### 1 x Mandatory Specialist Unit – Depending on the selected Pathway/Major

1. Unit 1: [ENG101](#) - Mechanical Principles (60 GLH)
2. Unit 57: [ENG157](#) - Electrical and Electronic Principles (60 GLH)

#### 2 x Optional Units/Subjects

1. Unit 1: [ENG101](#) - Mechanical Principles (60 GLH)
2. Unit 57: [ENG157](#) - Electrical and Electronic Principles (60 GLH)
3. Unit 4: [ENG104](#) - Applied Commercial and Quality Principles in Engineering (60 GLH)
4. Unit 5: [ENG105](#) - A Specialist Engineering Project (60 GLH)
5. Unit 7: [ENG107](#) - Calculus to Solve Engineering Problems (60 GLH)
6. Unit 9: [ENG109](#) - Work Experience in the Engineering Sector (60 GLH)
7. Unit 10: [ENG110](#) - Computer Aided Design in Engineering (60 GLH)
8. Unit 11: [ENG111](#) - Engineering Maintenance and Condition Monitoring Techniques (60 GLH)
9. Unit 12: [ENG112](#) - Pneumatic and Hydraulic Systems (60 GLH)
10. Unit 19: [ENG119](#) - Electronic Devices and Circuits (60 GLH)
11. Unit 25: [ENG125](#) - Mechanical Behaviour of Metallic Materials (60 GLH)
12. Unit 30: [ENG130](#) - Mechanical Measurement and Inspection Technology (60 GLH)
13. Unit 33: [ENG133](#) - Computer Systems Security (60 GLH)
14. Unit 35: [ENG135](#) - Computer Programming (60 GLH)
15. Unit 36: [ENG136](#) - Programmable Logic Controllers (60 GLH)
16. Unit 41: [ENG141](#) - Manufacturing Secondary Machining Processes (60 GLH)



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1. Unit 43: [ENG143](#) - Manufacturing Computer Numerical Control Machining Processes (60 GLH)
2. Unit 44: [ENG144](#) - Fabrication Manufacturing Processes (60 GLH)
3. Unit 45: [ENG145](#) - Additive Manufacturing Processes (60 GLH)
4. Unit 47: [ENG147](#) - Composites Manufacture and Repair Processes (60 GLH)
5. Unit 48: [ENG148](#) - Aircraft Flight Principles and Practice (60 GLH)
6. Unit 56: [ENG156](#) - Industrial Robotics (60 GLH)
7. Unit 58: [ENG158](#) - Entrepreneurship and Intrapreneurship in Practice (60 GLH)
8. Unit 59: [ENG159](#) - Principles of Electrical Machines (60 GLH)
9. Unit 60: [ENG160](#) - Autonomous Mobile Robotics (60 GLH)



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# School of Engineering (ENG)

## YEAR 2 – UK LEVEL 4

### 4 Mandatory core Units + 4 (Mandatory specialist Units + Optional Units) + General Education Subjects

#### 4 x Mandatory Core Units - For all pathways/majors

1. Unit 1: [ENG201](#) – Engineering Design (15 UK Credits)
2. Unit 2: [ENG202](#) – Engineering Maths (15 UK Credits)
3. Unit 3: [ENG203](#) – Engineering Science (15 UK Credits)
4. Unit 4: [ENG204](#) – Managing a Professional Engineering Project (15 UK Credits)

#### 4 x (Mandatory specialist Units + Optional Units) divided according to Major/Pathway as follows:

##### Electrical & Electronic Engineering: 1 x Mandatory Specialist Unit

1. Unit 19: [ENG219](#) – Electrical and Electronic Principles\* (15 UK Credits)
- + 3 x Optional Units from the list of Optional Level 4 Subjects/Units (NOT in their Mandatory Specialist List)

##### Mechanical Engineering: 2 x Mandatory Specialist Units

1. Unit 8: [ENG208](#) – Mechanical Principles\* (15 UK Credits)
  2. Unit 13: [ENG213](#) – Fundamentals of Thermodynamics and Heat Engines\* (15 UK Credits)
- + 2 x Optional Units from the list of Optional Level 4 Subjects/Units (NOT in their Mandatory Specialist List)

##### List of Optional Level 4 Subjects/Units

1. Unit 5: [ENG205](#) – Renewable Energy (15 UK Credits)
2. Unit 6: [ENG206](#) – Mechatronics (15 UK Credits)
3. Unit 7: [ENG207](#) – Machining and Processing of Engineering Materials (15 UK Credits)
4. Unit 8: [ENG208](#) – Mechanical Principles\* (15 UK Credits)



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5. Unit 9: ENG209 – Materials, Properties and Testing (15 UK Credits)
6. Unit 10: [ENG210](#) – Mechanical Workshop Practices (15 UK Credits)
7. Unit 11: [ENG211](#) – Fluid Mechanics (15 UK Credits)
8. Unit 12: ENG212 – Engineering Management (15 UK Credits)
9. Unit 13: [ENG213](#) – Fundamentals of Thermodynamics and Heat Engines\* (15 UK Credits)
10. Unit 14: ENG214 – Production Engineering for Manufacture\* (15 UK Credits)
11. Unit 15: [ENG215](#) – Automation, Robotics and Programmable Logic Controllers (PLCs) (15 UK Credits)
12. Unit 16: ENG216 – Instrumentation and Control Systems (15 UK Credits)
13. Unit 17: ENG217 – Quality and Process Improvement\* (15 UK Credits)
14. Unit 18: ENG218 – Maintenance Engineering (15 UK Credits)
15. Unit 19: [ENG219](#) – Electrical and Electronic Principles\* (15 UK Credits)
16. Unit 20: [ENG220](#) – Digital Principles (15 UK Credits)
17. Unit 21: ENG221 – Electrical Machines (15 UK Credits)
18. Unit 22: [ENG222](#) – Electronic Circuits and Devices\* (15 UK Credits)
19. Unit 23: [ENG223](#) – Computer Aided Design and Manufacture (CAD/CAM) (15 UK Credits)
20. Unit 29: ENG229 – Electro, Pneumatic and Hydraulic Systems (15 UK Credits)
21. Unit 30: ENG230 – Operations and Plant Management (15 UK Credits)
22. Unit 31: ENG231 – Electrical Systems and Fault Finding (15 UK Credits)
23. Unit 32: ENG232 – CAD for Maintenance Engineers (15 UK Credits)
24. Unit 73: ENG273 – Materials Engineering with Polymers (15 UK Credits)
25. Unit 74: ENG274 – Polymer Manufacturing Processes (15 UK Credits)
26. Unit 75: ENG275 – Industry 4.0 (15 UK Credits)
27. Unit 76: ENG276 – Introduction to Professional Engineering Management (15 UK Credits)
28. Unit 77: ENG277 – Industrial Robots (15 UK Credits)
29. Unit 78: ENG278 – Programmable Logic Controllers (15 UK Credits)
30. Unit 79: ENG279 – Computer Aided Design (CAD) for Engineering (15 UK Credits)
31. Unit 82: ENG282 – Statistical Process Control (15 UK Credits)
32. Unit 83: ENG283 – Telecommunication Principles (15 UK Credits)
33. Unit 84: ENG284 – Semiconductor Manufacture\* (15 UK Credits)
34. Unit 85: ENG285 – Semiconductor Production Environments\* (15 UK Credits)



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# School of Engineering (ENG)

## YEAR 3 – UK LEVEL 5

### 2 Mandatory core Units + 3 Mandatory specialist Units + 1 Optional Unit + General Education Subjects

#### 2x Mandatory Core Units /Subjects - For all pathways/majors

1. Unit 34: [ENG334](#) – Research Project (30 UK Credits)
2. Unit 35: [ENG335](#) – Professional Engineering Management (15 UK Credits)

#### 3 x Mandatory Specialist Units/Subjects – According to the selected Pathways/Majors

##### Electrical & Electronic Engineering:

1. Unit 39: [ENG339](#) - Further Mathematics (15 UK Credits)
2. Unit 44: [ENG344](#) – Industrial Power, Electronics and Storage\* (15 UK Credits)
3. Unit 45: [ENG345](#) – Industrial Systems (15 UK Credits)

##### Mechanical Engineering:

1. Unit 36: [ENG336](#) – Advanced Mechanical Principles (15 UK Credits)
2. Unit 37: [ENG337](#) – Virtual Engineering\* (15 UK Credits)
3. Unit 39: [ENG339](#) - Further Mathematics (15 UK Credits)

#### 1 x Optional Units/Subjects

##### Students can choose ONE Unit/subject from the optional list below:

1. Unit 36: [ENG336](#) – Advanced Mechanical Principles (15 UK Credits)
2. Unit 37: [ENG337](#) – Virtual Engineering\* (15 UK Credits)
3. Unit 38: [ENG338](#) – Further Thermodynamics (15 UK Credits)
4. Unit 39: [ENG339](#) – Further Mathematics\* (15 UK Credits)
5. Unit 40: [ENG340](#) – Commercial Programming Software (15 UK Credits)



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6. Unit 41: ENG341 – Distributed Control Systems (15 UK Credits)
7. Unit 42: ENG342 – Further PLCs (15 UK Credits)
8. Unit 43: ENG343 – Further Electrical Machines and Drives (15 UK Credits)
9. Unit 44: [ENG344](#) – Industrial Power, Electronics and Storage\* (15 UK Credits)
10. Unit 45: [ENG345](#) – Industrial Systems\* (15 UK Credits)
11. Unit 46: ENG346 – Embedded Systems (15 UK Credits)
12. Unit 47: ENG347 – Analogue Electronic Systems (15 UK Credits)
13. Unit 48: ENG348 – Manufacturing Systems Engineering\* (15 UK Credits)
14. Unit 49: ENG349 – Lean Manufacturing\* (15 UK Credits)
15. Unit 50: ENG350 – Advanced Manufacturing Technology\* (15 UK Credits)
16. Unit 51: ENG351 – Sustainability (15 UK Credits)
17. Unit 52: [ENG352](#) – Further Electrical, Electronic and Digital Principles(15 UK Credits)
18. Unit 53: [ENG353](#) – Utilisation of Electrical Power (15 UK Credits)
19. Unit 54: ENG354 – Further Control Systems Engineering (15 UK Credits)
20. Unit 62: ENG362 – Heating, Ventilation, Air Conditioning (HVAC)\* (15 UK Credits)
21. Unit 63: ENG363 – Industrial Services\* (15 UK Credits)
22. Unit 64: ENG364 – Thermofluids\* (15 UK Credits)
23. Unit 86: ENG386 – Emerging Semiconductor Technologies\* (15 UK Credits)
24. Unit 87: ENG387 – Semiconductor Integrated Electronics\* (15 UK Credits)



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# School of Engineering (ENG)

## YEAR 4 – UK LEVEL 6 (Top-Up)

### 5 Mandatory specialist Units + General Education Subjects

#### 5 x Mandatory Specialist Units – Depending on the selected Pathway/Major

##### **Electrical & Electronic Engineering**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 2: [CBE402/ ENG402 / MMD3058-N](#) Project (40 UK Credits)
3. Unit 3: [ENG403 / EAC3018-N Electronic Systems](#) (20 UK Credits)
4. Unit 4: [ENG404 / EAC3046-N Power Electronics & Drive Systems](#) (20 UK Credits)
5. Unit 5 : [ENG405 / EAC3027-N Power Systems](#) (20 UK Credits)

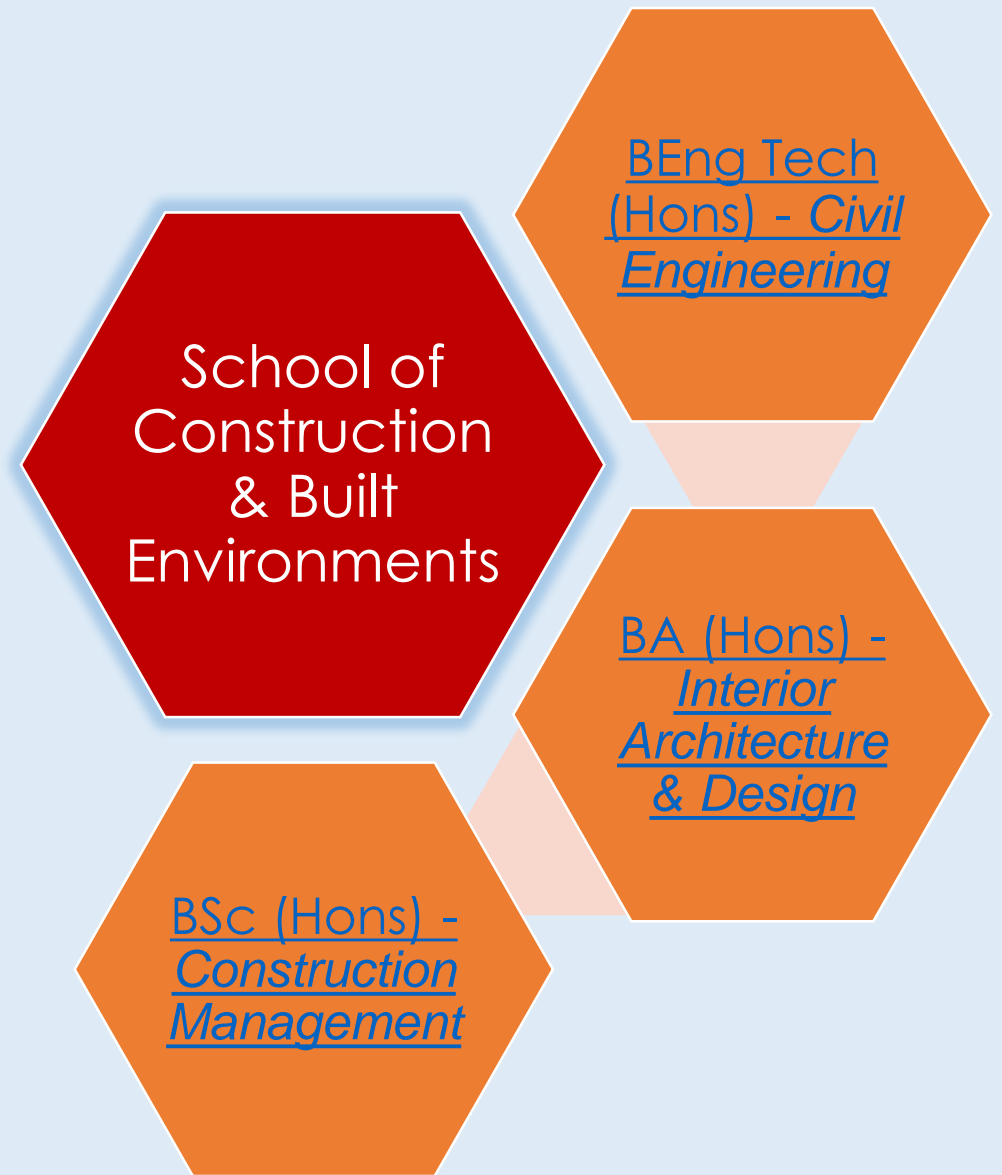
##### **Mechanical Engineering**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 2: [CBE402/ ENG402 / MMD3058-N](#) Project (40 UK Credits)
3. Unit 6: [ENG406 / EAC3029-N](#) Computer Aided Engineering (20 UK Credits)
4. Unit 7: [ENG407 / MMD3019-N](#) Mechanics of Materials 2 (20 UK Credits)
5. Unit 8 : [ENG408 / MMD3048-N](#) Product Quality & Reliability (20 UK Credits))



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# *School of Construction & Built Environments*



1- Program  
Summary

2- Program  
Advantages &  
Careers

## *Civil Engineering*

BEng Tech (Hons)

***School of Construction & Built  
Environments***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan

# Civil Engineering

## Const. & Built – Major Summary

- Civil engineering work on bridges, roads, agricultural irrigation systems, airports, water and sanitation systems, huge buildings, and dams, then designing and analyzing the results to identify weaknesses and try to find a practical solution.
- Civil engineering is not only related to **design and implementation** but also to the **follow-up** of how the new facility works, helping to raise the status of humankind, and putting all the resources of nature to serve it.

**Civil engineering is one of the important specialties studying different buildings.**



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# Civil Engineering

## Const. & Built – Advantages & Careers

- Civil engineering is one of the most required specialties due to the continuing need for design, development, and control of the new facilities that increase every day.

Most important jobs that a civil engineering graduate can work in:

- **Self-employment, a general civil engineer.**
- **Head of civil engineering.**
- **Work in all kinds of civil engineering services.**
- **Work in real estate and bank projects.**
- **Work in contracting companies.**
- **Work in engineering consulting companies.**
- **Work in environmental and water laboratories.**
- **Work in civil engineering supervision.**

**There is a high demand for civil engineers all over the world. Also, in the labor market, civil engineers usually have the lowest unemployment rates in the world.**



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# Civil Engineering

## Construction & Built Environments – Program Aims & Objectives

The overall aims of the programme are to:

- The objective of the programme of study is to produce graduates who possess a rounded knowledge and understanding of civil engineering and the skills to analyse complex problems appropriate to the discipline.

The overall aims of the programme are:

1. To produce graduates with an enthusiasm for civil engineering, an appreciation of its application in different contexts and to involve them in an intellectually stimulating and satisfying experience of learning and studying.
2. To produce graduates with the ability to apply their knowledge and understanding in order to be competitive and creative.
3. To produce graduates with the ability to apply a variety of methods and skills in the investigation and solution of real civil engineering problems.
4. To produce graduates with the qualities and skills for employability, enabling them to either pursue programmes of further study or to move directly into their chosen employment in industry and manage their own continuous professional development.
5. To meet the educational requirements (in compliance with UK-SPEC), at degree level, to permit progression to Incorporated Membership of the appropriate Engineering Institution.

# Civil Engineering

## Construction & Built Environments – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

#### PT1

Plan, manage and evaluate the application of new knowledge and skills as part of a lifelong learning strategy.

#### PT2

Demonstrate both employment potential and ability to manage future professional development.

#### PT3

Communicate clearly, fluently and effectively in a range of styles appropriate to the engineering profession. Engage effectively in academic discussion and present arguments in a professional manner.

#### PT4

Select, apply and evaluate appropriate numerical and statistical methods for complex and open-ended engineering tasks.

#### PT5

Select and evaluate software applications for engineering tasks.

#### PT6

Recognise and evaluate factors which enhance group processes and team working and modify and evaluate own personal effectiveness within a team.

#### PT7

Select and use the relevant practical skills needed to operate equipment and measurement devices safely and effectively.

### Research, Knowledge & Cognitive Skills

#### RKC1

Demonstrate a comprehensive and detailed knowledge and understanding of the scientific principles underpinning civil engineering technologies, and their evolution.

#### RKC2

Demonstrate a comprehensive and detailed knowledge and understanding of the mathematics necessary to support the application of key engineering principles in civil engineering.

#### RKC3

Demonstrate knowledge of and the ability to selectively apply relevant equipment, tools, processes and products relevant to civil engineering.

#### RKC4

Demonstrate detailed knowledge of contexts in which engineering knowledge can be applied.

#### RKC5

Demonstrate the ability to apply a systems approach to civil engineering problems through knowledge of, and know-how of the application of, the relevant technologies.

#### RKC6

Demonstrate an ability to monitor, critically evaluate and apply the results of analysis and modelling to solve engineering problems, apply new technology, or implement new engineering processes in order to bring about continuous improvement to engineering designs or processes relevant to civil engineering.

#### RKC7

Define the range and scope of civil engineering problems and identify constraints.

#### RKC8

Use creativity and intellectual flexibility to establish innovative solutions within a civil engineering context.

#### RKC9

Demonstrate an ability to use and apply technical literature and other information sources.

### Professional Skills

#### PS1

Design solutions according to customer and user needs and ensure fitness for purpose.

#### PS2

Demonstrate the ability to use the codes of practice and industry standards used in civil engineering and related disciplines.

#### PS3

Demonstrate an awareness of quality issues and their application to continuous improvement.

#### PS4

Effectively adapt designs to meet new purposes or applications and identify and manage the cost drivers that influence the process.

#### PS5

Demonstrate and critical understanding of the principles of managing engineering processes.

#### PS6

Act autonomously with limited supervision or direction within agreed guidelines.

1- Program  
Summary

2- Program  
Advantages &  
Careers

## *Interior Architecture & Design*

BA (Hons)

***School of Construction & Built  
Environments***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan



# Interior Architecture & Design

## Const. & Built – Major Summary

- It is critical that these structures, and hence the surroundings they create, as well as the communities and cities they are a part of, be built to be the greatest possible buildings for their unique location, usage, and customers.
- Architecture is the art and science of designing buildings and other physical structures. A broader definition frequently involves the design of the entire building sector, from the macro scale of city planning, urban design, and landscape design to the micro-scale of building components and, on occasion, furniture.
- The term "architecture" is often used to refer to the practice of producing architectural services.



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**Architecture is everywhere.  
Every structure, including a  
house, a campus, an office,  
a hospital, and a shop, was  
built with a specific purpose  
in mind.**

# Interior Architecture & Design

## Const. & Built – Advantages / Careers

- The field of architecture in general and Interior Design (specifically) is dynamic since technology and processes are always developing.
- Architects and Interior Designers must continuously train themselves in today's competitive environment in this industry, which is both challenging and fascinating.

Here is a list that demonstrates what kind of jobs a graduate in Architecture can work in:

- Interior Designer
- Architectural technologist
- Interior Architect & Spatial designer.
- Building surveyor.
- Town planner / Consultant
- Production designer.
- Structural engineer.
- Engineering Supervisor & Manager



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**Architecture is the art of designing and developing structures. It is a form of art, and there are multiple reasons why one would choose to study Interior Architecture & Design**

# Interior Architecture & Design

## Construction & Built Environments – Program Aims & Objectives

The To provide students with the skills, knowledge and tools to thrive in complex and uncertain futures and achieve sustainable success within the global workplace.

1. Educate students to become confident, critical, creative, articulate, aspiring and articulate within their specific field of **Interior Architecture and Design**
2. Encourage the development of independent thinking and judgement and apply them to critical, creative, and professional practices
3. Enable students to acquire and develop transferable skills in order to create or respond to career opportunities or to undertake further study. This is supported through on-line professional progress via e-learning. Deliver structured and supported opportunities to enable our students to reflect on their own learning, performance, and achievements and to plan for their personal, educational and career development
4. Deliver learning experiences for our students that foster a highly developed social awareness, an ethical understanding of the relationship between action and consequence, and a sophisticated sense of the creative and innovative design industry within local, regional, national and global contexts.
5. Encourage the development of independent thinking and judgement and apply them to critical, creative, and professional practices
6. Engage in work related experiences and industry placements promoting employability and career readiness for working in design and the related businesses within the industry
7. Focuses on experimental and creative approaches for the development of contemporary and original design solutions.
8. Enable students to develop a creative and critical approach within a design-led environment
9. Enable students to acquire and develop knowledge and expertise in the application of specialist skills, materials, techniques, processes and technologies relating to the Interior Architecture and Design industry.
10. Prepare students with the knowledge and understanding to establish themselves within a local, regional, national and international profile within their chosen specialist field of Interior Architecture and Design
11. Enable students to evaluate Interior Architecture and Design and its constituent aspects of research, design, development, innovation, production within cultural and professional contexts to inform their practice and develop their critical abilities

# *Interior Architecture & Design*

## **Construction & Built Environments – Program Learning Outcomes (PLOs)**

### **Personal and Transferable Skills**

#### **PT1**

Work autonomously, plan project schemes and self-manage time, set targets, manage workloads and achieve deadlines.

#### **PT2**

Apply personal strengths to employment opportunities within design practice and confidently manage individual professional development.

#### **PT3**

Demonstrate effective and professional communication strategies through drawing and CAD, critique and written forms to a variety of audiences.

#### **PT4**

Reflect upon own learning and factors which enhance group processes, practice working and evaluate personal effectiveness within the design team.

### **Research, Knowledge & Cognitive Skills**

#### **RKC1**

Analyse, contextualise and critically evaluate an extensive range of research material around local, national and international design contexts.

#### **RKC2**

Generate ideas, project briefs, experimental concepts, design proposals and solutions independently or collaboratively.

#### **RKC3**

Construct balanced, logical and supported arguments in response to information, experience, reflection and iterative design processes.

#### **RKC4**

Demonstrate an openness to complex thinking, intellectual flexibility, creativity, visualisation and critical enquiry.

#### **RKC5**

Apply comprehensive structural, technological, and regulatory knowledge in the field of interior and architectural and applications.

### **Professional Skills**

#### **PS1**

Exploit advanced skills in communication; to employ a range of visual language to research, appraise, interpret, develop and articulate design ideas.

#### **PS2**

Respond to and incorporate ethical, global, sustainable and regulatory debates within professional architectural practice.

#### **PS3**

Utilise a range of professional materials, media, techniques and technology associated with specialised architectural industries.

#### **PS4**

Curate a professional portfolio including self-promotion and marketing opportunities appropriate to interior architectural practice, enterprise and entrepreneurship.

1- Program  
Summary

2- Program  
Advantages &  
Careers

## *Construction Management*

BSc (Hons)

***School of Construction & Built  
Environments***

3- Program Aims  
& Objectives

4- Program  
Learning  
Outcomes  
(PLOs)

5- Program  
Structure & Plan

# Construction Management

## Const. & Built – Major Summary

- Construction Management is the **management of process** that results in the roads, bridges, buildings and industrial facilities upon which we all depend.
- The built environment involves marshaling the resources required — labor, materials, equipment, time and money — and then translating the work of architects and engineers into tangible structures.



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**Construction Managers deal with every facet of a construction project including labor relations, cost evaluation, materials handling, city planning, and many more.**

# Construction Management

## Const. & Built – Advantages / Careers

Construction management is the process of overseeing a building project. In this field, professionals can work in a variety of roles related to different stages of construction including:

- **Field engineer**
- **Construction superintendent**
- **Sustainability consultant**
- **Construction project manager**
- **Site Engineer**
- **General Contractor**
- **Construction Project Director**



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**Construction management is the process of overseeing and managing ANY construction project. Hence, always on demand !**

# ***Construction Management***

## ***Construction & Built Environments – Program Aims & Objectives***

The overall aims of the course is to provide students with the skills and understanding of the principles, practices, and ethics in the construction industry within the context at national and global level as expected from a bachelor's degree graduate. This will be achieved by

1. Equipping students with the knowledge, understanding and skills to take on a leadership role in the global construction industry.
2. Providing students with the necessary knowledge in risk management, health and safety, legislation and management in order to integrate effectively in construction project teams.
3. Developing students' skills that will support their career and ongoing professional development.
4. Preparing students for graduate employment, postgraduate study and lifelong learning.



# Construction Management

## Construction & Built Environments – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

#### PT1

Plan, manage and evaluate the application of new knowledge and skills associated with construction management, and recognise how this relates to personal and professional development and as part of a lifelong learning strategy.

#### PT2

Communicate clearly, fluently and effectively in a publishable/ professional standard, using a range of methods to specialist and non-specialist audiences relevant to the construction industry.

#### PT3

Recognise and evaluate factors which enhance group processes and team working and modify and evaluate own personal effectiveness within a team.

#### PT4

Select and evaluate software applications relevant to construction and construction management activities

### Research, Knowledge & Cognitive Skills

#### RKC1

Work with and articulate abstract ideas to critically analyse, synthesise and summarise information from a variety of sources within the construction management discipline and sub-disciplines

#### RKC2

Apply knowledge and understanding to address multidisciplinary problems within a local and global context in construction management

#### RKC3

Demonstrate creativity and innovation

#### RKC4

Critically use appropriate theoretical research models to seek new information in construction management.

#### RKC5

Explore data and identify patterns and relationships, collect and synthesise ideas to make well-considered decisions in complex and unpredictable contexts

#### RKC6

Analyse new, novel and/or abstract data in construction, comparing alternative methods and techniques.

#### RKC7

Judge the reliability and significance of evidence used to support conclusions associated with a field of study and articulate explanations for contradictory data/results.

### Professional Skills

#### PS1

Act with minimal supervision in complex and unpredictable contexts within agreed guidelines.

#### PS2

Evaluate performance using a range of techniques and processes including self-reflection.

#### PS3

Incorporate personal responsibility and professional codes of conduct into their academic and professional practice.

#### PS4

Demonstrate an understanding of the need for a high level of professional, commercial, legal and ethical conduct.

# *School of Construction & Built Environments*

Study Plan

# School of Construction & Built Environments (CBE)

## Year 1 - UK LEVEL 3 – For all Pathways

### 3 Mandatory core Units + 3 Optional Units + General Education Subjects

#### 3 x Mandatory Core Units/Subjects

1. Unit 1: [CBE101](#) - Construction Technology (60 GLH)
2. Unit 2: [CBE102](#) - Construction Design (60 GLH)
3. Unit 3: [CBE 103](#) - Construction Science (60 GLH)

#### 3 x Optional Units/Subjects

***Students can choose any 3 Units/subjects from the optional list below:***

1. Unit 7: [CBE107](#) - Graphical Detailing (60 GLH)
2. Unit 8: [CBE108](#) - Sustainability in Construction (60 GLH)
3. Unit 9: [CBE109](#) - Building Information Modelling and Artificial Intelligence (60 GLH)
4. Unit 11: [CBE111](#) - Management of a Construction Project (60 GLH)
5. Unit 12: [CBE112](#) - Building Surveying in Construction (60 GLH)
6. Unit 13: [CBE113](#) - Site Engineering for Construction (60 GLH)
7. Unit 14: [CBE114](#) - Low Temperature Hot Water Systems in Building Services (60 GLH)
8. Unit 15: [CBE115](#) - Measurement Techniques in Construction (60 GLH)
9. Unit 16: [CBE116](#) - Provision of Primary Services in Buildings (60 GLH)
10. Unit 18: [CBE118](#) - Work Experience (60 GLH)
11. Unit 19: [CBE119](#) - Projects in Construction (60 GLH)
12. Unit 20: [CBE120](#) - Quantity Surveying (60 GLH)
13. Unit 22: [CBE122](#) - Economics and Finance in Construction (60 GLH)



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# School of Construction & Built Environments (CBE)

## YEAR 2 – UK LEVEL 4

### 4 Mandatory core Units + 4 (Mandatory specialist Units + Optional Units) + General Education Subjects

#### Subjects 4 x Mandatory Core Units - For all pathways/majors

1. Unit 1: [CBE201](#) - Individual Project (15 UK Credits)
2. Unit 2: [CBE202](#) - Construction Technology (15 UK Credits)
3. Unit 3: [CBE203](#) - Science & Materials (15 UK Credits)
4. Unit 4: [CBE204](#) - Construction Practice & Management (15 UK Credits)

**4 x (Mandatory specialist Units + Optional Units) divided according to Major/Pathway as follows:**

#### Civil Engineering: 3 x Mandatory Specialist Units

1. Unit 6: [CBE206](#) - Construction Information (Drawing, Detailing, Specification) (15 UK Credits)
2. Unit 8: [CBE208](#) - Mathematics for Construction (15 UK Credits)
3. Unit 20: [CBE220](#) - Principles of Structural Design (15 UK Credits)

**+ 1 x Optional Unit from the list of Optional Level 4 Subjects/Units**

#### Construction Management / Interior Architecture & Design : 2 x Mandatory Specialist Units

1. Unit 5: [CBE205](#) - Legal & Statutory Responsibilities in Construction (15 UK Credits)
2. Unit 6: [CBE206](#) - Construction Information (Drawing, Detailing, Specification) (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 4 Subjects/Units**



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## List of Optional Level 4 Subjects/Units

1. Unit 7: CBE207 - Surveying, Measuring & Setting-out (15 UK Credits)
2. Unit 13: [CBE213](#) - Tender & Procurement (15 UK Credits)
3. Unit 14: [CBE214](#) - Building Information Modelling (15 UK Credits)
4. Unit 15: [CBE215](#) - Principles of Refurbishment (15 UK Credits)
5. Unit 16: CBE216 - Principles of Alternative Energy (15 UK Credits)
6. Unit 17: CBE217 - Principles of Public Health Engineering (15 UK Credits)
7. Unit 18: CBE218 - Civil Engineering Technology (15 UK Credits)
8. Unit 19: CBE219 - Principles of Electrical Design & Installation (15 UK Credits)
9. Unit 21: [CBE221](#) - Site Supervision & Operations (15 UK Credits)



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# School of Construction & Built Environments (CBE)

## YEAR 3 – UK LEVEL 5

### 1 Mandatory core Units + 3 Mandatory specialist Units + 3 Optional Units + General Education Subjects

#### 1x Mandatory Core Units - For all pathways/majors

1. Unit 22: [CBE322](#) – Group Project (30 UK Credits)

#### 3 x Mandatory Specialist Units – According to the selected pathways/Majors

##### **Civil Engineering:**

1. Unit 28: [CBE328](#) - Further Mathematics for Construction (15 UK Credits)
2. Unit 29: [CBE329](#) - Geotechnics & Soil Mechanics (15 UK Credits)
3. Unit 30: [CBE330](#) - Advanced Structural Design (15 UK Credits)

##### **Construction Management:**

1. Unit 23: [CBE323](#) – Contracts & Management (15 UK Credits)
2. Unit 24: [CBE324](#) – Project Management (15 UK Credits)
3. Unit 25: [CBE325](#) – Management for Complex Buildings Projects (15 UK Credits)

##### **Interior Architecture & Design / Construction – Architectural Technology:**

1. Unit 23: [CBE323](#) – Contracts & Management (15 UK Credits)
2. Unit 26: [CBE326](#) – Advanced Construction Drawing & Detailing (15 UK Credits)
3. Unit 27: [CBE327](#) – Construction Technology for Complex Buildings Projects (15 UK Credits)

#### 3 x Optional Units

##### **Students can choose THREE Units/subjects from the optional list below:**

1. Unit 35: [CBE335](#) - Alternative Methods of Construction (15 UK Credits)
2. Unit 36: [CBE336](#) - Advanced Building Information Modelling (15 UK Credits)



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3. Unit 37: [CBE337](#) - Environmental Assessment & Monitoring (15 UK Credits)
4. Unit 38: [CBE338](#) - Personal Professional Development (15 UK Credits)
5. Unit 39: CBE339 - Transport Systems for Buildings (15 UK Credits)
6. Unit 40: CBE340 - Alternative Energy Systems Design & Installation (15 UK Credits)
7. Unit 42: [CBE342](#) - Highway Engineering (15 UK Credits)
8. Unit 43: [CBE343](#) - Hydraulics (15 UK Credits)
9. Unit 44: CBE344 - Advanced Surveying & Measurement (15 UK Credits)
10. Unit 45: CBE345 - Maintenance & Operations (15 UK Credits)
11. Unit 46: CBE346 - Advanced Materials (15 UK Credits)
12. Unit 47: [CBE347](#) - Construction Data Management (15 UK Credits)



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# School of Construction & Built Environments (CBE)

## YEAR 4 – UK LEVEL 6 (Top-Up)

### 5 Mandatory core Units + General Education Subjects

#### 5 x Mandatory Specialist Units/Subjects – Depending on the selected Pathway/Major<sup>1</sup>.

#### **Civil Engineering:**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 2: [CBE402/ ENG402 / MMD3058-N](#) Project (40 UK Credits)
3. Unit 3: [CBE403 / MMD3045-N](#) Design of Concrete Structures (20 UK Credits)
4. Unit 4: [CBE404 / MMD3046-N](#) Hydrology & Hydraulic Systems (20 UK Credits)
5. Unit 5 : [CBE405 / MMD3043-N](#) Construction Management & Contracts (20 UK Credits)

#### **Interior Architecture & Design**

1. Unit 6: [CBE406 /MMA3023-N](#) Building rehabilitation (20 UK Credits)
2. Unit 7: [CBE407 /MMA3014-N](#) Writing architecture (20 UK Credits)
3. Unit 8: [CBE408 /MMA3016-N](#) CAD: Visualization and BIM (20 UK Credits)
4. Unit 9 : [CBE409 /MMA3015-N](#) Major Project: Realization (20 UK Credits)
5. Unit 10: [CBE410 /MMA3013-N](#) Major Project: Research and Development (40 UK Credits)

#### **Construction Management**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 5 : [CBE405 / MMD3043-N](#) Construction Management & Contracts (20 UK Credits)
3. Unit 11: [CBE411 / ENG3022-N](#) Digital Information Management in Construction (20 UK Credits)
4. Unit 12: [CBE412 / ENG3023-N](#) Supply Chain Management in Construction (20 UK Credits)
5. Unit 15 : [CBE415 / ENG3024-N](#) Construction Project (40 UK Credits)



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# *School of Business*

BA (Hons) –  
Business  
Management

BA (Hons) –  
Accounting &  
Finance

School of Business

BA (Hons) –  
HR  
Management

BA (Hons) –  
Marketing

# Business

## **School of Business – School Summary**

- The **School of Business** at the BACU offers innovative specialty programs in the significant areas of: Accounting & Finance, Business Management, Human Resource Management and Marketing.
- We have built on our faculty member's long experience to provide up to date applied education with different delivery models that is of national importance.
- We provide students a rich immersion in academic study, personal growth, skills expertise and work flexibility. We train students to become the next business managers who can adapt to constantly changing demands and scenarios.

We currently offer two major types of degrees: a 2 year higher diploma degree, HND (with UK Pearson BTEC) and a 4-year Bachelors Program, BA (Hons) (Level 6-Top-Up with Teeside University, UK).

# Business

## School of Business – Degrees Summary

The Pearson BTEC Higher National qualifications in Business are designed to reflect the increasing need for high quality professional and technical education at levels 3, 4 and 5. They provide students with a clear line of sight to employment and to a degree at level 6 if they choose.

On the other hand, the Bachelors (**BA (Hons)**) degree course is designed to give students **in-depth skills & knowledge** to build a successful career in BUSINESS. With unparalleled flexibility, the course allows students to forge their own pathway after a founder year 1 with a clear line of sight to employment and to a Masters degree (MBA) if they choose.

The **general aims** of all undergraduate degrees (HNDs & Bachelors) in **Business** are:

- to develop students the business skills, knowledge and understanding they need to achieve high performance in the international business environment
- to develop students with enquiring minds, who have the abilities and confidence to work across different business functions and to lead, manage, respond to change, and tackle a range of complex business situations
- to provide the core skills required for a range of careers in business, including management, human resources, marketing, entrepreneurship, accounting and finance
- to offer a balance between employability skills and the knowledge essential for students with entrepreneurial, employment or academic ambitions
- to develop students' understanding of the major impact that new digital technologies have on the business environment
- to provide insight into international business operations and the opportunities and challenges presented by a global marketplace
- to equip students with knowledge and understanding of culturally diverse organisations, cross-cultural issues, diversity and values, and to allow flexible study to meet local and specialist needs.

The **UK Pearson Higher National Diploma (HND)** is a Level 4 and Level 5 qualification made up of 240 credits. It is usually studied full time over **two years**, or part time over four years. The Total qualification time = 2,400 hours and the Total guided learning hours = 960 hours.

The purpose of the BACU programs in Business is to develop students as independent-thinking professionals who can meet the demands of business employers and adapt to a constantly changing world.

# Business Management

School of Business

# *Business Management*

## **School of Business – Program Summary**

This program provides a good head start for candidates who wish to develop managerial skills. The program takes students through the core areas of management including Marketing, Sales, Strategy management, etc., along with the key areas such as finance and economics.

Business management is **the coordination and organization of business activities**. Business managers oversee operations and help employees reach their top productivity levels. A business manager may also supervise or train new employees, help a business reach its operational and financial objectives.

As Business graduates are designed to fit into a variety of roles in an organization, they have plenty of job opportunities available in the market.

# Business Management

## School of Business – Program Advantages/Careers

A Degree in Business Management is one of the best known and most sought-after undergraduate programs for those seeking to advance their careers in management. Below listed are some of the many **advantages** of a Business program:

- The program provides a good head start for candidates who wish to develop managerial skills. The program takes students through the core areas of management including Marketing, Sales, Strategy management, etc., along with the key areas such as finance and economics.
- The program is very well adapted to train students as per industry requirements. It provides an excellent combination of practical and theoretical knowledge.
- As Business graduates are designed to fit into a variety of roles in an organization, they have plenty of job opportunities available in the market.
- In addition to this, the program is also well suited for students who aspire to be entrepreneurs or manage their family business.
- One of the main advantages of a degree in Business is that it allows students to have an early start to their careers. Business graduates tend to find a job much quicker and at a higher salary than graduates from other streams.

### Careers in:

- Financial management
- Marketing
- Digital Marketing
- Human Resources
- Accounting
- Logistics
- Procurement
- Business Administration
- Management consulting
- Training and development

# *Business Management*

## **School of Business – Program Aims & Objectives**

1. Develop an enthusiasm and the abilities required for independent learning in the context of business and management;
2. Develop the knowledge and skills necessary to operate effectively in business situations;
3. Provide opportunities for study which encourage the acquisition of theoretical knowledge, intellectual development and the application of knowledge to the professional world of business;
4. Develop an understanding of the nature and operations of business and its external and internal environment, reflecting on local, national and international conditions for success;
5. Develop an awareness of the impact of information and communication technology on business decision making;
6. Stimulate an enquiring, analytical, practical and creative approach to the study and practice of business;
7. Lay a foundation for lifelong learning, enquiry and personal and professional development;
8. Develop an understanding of the importance of enterprise and the skills associated with entrepreneurship;
9. Develop knowledge and skills complementary to the core areas of business;
10. Provide opportunities for the application and critical reflection of knowledge and skills.

In addition it should be recognised that the purpose of the programme is to:

- Increase understanding of organisations, their management, the economy and the business environment;
- Prepare for and develop a career in business and management;
- Enhance a wide range of skills and attributes which equip graduates to become effective global citizens.

In summary the overall aim of the programme is to produce graduates who possess: a comprehensive knowledge and understanding of business and management; a range of practical, professional and key transferable skills required for graduate employability and life-long learning and; a range of experiences enabling them to demonstrate application of this knowledge within a business environment.

# Business Management

## School of Business – Program Learning Outcomes (PLOs)

### Personal and Transferable Skills

**PT1:** Think independently, take action and evaluate outcomes.

**PT2:** Be reflective: plan, manage and evaluate own learning.

**PT3:** Demonstrate interpersonal skills to generate networking opportunities in a range of business situations.

**PT4:** Generate, develop and communicate ideas, gain support, and deliver successful outcomes in a range of business related situations.

**PT5:** Work collaboratively internally and externally seeking out opportunities to lead and support others.

**PT6:** Build and maintain relationships, recognising difference and diversity.

**PT7:** Negotiate with others to manage and resolve conflict.

**PT8:** Demonstrate intellectual coherence, adaptability and openness with digital technology in business.

### Research, Knowledge & Cognitive Skills

**RKC1:** Demonstrate a comprehensive and detailed understanding of the dynamic and changing nature of the business environment at a strategic, local, national and international level.

**RKC2:** Demonstrate a comprehensive and detailed understanding of organisations: their nature, structure, governance and internal processes.

**RKC3:** Demonstrate a comprehensive and detailed knowledge of leadership and management and the associated individual and organisational behaviours that exist within and between organisations.

**RKC4:** Demonstrate a comprehensive and detailed knowledge of established business theories and models and the application of these within different organisational contexts.

**RKC5:** Synthesise and critically appraise the multidisciplinary nature of business and the interrelationships between these complex disciplines.

**RKC6:** Synthesise, recognise and apply the key drivers for business success and operate ethically in complex and unpredictable contexts.

**RKC7:** Plan, undertake and evaluate a negotiated, self managed major project in a business related discipline.

**RKC8:** Effectively use numerical and quantitative skills to manipulate data, evaluate and model business problems.

### Professional Skills

**PS3L** Critically evaluate facts, knowledge and circumstances to determine the causes of problems and identify appropriate solutions within a range of business contexts.

**PS2:** Synthesise, appraise and evaluate a range of data and identify appropriate methodologies to make independent judgements.

**PS1:** Critically evaluate own leadership and management skills and apply these to manage situations and people through effective communications, team work and motivation.

**PS4:** Work autonomously, accept responsibility, be flexible and assertive.



# Accounting and Finance

School of Business

# *Accounting & Finance*

## ***School of Business – Program Summary***

Accounting & Finance involves looking at money, business and management. Accounting relates to information analysis for different aspects of a company, while finance solely concerns an organisations' monetary funds.

Accounting can be broken into three categories of public accounting, tax accounting, and auditing. And finance can be divided into two categories of traditional finance and financial planning.

# *Accounting & Finance*

## ***School of Business – Program Advantages/Careers***

The program is very well adapted to train students as per industry requirements. Accountants and financial manager are always on demand.

Jobs for Accounting & Finance graduates can often be found in big, multinational professional services firms, banks or insurance companies.

### **Careers in:**

- **Actuary**
- **Auditor**
- **Chartered accountant**
- **Compliance manager**
- **Credit controller**
- **Finance manager**
- **Forensic accountant**
- **Investment banker/ Retail banker**
- **Stockbroker**
- **Tax adviser**

# *Accounting & Finance*

## **School of Business – Program Aims & Objectives**

1. Develop an enthusiasm and the abilities required for independent learning in the context of business and management;
2. Develop the knowledge and skills necessary to operate effectively in business situations;
3. Provide opportunities for study which encourage the acquisition of theoretical knowledge, intellectual development and the application of knowledge to the professional world of business;
4. Develop an understanding of the nature and operations of business and its external and internal environment, reflecting on local, national and international conditions for success;
5. Develop an awareness of the impact of information and communication technology on business decision making;
6. Stimulate an enquiring, analytical, practical and creative approach to the study and practice of business;
7. Lay a foundation for lifelong learning, enquiry and personal and professional development;
8. Develop an understanding of the importance of enterprise and the skills associated with entrepreneurship;
9. Develop knowledge and skills complementary to the core areas of business;
10. Provide opportunities for the application and critical reflection of knowledge and skills.

# Human Resource Management

School of Business

# *HR Management*

## *School of Business – Program Summary*

Human resource management (HRM) is the practice of recruiting, hiring, deploying and managing an organization's employees. A company or organization's HR department is usually responsible for creating, putting into effect and overseeing policies governing workers and the relationship of the organization with its employees.

The role of HRM practices are to manage the people within a workplace to achieve the organization's mission and reinforce the culture. When done effectively, HR managers can help recruit new professionals who have skills necessary to further the company's goals as well as aid with the training and development of current employees to meet objectives.

# HR Management

## **School of Business – Program Advantages/Careers**

A company is only as good as its employees, making HRM a crucial part of maintaining or improving the health of the business.

You will have the opportunity to build and maintain a positive employee experience with high satisfaction and quality of life, so that employees can contribute their best efforts to their work.

- HR business partner
- HR manager
- Recruiting manager
- Immigration specialist
- Compensation specialist/manager
- Benefits specialist/manager
- Talent management specialist/manager
- Learning and development manager
- HR technology/process program manager
- HR analytics specialist/manager

# *HR Management*

## **School of Business – Program Aims & Objectives**

1. Develop an enthusiasm and the abilities required for independent learning in the context of business and management;
2. Develop the knowledge and skills necessary to operate effectively in business situations;
3. Provide opportunities for study which encourage the acquisition of theoretical knowledge, intellectual development and the application of knowledge to the professional world of business;
4. Develop an understanding of the nature and operations of business and its external and internal environment, reflecting on local, national and international conditions for success;
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7. Lay a foundation for lifelong learning, enquiry and personal and professional development;
8. Develop an understanding of the importance of enterprise and the skills associated with entrepreneurship;
9. Develop knowledge and skills complementary to the core areas of business;
10. Provide opportunities for the application and critical reflection of knowledge and skills.



# Marketing

School of Business

# *Marketing*

## **School of Business – Program Summary**

A marketing degree is an academic course of study on how to promote products and services to a target audience. Marketing majors learn how to find out what people want, understand the needs of different customer segments, communicate how a product or service fills those needs, and guide potential customers to take action.

Marketing degree coursework combines theory and practice, so that graduates can enter careers equipped to help companies increase their profitability and brand recognition.

By majoring in marketing and pursuing a career in this field, you can engage your creativity and strategic thinking, learn marketing foundations and principles, and explore new technologies and platforms, while taking on the ever-evolving business world in 2023 and beyond.

# Marketing

## **School of Business – Program Advantages/Careers**

Raising consumer awareness about a product or service is a complex process that leads to the creation of many marketing-related roles. Advances in technology and increasing competition between companies make a marketing degree a valuable asset.

With companies and organizations prioritizing their marketing efforts in a digital world, skilled marketing professionals are increasingly in demand.

- Marketing assistant
- Social media manager
- Event manager / Media planner
- Copywriter
- Marketing manager
- Public relations specialist
- Sales manager
- Marketing research analyst
- e-commerce Manager
- SEO manager
- Advertising director
- Brand manager

# Marketing

## **School of Business – Program Aims & Objectives**

1. Develop an enthusiasm and the abilities required for independent learning in the context of business and management;
2. Develop the knowledge and skills necessary to operate effectively in business situations;
3. Provide opportunities for study which encourage the acquisition of theoretical knowledge, intellectual development and the application of knowledge to the professional world of business;
4. Develop an understanding of the nature and operations of business and its external and internal environment, reflecting on local, national and international conditions for success;
5. Develop an awareness of the impact of information and communication technology on business decision making;
6. Stimulate an enquiring, analytical, practical and creative approach to the study and practice of business;
7. Lay a foundation for lifelong learning, enquiry and personal and professional development;
8. Develop an understanding of the importance of enterprise and the skills associated with entrepreneurship;
9. Develop knowledge and skills complementary to the core areas of business;
10. Provide opportunities for the application and critical reflection of knowledge and skills.

# ***School of Business***

Study Plan

# School of Business (BUS)

## YEAR 1 – UK LEVEL 3 – For all Pathways

### 2 Mandatory core Units + 3 Optional Units (180 GLH) + General Education Subjects

#### 2 x Mandatory Core Units

1. Unit 19: [BUS119](#) – Exploring Business (90 GLH)
2. Unit 20: [BUS120](#) – Research and Plan a Marketing Campaign (90 GLH)

#### 3 x Optional Units/Subjects

1. Unit 3: [BUS103](#) - Business Finance (90 GLH)
2. Unit 4: [BUS104](#) - Managing an Event (90 GLH)
3. Unit 5: [BUS105](#) - International Business (60 GLH)
4. Unit 6: [BUS106](#) - Principles of Management (60 GLH)
5. Unit 7: [BUS107](#) - Business Decision Making (120 GLH)
6. Unit 8: [BUS108](#) - Human Resources (60 GLH)
7. Unit 9: [BUS109](#) - Team Building in Business (60 GLH)
8. Unit 10: [BUS110](#) - Recording Financial Transactions (60 GLH)
9. Unit 11: [BUS111](#) - Financial Statements for Public Limited Companies (60 GLH)
10. Unit 12: [BUS112](#) - Financial Statements for Specific Businesses (60 GLH)
11. Unit 13: [BUS113](#) - Cost and Management Accounting (60 GLH)
12. Unit 14: [BUS114](#) - Investigating Customer Service (60 GLH)
13. Unit 15: [BUS115](#) - Investigating Retail Business (60 GLH)
14. Unit 16: [BUS116](#) - Visual Merchandising (60 GLH)
15. Unit 17: [BUS117](#) - Digital Marketing (60 GLH)
16. Unit 18: [BUS118](#) - Creative Promotion (60 GLH)
17. Unit 19: [BUS119](#) - Pitching for a New Business (60 GLH)
18. Unit 20: [BUS120](#) - Business Ethics (60 GLH)
19. Unit 21: [BUS121](#) - Training and Development (60 GLH)
20. Unit 22: [BUS122](#) - Market Research (60 GLH)
21. Unit 23: [BUS123](#) - Work Experience in Business (60 GLH)



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22. Unit 24: [BUS124](#) - Branding (60 GLH)
23. Unit 25: [BUS125](#) - Relationship Marketing (60 GLH)
24. Unit 26: [BUS126](#) - Procurement Processes in Business (60 GLH)
25. Unit 27: [BUS127](#) - International Logistics (60 GLH)
26. Unit 28: [BUS128](#) - Sales Techniques and Processes (60 GLH)
27. Unit 29: [BUS129](#) - Health and Safety in the Workplace (60 GLH)
28. Unit 30: [BUS130](#) - Career Planning (60 GLH)
29. Unit 31: [BUS131](#) - Effective Project Management (60 GLH)
30. Unit 32: [BUS132](#) - Business and Environmental Sustainability (60 GLH)

# School of Business (BUS)

## YEAR 2 – UK LEVEL 4

### 6 Mandatory core Units + 2 Optional Units + General Education Subjects

#### 6 x Mandatory Core Units

1. Unit 1: [BUS201](#) - Business and the Business Environment (15 UK Credits)
2. Unit 2: [BUS202](#) - Marketing Processes and Planning (15 UK Credits)
3. Unit 3: [BUS203](#) - Human Resource Management (15 UK Credits)
4. Unit 4: [BUS204](#) - Leadership and Management (15 UK Credits)
5. Unit 5: [BUS205](#) - Accounting Principles (15 UK Credits)
6. Unit 6: [BUS206](#) - Managing a Successful Business Project (15 UK Credits)

#### 2 x Optional Units

#### List of Optional Level 4 Subjects/Units

1. Unit 7: [BUS207](#) - Business Law (15 UK Credits)
2. Unit 8: [BUS208](#) - Innovation and Commercialisation (15 UK Credits)
3. Unit 9: [BUS209](#) - Entrepreneurial Ventures (15 UK Credits)
4. Unit 10: [BUS210](#) - Recording Financial Transactions (15 UK Credits)
5. Unit 11: [BUS211](#) - Business Data and Numerical Skills (15 UK Credits)
6. Unit 12: [BUS212](#) - Executive Recruitment Solutions (15 UK Credits)
7. Unit 13: [BUS213](#) - Human Capital Management (15 UK Credits)
8. Unit 14: [BUS214](#) - Digital Business in Practice (15 UK Credits)
9. Unit 15: [BUS215](#) - Operations Management (15 UK Credits)
10. Unit 16: [BUS216](#) - Managing the Customer Experience (15 UK Credits)
11. Unit 17: [BUS217](#) - Professional Identity and Practice (15 UK Credits)
12. Unit 18: [BUS218](#) - Work Experience (15 UK Credits)

### In year 3, students have to choose their pathways:

- Accounting & Finance
- Business Management
- Human Resource Management
- Marketing

Construction Management, Automation, Business Management, Accounting and Finance, Marketing, HR among others



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# School of Business (BUS)

## YEAR 3 – UK LEVEL 5

### **2 Mandatory core Units + 3 Mandatory specialist Units + 2 Optional Units + General Education Subjects**

#### **2x Mandatory Core Units /Subjects - For all pathways/majors**

1. Unit 19: [BUS319](#) – Research Project (30 UK Credits)
2. Unit 20: [BUS320](#) – Organizational Behavior (15 UK Credits)

#### **+ 3x Mandatory specialist Units – According to the selected Pathways/Majors**

#### **Accounting & Finance (3 x Mandatory Specialist Units)**

1. Unit 21: [BUS321](#) - Financial Reporting (15 UK Credits)
2. Unit 22: [BUS322](#) – Management Accounting (15 UK Credits)
3. Unit 23: [BUS323](#) – Financial Management (15 UK Credits)

#### **+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

#### **Business Management (General): (3 x Mandatory Specialist Units)**

1. Unit 24: [BUS324](#) - Understanding and Leading Change (15 UK Credits)
2. Unit 25: [BUS325](#) – Global Business Environment (15 UK Credits)
3. Unit 26: [BUS326](#) – Principles of Operations Management (15 UK Credits)

#### **+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**



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## **Entrepreneurship and Small Business Management: (3 x Mandatory Specialist Units)**

1. Unit 27: [BUS327](#) - Identifying Entrepreneurial Opportunities (15 UK Credits)
2. Unit 28: [BUS328](#) – Launching a New Venture (15 UK Credits)
3. Unit 29: [BUS329](#) – Managing and Running a Small Business (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

## **Human Resource Management: (3 x Mandatory Specialist Units)**

- Unit 30: [BUS330](#) - Resource and Talent Planning (15 UK Credits)  
Unit 31: [BUS331](#) – Employee Relations (15 UK Credits)  
Unit 32: [BUS332](#) – Strategic Human Resource Management (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

## **Marketing: (3 x Mandatory Specialist Units)**

- Unit 33: [BUS333](#) - Marketing Insights and Analytics (15 UK Credits)  
Unit 34: [BUS334](#) – Digital Marketing (15 UK Credits)  
Unit 35: [BUS335](#) – Integrated Marketing Communications (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

## **Level 5 Optional Units/Subjects**

1. Unit 41: [BUS341](#) – Taxation (15 UK Credits)
2. Unit 42: [BUS342](#) – Statistics for Management (15 UK Credits)
3. Unit 43: [BUS343](#) – Business Strategy (15 UK Credits)
4. Unit 44: [BUS344](#) – Business Information Technology Systems (15 UK Credits)
5. Unit 45: [BUS345](#) – Business Data Analytics and Insights (15 UK Credits)
6. Unit 46: [BUS346](#) – Developing Individuals, Teams and Organisations (15 UK Credits)
7. Unit 47: [BUS347](#) – Human Resources – Value and Contribution to Organisational Success (15 UK Credits)



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8. Unit 48: [BUS348](#) – Customer Value Management (15 UK Credits)
9. Unit 49: [BUS349](#) – Sales Management (15 UK Credits)
10. Unit 50: [BUS350](#) – International Marketing (15 UK Credits)
11. Unit 51: [BUS351](#) – Brand Management (15 UK Credits)
12. Unit 52: [BUS352](#) – Product Service and Development (15 UK Credits)
13. Unit 53: [BUS353](#) – Planning for Growth (15 UK Credits)
14. Unit 54: [BUS354](#) – E-Commerce and Strategy (15 UK Credits)
15. Unit 55: [BUS355](#) – Planning Social Media Campaigns (15 UK Credits)
16. Unit 56: [BUS356](#) – Tapping into New and International Markets (15 UK Credits)
17. Unit 57: [BUS357](#) – Business Intelligence (15 UK Credits)

# School of Business (BUS)

## YEAR 4 – UK LEVEL 6 (Top-Up)

### 3 Mandatory Specialist Units + 2 Optional Units + General Education Subjects

#### Accounting & Finance

##### 3 x Mandatory Specialist Units

1. Unit 1: [BUS 401/ACC3023-N](#) Advanced Financial Accounting and Reporting (20 UK Credits)
2. Unit 2: [BUS 402/ACC3026-N](#) Audit and Assurance (20 UK Credits)
3. Unit 3: [BUS 403/ACC3025-N](#) Global Enterprise and Strategy (20 UK Credits)

##### + 2 x Optional Units

1. Unit 4: [BUS 404/ ACC3027-N](#) Consultancy Project (20 UK Credits)
2. Unit 5: [BUS 405/ BIN3023-N](#) Undergraduate Business Project (20 UK Credits)

#### Business Management (General)

##### 3 x Mandatory Specialist Units

1. Unit 6: [BUS 406/BIN3038-N](#) Contemporary Issues in Business Management (20 UK Credits)
2. Unit 7: [BUS 407/BIN3050-N](#) Sustainability, Strategy & Society (20 UK Credits)
3. Unit 8: [BUS 408/BIN3039-N](#) Dissertation (40 UK Credits)

+ any 2 x Optional Units from the list of Optional Level 5 Subjects/Units

#### Human Resource Management

##### 5 x Mandatory Specialist Units

1. Unit 6: [BUS 406/BIN3038-N](#) Contemporary Issues in Business Management (20 UK Credits)
2. Unit 8: [BUS 408/BIN3039-N](#) Dissertation (40 UK Credits)
3. Unit 10: [BUS 410/ BIN3050-N](#) Sustainability, Strategy & Society (20 UK Credits)
4. Unit 11: [BUS 411/CSE3005-N](#) Concepts and Principles of International Management (20 UK Credits)
5. Unit 12: [BUS 412/HRM3046-N](#) Current Issues in Business Ethics & CSR (20 UK Credits)

#### Marketing (Business with Marketing)

##### 5 x Mandatory Specialist Units

1. Unit 6: [BUS 406/BIN3038-N](#) Contemporary Issues in Business Management (20 UK Credits)
2. Unit 7: [BUS 407/BIN3050-N](#) Sustainability, Strategy & Society (20 UK Credits)
3. Unit 8: [BUS 408/BIN3039-N](#) Dissertation (40 UK Credits)
4. Unit 9: [BUS 409/ MAR3017-N](#) Marketing Planning Application (20 UK Credits)
5. Unit 10: [BUS 410/ MAR3020-N](#) Sales Management (20 UK Credits)



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# Subject Catalog

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# School of Computing (CMP)

## YEAR 1 – UK LEVEL 3 – For all Pathways in Computing

### ➤ 2 Mandatory core Units + 3 Optional Units + General Education Subjects

#### 2 x Mandatory Core Units/Subjects

1. Unit 1: [CMP101](#) Information Technology Systems – Strategy, Management and Infrastructure (120 GLH)
2. Unit 6: [CMP106](#) Website Development (60 GLH)

#### 3 x Optional Units/Subjects

**Students can choose any 3 Units/subjects from the optional list below:**

1. Unit 2: [CMP102](#) Creating Systems to Manage Inforion (90 GLH)
2. Unit 3: [CMP103](#) Using Social Media in Business (90 GLH)
3. Unit 4: [CMP104](#) Programing (90 GLH)
4. Unit 5: [CMP105](#) Data Modelling (60 GLH)
5. Unit 7: [CMP107](#) Mobile Apps Development (60 GLH)
6. Unit 8: [CMP108](#) Computer Games Development (60 GLH)
7. Unit 9: [CMP109](#) IT Project Management (60 GLH)
8. Unit 10: [CMP110](#) Big Data and Business Analytics (60 GLH)
9. Unit 12: [CMP112](#) IT Technical Support and Management (60 GLH)
10. Unit 13: [CMP113](#) Software Testing (60 GLH)
11. Unit 14: [CMP114](#) Customising and Integrating Applications (60 GLH)
12. Unit 15: [CMP115](#) Cloud Storage and Collaboration Tools 60 Optional Internal (60 GLH)
13. Unit 16: [CMP116](#) Digital 2D and 3D Graphics (60 GLH)
14. Unit 17: [CMP117](#) Digital Animation and Effects (60 GLH)
15. Unit 18: [CMP118](#) The Internet of Things (60 GLH)
16. Unit 19: [CMP119](#) Enterprise in IT (60 GLH)
17. Unit 20: [CMP120](#) Business Process Modelling Tools (60 GLH)
18. Unit 21: [CMP121](#) Introduction to Artificial Intelligence (AI) (60 GLH)
19. Unit 22: [CMP122](#) Introduction to Robotics and Automation (60 GLH)
20. Unit 23: [CMP123](#) Emerging Trends and Technologies (60 GLH)
21. Unit 24: [CMP124](#) Technical Fundamentals for Computing Professionals (60 GLH)
22. Unit 25: [CMP125](#) Full Stack Development (60 GLH)



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# Unit 1: Information Technology Systems – Strategy, Management and Infrastructure

## Unit in brief

Learners study the role of computer systems and the implications of their use in personal and professional situations.

## Unit introduction

Information technology (IT) systems play a significant role in the world around us.

They play a key part in almost everything we do. They give individuals and organisations opportunities to access goods, information and services from around the world to an extent not possible before. Having a sound understanding of how to select and use appropriate IT systems will benefit you personally and professionally.

You will explore the relationships between the hardware and software that form an IT system. You will look at the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the

use of IT systems and the impact that they have on organisations and their stakeholders.

You will explore how IT systems enable organisations to access data, information and users locally and globally.

This unit will give you a fundamental understanding of all areas of IT, supporting your progression to an IT-related higher education course.

To complete the set assignment in this unit, you will need to draw on, and apply, your learning from across key content areas.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

- A Explore how IT infrastructure meets the needs of organisations and their stakeholders
- B Understand how organisations make use of data and information
- C Develop policies for the use of IT within an organisation.

CMP 101

120 GLH  
20 UK Credits

Level 3

School of  
Computing

# Unit 2: Creating Systems to Manage Information

## Unit in brief

Learners study the design, creation, testing and evaluation of a relational database system to manage information.

## Unit introduction

Relational databases are widely used to manage and process data to support, for example business processes and our social lives. From the smallest in-house systems to stock control systems for large multinational online retailers, databases are repositories of information that are a significant part of organisational operating requirements.

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

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

## Learning aims

In this unit you will:

- A Understand the purpose and structure of relational database management systems
- B Design a relational database to meet client requirements
- C Develop a relational database to meet client requirements.

CMP 102

90 GLH  
15 UK Credits

Level 3

School of  
Computing

# Unit 3: Using Social Media in Business

## Unit in brief

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.

## Unit introduction

Social media websites are a popular way for people to communicate and share information internationally and with friends and family. Around the world people spend a lot of time on social media websites and they give businesses opportunities to interact with people, for example to promote their business internationally, to encourage people to visit their e-commerce site and buy, and to provide customer service. You may be familiar with social media for personal use and in this unit you will discover how it can be used in a business context.

You will explore different social media websites, the ways in which they can be used and the potential pitfalls when using them for business purposes. You will develop a plan to use social media strategies for business purposes to achieve specific aims and objectives. You will then implement the plan, developing and posting content and interacting with others. Finally, you will collect data on the business use of social media and review the effectiveness of your 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 you a starting point for progression to roles such as social media specialist, content developer and web developer.

## Learning aims

In this unit you will:

- A Explore the impact of social media on the ways in which businesses promote their products and services
- B Develop a plan to use social media in a business to meet requirements
- C Implement the use of social media in a business.

CMP 103

90 GLH  
15 UK Credits

Level 3

School of  
Computing

# Unit 4: Programming

## Unit in brief

Learners study the underpinning concepts and implications of programming languages to design, develop and test computer programs.

## Unit introduction

Organisations and individuals increasingly depend on the functions and services offered by computing devices such as smartphones, tablets, laptops and personal desktop computers. You make use of computing programs when using an operating system or application programs such as word processing and spreadsheets. Understanding the concepts of high-quality software application design and development is key to ensuring that products are effective. As a programmer, you will need to understand the characteristics of different programming languages in order to select and apply appropriate methodologies to meet a client's needs.

Many organisations and businesses rely on computer programs to help deliver products and services. Organisations and businesses (often known as 'clients') work closely with programmers to help design and build computer programs that fulfil their requirements. To complete the assessment task within this unit, you will need to draw on your learning from across your programme of study and apply programming skills to provide a solution for a new IT-related problem.

You will learn about computational thinking skills and the principles of designing and developing computer programs. You will apply computational thinking skills to design, develop, test, refine and review computer programs for a given range of purposes. By developing your analytical, problem-solving and programming skills, this unit will help you to progress to higher education or to employment as a software developer.

## Learning aims

In this unit you will:

- A Examine the computational thinking skills and principles of computer programming
- B Design a software solution to meet client requirements
- C Develop a software solution to meet client requirements.

CMPS 104

90 GLH  
15 UK Credits

Level 3

School of  
Computing



# Unit 5: Data Modelling

## Unit in brief

Learners study how data modelling can be used to solve problems. They will design and implement a data model to meet client requirements.

## Unit introduction

In all aspects of life, individuals are constantly faced with situations where they must weigh up the available information in order to produce alternatives and make decisions.

In a working environment, effective decision making can ensure the successful development of organisations. Poor decision making can have significant negative consequences and can even lead to the demise of an organisation.

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

You will develop the skills and techniques necessary to create complex spreadsheets in order to produce accurate information that informs decision making. You will examine a scenario and then design, develop and test a spreadsheet; you will review your 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 business-related higher education courses and for use in decision making in the workplace.

## Learning aims

In this unit you will:

- A Investigate data modelling and how it can be used in the decision-making process
- B Design a data model to meet client requirements
- C Develop a data model to meet client requirements.

CMP 105

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 6: Website Development

## Unit in brief

Learners investigate website development principles. They will design and develop a website using scripting languages.

## Unit introduction

Increasingly, international organisations rely on websites to serve customers and, in some cases, to generate revenue. With millions of web pages being created daily, the need for websites to be engaging, innovative and desirable is important. As a website developer, you must use sophisticated techniques to capture user interest and to ensure that customers are served. The scripting involved in the development of websites has become crucial: website developers need to understand and acquire the necessary skills to find solutions to a variety of scenarios and problems.

In this unit, you will review existing websites – commenting on their overall design and effectiveness. You 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, you 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 you for employment as a website developer or as a website development apprenticeship. The unit will benefit you if you want to go on to higher education to develop your studies.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

- A Understand the principles of website development
- B Design a website to meet client requirements
- C Develop a website to meet client requirements.

CMP 106

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 7: Mobile Apps Development

## Unit in brief

Learners investigate mobile apps and design, and develop an application intended for use on mobile devices.

## Unit introduction

Millions of people carry a mobile device that rivals the capability of many desktop computers. These devices offer a broad range of functionality by bringing together many different technologies. To develop high-quality mobile apps, you must have an understanding of how they are designed to run specifically on mobile devices and how you can exploit the technologies currently available to ensure an effective final product.

In this unit you 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. You will study the design considerations inherent in mobile apps and general software design. You 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 you to progress to an app development role and gives you a basis for further study of the design and development of mobile apps and services.

## Learning aims

In this unit you will:

- A Investigate mobile apps and mobile devices
- B Design a mobile app that utilises device functions
- C Develop a mobile app that utilises device functions.

CMP 107

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 8: Computer Games Development

## Unit in brief

Learners investigate the computer games industry and its impact on technological and social trends. They will design and develop a computer game to meet requirements.

## Unit introduction

The computer games industry has been growing year on year and has become a multi-billion industry. With the prevalence of computing devices, games consoles and mobile devices, this growth shows no sign of slowing. Many computer games are vast productions involving a range of people such as programmers, graphical artists, animators, level designers, actors and directors. As a games developer, you will analyse the needs of a client and understand the potential and limitations of different gaming solutions. In this unit, you will investigate the technologies used in the computer gaming industry and the implications they have for users, developers and organisations. You will analyse how user needs and preferences impact on game design and how target technologies affect the design and development of a computer game. Finally, you 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.

You 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 you gain through this unit will benefit you as you progress to employment in the computer gaming industry, for example in computer games developer and software developer roles.

## Learning aims

In this unit you will:

- A Investigate technologies used in computer gaming
- B Design a computer game to meet client requirements
- C Develop a computer game to meet client requirements.

CMP 108

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 9: IT Project Management

## Unit in brief

Learners investigate a range of project management principles and methodologies and undertake the management of a 'live' or 'simulated' IT project from start to finish.

## Unit introduction

Project management is the art of coordinating resources, both human and machine, and solving problems to complete an agreed set of objectives and/or to deliver benefits in a fixed time period, budget and to a specified quality. Ensuring the quality of IT projects in any sector is an essential requirement.

In this unit, you will investigate the principles of project management and different project management methodologies, as used in the IT industry. You will deliver an IT project using at least one project management methodology and complete the five main stages of a project. You will initiate the project by researching a problem and using your creative skills to generate a range of solutions, undertaking a feasibility study to select an appropriate solution and outline the requirements of the project. You will undertake the planning, execution, and monitoring and control stages of the project, either through simulation or by undertaking a major project as part of your BTEC course, which could involve the integration of several units. You will close the project by reflecting on the success of the project outcome and your personal performance.

The analytical and problem-solving skills and knowledge you gain in this unit will prepare you for entry to higher education to study a range of degrees. The unit will help you when entering an IT apprenticeship or the workplace, for example working alongside a project manager.

## Learning aims

In this unit you will:

- A Investigate the principles and methodologies of IT project management as used in industry
- B Carry out a project initiation for an IT project
- C Carry out the planning, execution, monitoring and controlling of an IT project, using an appropriate methodology
- D Undertake the closure of a project by reflecting on the success of personal performance and the project outcome.

CMP 109

90 GLH  
15 UK Credits

UK Level 3

School of  
Computing

# Unit 10: Big Data and Business Analytics

## Unit in brief

Learners explore how businesses and organisations use data and models to make decisions, develop strategy and improve performance.

## Unit introduction

Businesses and organisations collect vast amounts of data from a wide range of sources about their operations and customers, and much of this data is unplanned and/or unstructured. The resulting data sets can be so large that they are now known as big data. For example, most retailers use ecommerce systems that can capture customer preferences and enable them to optimise their stock holdings, while individual data from smartwatches and wearable devices can be compiled to monitor and improve health and sports performance. Big data and data analytics are also used to improve many aspects of our lives, such as reviewing and optimising traffic flows, detecting terrorist plots and preventing cybercrime.

In this unit, you will investigate how and why organisations collect data and the methods they use to store and analyse it. You will explore a range of methods to present data for different audiences and purposes, and statistical methods used to analyse data. You will use software to analyse a data set to provide information that could inform business plans and improve profitability.

The analytical and problem-solving skills and knowledge that you develop in this unit will prepare you for entry to higher education to study a range of degrees. This unit will also help you to progress to an IT apprenticeship or to employment.

## Learning aims

In this unit you will:

- A Investigate the role of big data and business analytics to improve performance, for benchmarking and/or to trigger innovation in organisations
- B Explore the statistical software tools and techniques used to analyse data in organisations
- C Carry out analysis of statistical data to meet the needs of an organisation.

CMP 110

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 11: Cyber Security and Incident Management

## Unit in brief

Learners study cyber security threats and vulnerabilities, the methods used to protect systems against threats and how to plan for and manage security incidents.

## Unit introduction

Our increasing reliance on computer systems and the data they contain makes us vulnerable to attacks from cyber criminals, and to the loss of these systems if there is an accident or a natural disaster. As IT system security is improved, more sophisticated methods of attack are developed, and it is important that organisations have robust plans in place to deal with a cyber security incident before it occurs. All IT professionals require a good understanding of the current threats to systems, how to apply appropriate and effective protection methods and how to manage a cyber security incident.

Countries throughout the world are accelerating efforts to address cyber security risks to their public-safety and mission-critical communications networks. In this unit, you will examine the many different types of cyber security attacks, the vulnerabilities that exist in networked systems and the techniques that can be used to defend an organisation's networked systems. You will investigate the techniques used to assess risks and ways of planning to deal with the results of a cyber security incident and recover systems following an incident. You will examine scenarios, carry out risk assessments and prepare protection plans before protecting networked systems. You will also examine evidence from cyber security incidents and relevant security documentation, using the evidence to make recommendations for improvement.

As IT systems evolve, there is an increasing need for IT professionals to protect networked systems and the information they contain, while providing enhanced features and benefits for organisations, customers and individuals.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

- A Understand cyber security threats, system vulnerabilities and security protection methods
- B Explore the security implications of networked systems
- C Develop a cyber security protection plan for a specified organisation
- D Examine procedures to collect forensic evidence following a security incident.

CMP 111

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 12: IT Technical Support and Management

## Unit in brief

Learners investigate the support and management of IT systems, carry out support tasks and prepare a support and management plan, all of which are essential for organisations to operate.

## Unit introduction

Effective IT technical support and management of systems are vital to organization and individual performance. Organisations require their IT systems to perform at their optimum capacity and efficiency, as any downtime of these systems can lead to lost working time or capacity. Individuals working in organisations often lack the technical expertise to maintain their systems correctly and efficiently, which is why support teams are employed to do this job for them.

In this unit, you will examine the support and management needs and characteristics of IT systems used by organisations, identifying areas where support is necessary and the different job roles involved. You will examine the legislation and regulations that are in place to provide a safe and productive environment for employees. You will carry out a series of practical IT support activities on a system and a range of devices, which could include performing software updates and changing user access rights. You will monitor system performance and optimise it to meet the client's requirements. You will learn about and apply appropriate behaviours to complete these activities.

Finally, you will prepare a support and management plan for a new IT system.

This unit will help to prepare you for progression to higher education, and in particular it will develop your communication, problem-solving and planning skills, which are valued by higher education providers. It will also prepare you for employment in the IT sector or for an IT apprenticeship.

## Learning aims

In this unit you will:

- A Examine the IT system support and management needs and characteristics of different organisations, which are essential to their operation
- B Carry out routine support and management activities on IT systems
- C Develop a plan to support and manage a new IT system using industry standards and methods.

CMP 112

60 GLH  
10 UK Credits

UK Level 3

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Computing



# Unit 13: Software Testing

## Unit in brief

Learners explore a range of testing methodologies used in commercial software development projects and carry out appropriate tests on a piece of code.

## Unit introduction

Ensuring the quality of software programs is an essential part of any software development project and testing is the process used to quality assure software. Software can be categorised into products that are deliverable computer programs, such as an application or website, and services that are background applications, which communicate with a database or a third party, for example an application programming interface. Products are typically tested with automated tools, and scripts and services are typically tested with a functional testing tool, such as SoapUI or unit tests written by software developers.

In this unit, you will learn about the different software testing methodologies that are used as part of commercial software development projects, and the effects of different software development methodologies. You will analyse the user requirements for a software product or service to produce suitable test plans, based on specifications and development tasks, and select and apply different test methodologies to the software post development. You will evaluate and present the results of your testing to inform development team members of their progress and success.

Ideally, this unit should be delivered alongside, or after, Unit 4: Programming and Unit 9: IT Project Management.

The analytical and problem-solving skills and knowledge that you develop in this unit will prepare you for entry to higher education to study a range of degrees. This unit will also help you to progress to an IT apprenticeship or to employment, for example as a junior software tester.

## Learning aims

In this unit you will:

- A Understand the software development and testing methodologies commonly used during the development life cycle to quality assure software
- B Carry out a range of testing methodologies on a software product to meet a client's needs
- C Review and present the results from software tests to meet a client's needs and suggest improvements.

CMP 113

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 14: Customizing and Integrating Applications

## Unit in brief

Learners explore and develop customized and integrated applications to meet organizational needs, such as to offer greater flexibility and improve performance.

## Unit introduction

Application software often requires extra functionality to support organizational processes and to improve the performance and/or flexibility of an organization. Customized and integrated applications may provide a cost-effective way for an organization to create solutions rather than developing software from scratch or purchasing bespoke software. For example, integrating apps with social media, providing automation using Google Docs™ and SharePoint® integration with cloud technology.

In this unit, you will explore how different technologies, such as Visual Basic® for Applications (VBA), AppleScript®, application programming interface (APIs) and third-party extensions can be used to extend the functionality of applications, including cloud products such as Software as a Service (SaaS). These technologies allow businesses to customize and integrate applications with greater scope and flexibility than is possible using off-the-shelf software.

You will explore different technologies and techniques for customizing and/or integrating applications by undertaking a series of short activities, analyzing the results. You will design, implement and test a customized and integrated software application to solve a problem requiring the use of a range of applications, such as office software or cloud solutions.

Ideally, this unit should be delivered after, or perhaps alongside, Unit 4: Programming.

The knowledge, understanding and skills, such as problem solving, you gain in this unit support progression to higher education courses. The unit will help you when entering an IT apprenticeship or the workplace.

## Learning aims

In this unit you will:

- A Investigate the customization and integration of applications used by organizations to meet their needs
- B Explore the technologies and techniques used to customize and integrate applications
- C Develop customized and integrated applications to meet organizational needs.

CMP 114

60 GLH  
10 UK Credits

UK Level 3

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Computing

# Unit 15: Cloud Storage and Collaboration Tools

## Unit in brief

Learners explore the uses of cloud technologies for storing and distributing data and apply cloud technologies that aid collaboration to meet a client's needs.

## Unit introduction

Cloud services provide on-demand access to a shared pool of configurable computing resources, including network devices, servers, storage and applications that can be rapidly provisioned and released. As our reliance on mobile devices to access digital services and content grows, the use of 'The Cloud' as a method of storing and distributing data and services becomes more popular. It is likely that you have made use of these technologies yourself for tasks such as backing up images from your smartphone. The scope of cloud-based services is much wider than just storage, and it gives organisations and individuals flexibility in the way IT meets their needs, allowing them to shrink, expand or diversify their IT use while reducing the complexity and cost of making changes to existing processes and systems.

In this unit, you will learn about how different cloud-based technologies can be used to meet a range of clients' needs. You will explore the characteristics, benefits and drawbacks of these technologies, considering their impact on individuals and organisations. You will analyse the IT needs of an organisation and how cloud storage and collaboration tools will meet the organisation's needs. Finally, you will design and implement a cloud-based solution to meet a client's need.

The analytical skills and knowledge that you develop in this unit will prepare you for entry to higher education to study a range of degrees. This unit will also help you to progress to an IT apprenticeship or to employment in a role that requires working as, and collaborating with, a team.

## Learning aims

In this unit you will:

- A Explore the use of cloud technologies and tools in organisations
- B Design and deploy a cloud-based collaboration service to meet a client's needs
- C Manage and review a cloud-based collaboration service to meet a client's needs.

CMP 115

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 16: Digital 2D and 3D Graphics

## Unit in brief

Learners explore the purpose and characteristics of digital graphics and use software tools to design and create a digital graphic that could be used in other media products.

## Unit introduction

Two-dimensional (2D) and three-dimensional (3D) digital graphics are used in a variety of ways, from basic elements of a user interface to being included in other media products, such as websites, printed media (such as advertising posters) and computer games.

Good planning, production and manipulation of digital content is essential to ensure that digital products are consumed by their intended audience and are fit for purpose.

In this unit, you will understand the difference between raster- and vector-based graphics. You will investigate the purpose and characteristics of different 2D and 3D digital graphics. The characteristics you will explore are technical characteristics, including how graphics are created and represented in digital form, and the local legal requirements. You will also explore the impact of the technologies used on the usability and accuracy of the digital graphics. You will design and develop 2D and 3D digital graphics for an audience and purpose. To do this you will use specialist software and hardware to develop the graphics that could be included in a larger media product, such as a user interface, a website or a computer game.

The visual communication, planning and design skills you gain in this unit will prepare you for entry to higher education to study a range of degrees. The unit will also help you when entering an IT apprenticeship or the workplace.

## Learning aims

In this unit you will:

- A Investigate the purpose and characteristics of digital graphics that are an important part of visual communications
- B Design 2D and 3D digital graphics products to meet a client brief
- C Develop 2D and 3D digital graphics products to meet a client brief.

CMP 116

60 GLH  
10 UK Credits

UK Level 3

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Computing

# Unit 17: Digital Animation and Effects

## Unit in brief

Learners explore the purpose and characteristics of digital animations and effects and create an animation, including effects, such as audio, that may be used in other media products.

## Unit introduction

Digital animation and effects are used in a variety of ways, from individual digital products to being included as part of other media products. Example applications include content for film, advertising, music videos, websites and computer games.

In this unit, you will investigate the purpose, local legal requirements and technical characteristics, for example techniques and principles, of different digital animation and effects products. You will explore how graphics are created and the impact of the technologies used on the digital animation and effects products. You will design and develop a digital animation and effects product for an audience and purpose. To do this, you will use specialist software and hardware to develop the digital product that could be included in a larger media product, such as a website or a computer game.

The communication, planning and design skills you gain in this unit will prepare you for entry to higher education to study a range of degrees. The employability and entrepreneurial skills will also be useful when entering an IT apprenticeship or the workplace.

## Learning aims

In this unit you will:

- A Investigate the purpose and characteristics of digital animations and effects that are an important part of communication
- B Design a digital animation and effects product to meet a client brief
- C Develop a digital animation and effects product to meet a client brief.

CMP 117

60 GLH  
10 UK Credits

UK Level 3

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Computing

# Unit 18: The Internet of Things

## Unit in brief

Learners explore systems and services that make up the Internet of Things (IoT) and develop an IoT system or device using off-the-shelf hardware and programming techniques and constructs.

## Unit introduction

The Internet of Things (IoT) is referred to as the next industrial revolution and is transforming the way we work, socialise and live our lives. The IoT is connecting together our physical world of everyday 'things' and the digital world. It involves a network of 'things', for example appliances, vehicles and wearable devices that are embedded with sensors and other electronics to gather, store and analyse data over the internet that meets a need by triggering action(s). For example, vehicle diagnostics involving the location of equipment, service options and the collection of real-time driver and machine data and asset tracking, or remote medical diagnostics of patients involving their historical records being analysed with real-time data so that healthcare professionals can provide accurate diagnosis and treatment.

In this unit, you will investigate the applications of different IoT systems and services, including the principles involved and the characteristics of the systems and services.

You will design a prototype IoT system or device and develop it using off-the-shelf hardware and suitable programming languages, techniques and constructs.

The analytical, problem-solving and practical skills you gain in this unit will prepare you for entry to higher education to study a range of degrees. The unit will help you when entering an IT apprenticeship or the workplace, for example as a junior software developer.

## Learning aims

In this unit you will:

- A Examine systems and services that form part of the Internet of Things
- B Develop a design for an Internet of Things system or device to solve a problem
- C Carry out the prototyping of an integrated Internet of Things system or device to solve a problem.

CMP 118

60 GLH  
10 UK Credits

UK Level 3

School of  
Computing

# Unit 19: Enterprise in IT

## Unit in brief

Learners develop the skills and attributes needed for developing an IT product or service and use lean methods or a traditional business plan for starting up an enterprise.

## Unit introduction

Entrepreneurial ideas in IT are plentiful, whether it is to design and develop new software or to provide IT support. IT businesses built on entrepreneurial ideas can create wealth for their owners and the nation, generate new employment opportunities, as well as provide customers with value-added products and services. WhatsApp®, Airbnb®, Impression, and Wizzed Media are examples of software, peer-to-peer services, digital marketing and websites, and mobile application start-ups that were once entrepreneurial ideas that successfully tapped into markets with a high demand and grew into thriving IT enterprises.

You will learn about enterprise by looking at the characteristics of entrepreneurs, the techniques they use and how these contribute to setting up and running an enterprise. Entrepreneurs have to drive through their ideas as there will be resources they need to gain and barriers to success they need to overcome, something that all entrepreneurs are accustomed to dealing with. You will examine whether you have the entrepreneurial skills to start up an IT enterprise.

Once you have identified a potential IT product or service, you will investigate whether customers want it and what features they do and don't like. You will do this by carrying out market research and creating a marketing plan to drive sales and generate the cash needed by an enterprise to survive. Start-up enterprises also need smart, lean plans as entrepreneurs have to focus primarily on product and service development. However, both you and your stakeholders have to be convinced of the realism and viability of your entrepreneurial idea so you will learn how to produce and present a start-up plan for your IT enterprise.

The research, planning and communication skills you gain in this unit will prepare you for entry to higher education to study a range of degrees. The employability and entrepreneurial skills will also be useful when entering an IT apprenticeship or the workplace, or when setting up an enterprise.

## Learning aims

In this unit you will:

- A Explore the nature of enterprise and entrepreneurship in an IT context
- B Develop a marketing plan for an IT product or service based on market research
- C Present a plan for a start-up IT enterprise using lean or traditional business principles.

CMP 119

60 GLH  
10 UK Credits

UK Level 3

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# Unit 20: Business Process Modelling Tools

## Unit in brief

Learners investigate business processes and their relationship to an organisation's aims and objectives. They will model a specific process and develop a plan to improve it.

## Unit introduction

Most small, medium and large organisations use an interrelated series of processes which carry out functions, such as manufacturing an item, placing an order or hiring a new employee. Understanding these processes is important so that you can apply new technology to improve them. Business processes in any organisation need to support their business aims and objectives. For example, if an organisation's aim is to provide excellent customer service, then the processes that include customer interaction need to reflect this. As a business or systems analyst, you will work with organisations to analyse their processes so that you can inform how improvements could be made. In this unit, you will investigate business aims and objectives, organisation models and departmental functions and processes and their interrelationships. You will select a specific business process to examine and produce a model of the way it operates.

Finally, you will develop a plan to improve the process to better support the businesses aims and objectives.

This unit will give you the knowledge, skills and confidence to become a business or systems analyst in the field of business software development, either directly through employment or an apprenticeship scheme, or to support continuing studies in further and higher education.

## Learning aims

In this unit you will:

- A Investigate the processes that organisations use to support their activities
- B Examine an organisation's business processes and activities to inform improvements
- C Develop a plan to improve an organisation's business processes and activities.

CMP 120

60 GLH  
10 UK Credits

UK Level 3

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# School of Computing (CMP)

## YEAR 2 – UK LEVEL 4

- **6 Mandatory core Units + 1 Mandatory specialist Unit + 1 Optional Unit + General Education Subjects**

### **6 x Mandatory Core Units/Subjects**

1. Unit 1: [CMP201](#) Programming (15 UK Credits)
2. Unit 2: [CMP202](#) Networking (15 UK Credits)
3. Unit 3: [CMP203](#) Professional Practice (15 UK Credits)
4. Unit 4: [CMP204](#) Database Design & Development (15 UK Credits)
5. Unit 5: [CMP205](#) Security (15 UK Credits)
6. Unit 6: [CMP206](#) Planning a Computing Project (15 UK Credits)

### **1 x Mandatory Specialist Unit/Subject – Depending on the selected Pathway/Major (15 UK Credits)**

#### ***Computing(General) / Software Engineering***

1. Unit 7: [CMP207](#) Software Development Lifecycles (15 UK Credits)

#### ***Artificial Intelligence / Data Analytics***

1. Unit 8: [CMP208](#) Data Analytics (15 UK Credits)

#### ***Cybersecurity***

1. Unit 10: [CMP210](#) Cybersecurity (15 UK Credits)

### **1 x Optional Units/Subjects Students can choose ONE Unit/subject from the optional list below:**

1. Unit 11: [CMP211](#) Strategic Information Systems (15 UK Credits)
2. Unit 12: [CMP212](#) Management in the Digital Economy (15 UK Credits)
3. Unit 13: [CMP213](#) Website Design & Development (15 UK Credits)
4. Unit 14: [CMP214](#) Maths for Computing (15 UK Credits)
5. Unit 15: [CMP215](#) Fundamentals of Artificial Intelligence (AI) & Intelligent Systems (15 UK Credits)



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# Unit 1: Programming

## Introduction

Programming involves describing processes and procedures that are derived from algorithms. The ability to program is what sets apart a developer and an end user.

Typically, the role of the developer is to instruct a device (such as a computer) to carry out instructions; the instructions are known as source code and are written in a language that is converted into something the device can understand. The device executes the instructions it is given.

Algorithms help to describe the solution to a problem or task by identifying the data and the process needed to represent the problem or task and the set of steps needed to produce the desired result. Programming languages typically provide the representation of both the data and the process; they provide control constructs and data types (which can be numbers, words and objects, and be constant or variable).

The control constructs are used to represent the steps of an algorithm in a convenient yet unambiguous fashion. Algorithms require constructs that can perform sequential processing, selection for decision making and iteration for repetitive control. Any programming language that provides these basic features can be used for algorithm representation.

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

On successful completion of this unit, students will be able to design and implement algorithms in a chosen language in a suitable Integrated Development Environment (IDE). This IDE will be used to develop and help track any issues with the code. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Define basic algorithms to carry out an operation and outline the process of programming an application

LO2 Explain the characteristics of procedural, object-orientated and event-driven programming

LO3 Implement basic algorithms in code using an IDE

LO4 Determine the debugging process and explain the importance of a coding standard.

CMP 201

15 UK  
Credits

UK Level 4

School of  
Computing

# Unit 2: Networking

## Introduction

Computer networks are the driving force behind the evolution of computer systems and allow users to access data, hardware, and services regardless of their location.

Being knowledgeable about the underlying principles of networking is of vital importance to all IT professionals. Networking is an environment that is increasingly complex and under continuous development.

Complex computer networking has connected the world by groups of small networks through internet links to support global communications. It supports access to digital information any time, anywhere, using many applications like email, audio and video transmission, including the World Wide Web, and this has opened the floodgates to availability of information.

The aim of this unit is to give students a wider background knowledge of computer networking essentials, how they operate, protocols, standards, security considerations and the prototypes associated with a range of networking technologies. Students will explore a range of hardware, with related software, and will configure and install these to gain knowledge of networking systems. A range of networking technologies

will be explored to deliver a fundamental knowledge of Local Area Networking (LAN), Wide Area Networking (WAN) and their evolution to form large-scale networks.

Students will also explore the protocol methodologies related to IP data networks.

On successful completion of this unit, students will have gained the knowledge and skills needed to successfully install, operate and troubleshoot a small network; and the operation of IP data networks, router, switching technologies, IP routing technologies, IP services and basic troubleshooting. Supporting a range of units in the Higher National suite, this unit underpins the principles of networks for all and enables students to work towards their studies in vendor units, if applicable. Students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Examine networking principles and their protocols

LO2 Explain networking devices and operations

LO3 Design efficient networked systems

LO4 Implement and diagnose networked systems.

CMP 202

15 UK  
Credits

UK Level 4

School of  
Computing

# Unit 3: Professional Practice

## Introduction

In the workplace, it is essential to be effective as a communicator, critical thinker, analyser, team worker and team leader. These skills are needed on a daily basis in order to carry out designated tasks as part of a job role. The development of academic competence and the continuation of lifelong learning and continuing professional development (CPD) are required to ensure that individuals have a valued set of interpersonal skills that can be applied to any situation or environment.

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 skills that enable tasks to be completed successfully and facilitate effective decision making. Working with others in a group environment such as an academic setting or in the workplace is an integral part of everyday life. Therefore, understanding the dynamics of teams in terms of culture, roles and responsibilities will ensure that there is a better understanding and awareness of the importance and value of teamwork. Continuing professional development, self-improvement, reflective practice and working towards various goals are encouraged in the workplace through an appraisal framework. Professional development includes at higher levels of learning and the ability to demonstrate effective research skills and academic reporting skills.

This unit covers the development of communication skills and communication literacy and the use of qualitative and quantitative data to demonstrate analysis, reasoning and critical thinking. Students will carry out tasks that require working with others in a team-based scenario and planning and problem solving.

On successful completion of the unit, students will be able to demonstrate leadership skills through the dynamics of team working. Through reflective practice, they will be able to evaluate the contributions they make as an individual and those of others.

## Learning Outcomes

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

LO1 Demonstrate a range of interpersonal and transferable communication skills to a target audience.

LO2 Apply critical reasoning and thinking to a range of problem-solving scenarios.

LO3 Discuss the importance and dynamics of working within a team and the impact of team working in different environments.

LO4 Examine the need for continuing professional development (CPD) and its role within the workplace and for higher-level learning.

CMP 203

15 UK  
Credits

UK Level 4

School of  
Computing

# Unit 4: Database Design & Development

## Introduction

Organizations depend on their databases for providing information that is essential for their day-to-day operations and to help them take advantage of today's rapidly growing and maturing e-commerce opportunities. An understanding of database tools and technologies is an essential skill for designing and developing systems to support them.

As applications get increasingly more sophisticated, database systems continue to demand more complex data structures and interfaces. Most organisations collect and store large volumes of data, either on their own systems or in the cloud, and this data is used not just for the operational running of their business but is also mined for other more intelligent and complex applications. Databases stand as the back-end of most systems used by organization's for their operations.

Database design and development is a fundamental and highly beneficial skill for computing students to master, regardless of their specialism.

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. It will also provide the practical skills needed to be able to translate that understanding into the design and creation of complex databases.

Topics covered in this unit are: examination of different design tools and techniques; examination of different development software options; consideration of the development features of a fully-functional robust solution covering data integrity, data validation, data consistency, data security and advanced database querying facilities across multiple tables; appropriate user interfaces for databases and for other externally linked systems; creating complex reports/dashboards, testing the system against the user and system requirements; and elements of complete system documentation.

On successful completion of the unit, students will be able to use appropriate tools to design and develop a relational database system for a substantial problem. They will be able to test the system to ensure that it meets user and system requirements, and fully document the system by providing technical and user documentation. For practical purposes, this unit covers relational databases and related tools and techniques. A brief overview of object-oriented databases will also be covered. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Use an appropriate design tool to design a relational database system for a substantial problem
- LO2 Develop a fully-functional relational database system, based on an existing system design
- LO3 Test the system against user and system requirements
- LO4 Produce technical and user documentation.

CMP 204

15 UK  
Credits

UK Level 4

School of  
Computing

# Unit 5: Security

## Introduction

Security is one of the most important challenges modern organisations face. It is about protecting organisational assets, including personnel, data, equipment and networks, from attack through the use of prevention techniques in the form of vulnerability testing/security policies and detection techniques, exposing breaches in security and implementing effective responses.

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.

This unit includes network security design and operational topics, including address translation, DMZ, VPN, firewalls, AV and intrusion detection systems. Remote access will be covered, as will the need for frequent vulnerability testing as part of organisational and security audit compliance. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Assess risks to IT security
- LO2 Describe IT security solutions
- LO3 Review mechanisms to control organisational IT security
- LO4 Manage organisational security.

CMP 205

15 UK  
Credits

UK Level 4

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# Unit 6: Planning a Computing Project (Pearson-set)

## Introduction

This unit is assessed through a Pearson-set assignment. The project brief will be set by the centre, based on a theme provided by Pearson (this will change annually). The theme and chosen project within the theme will enable students to explore and examine a relevant and current topical aspect of computing in the context of a business environment. As computing systems and technologies continually develop so do the ways in which businesses utilise technologies to support their operations and remain competitive.

As a computing professional it is important to understand the ways in which technology evolves and how it can be utilised in different sectors.

The aim of this unit is to give students an opportunity 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. Students will also investigate and research an industry sector as outlined in the centre-set project brief. Students will use the outcomes of their research to help them plan a computer-based project and to support recommendations for how the identified business could utilise the tools and technologies identified as part of their research.

On successful completion of this unit, students will have the confidence to engage in decision making, problem solving, research activities and project planning tasks. They will have the fundamental knowledge and skills that will enable them to investigate and examine relevant computing concepts in a work-related context, determine appropriate outcomes, decisions or solutions and present evidence to various stakeholders in an acceptable and understandable format.

## Learning Outcomes

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

LO1 Conduct small-scale research, information gathering and data collection to generate knowledge on an identified subject

LO2 Explore the features and business requirements of organisations in an identified sector.

LO3 Produce project plans based on research of the chosen theme for an identified organisation

LO4 Present your project recommendations and justifications of decisions made, based on research of the identified theme and sector.

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# Unit 7: Software Development Lifecycles

## Introduction

The software development lifecycle is an integrated process that promotes building good quality, secure software throughout the entire development process. The aim of this unit is to give students the knowledge and skills needed to understand software development lifecycles so that they can demonstrate their knowledge by implementing a software development lifecycle with a suitable methodology. 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. Among the topics included in this unit are iterative and sequential models of software development lifecycles and reference frameworks for initially capturing conceptual data and information through a feasibility study, and requirement gathering techniques through to analysis, design and software implementation activities. Students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Describe different software development lifecycles
- LO2 Explain the importance of a feasibility study
- LO3 Undertake a software development lifecycle
- LO4 Discuss the suitability of software behavioural design techniques.

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# Unit 8: Data Analytics

## Introduction

Like the physical universe, the digital universe is enormous and is doubling in size every two years. By 2020, the digital universe – the data we create and copy annually –projected to reach 44 zettabytes or 44 trillion gigabytes.

Data is everywhere in the world. Without knowing how to interpret this data it would be difficult to understand its meaning or make use of the data to increase the productivity of an organisation. Data analytics is a range of processes that converts data into actionable insight using a range of statistical techniques. Data analytics is a relatively new term – it is an overarching term for all decision support and problemsolving techniques. Most of the time the terms ‘data analytics’ and ‘business analytics’ are used interchangeably.

This unit introduces students to the theoretical foundation of data analytics and a range of data analytic processes and techniques to provide hands-on experience to enhance their skills. Topics included in this unit are data analytic terminologies, types of data analytics, data exploration and visualisation, understanding data with descriptive, predictive and prescriptive analytics.

On successful completion of this unit, students will understand the theoretical foundation of data analytics, data analytic processes and techniques. They will also gain hands-on experience of implementing data analytic processes and techniques using a programming language such as Python, R, or a tool such as Weka, KNIME, Power BI, Excel etc. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Discuss the theoretical foundation of data analytics that determine decisionmaking processes in management or business environments

LO2 Apply a range of descriptive analytic techniques to convert data into actionable insight using a range of statistical techniques

LO3 Investigate a range of predictive analytic techniques to discover new knowledge for forecasting future events

LO4 Demonstrate prescriptive analytic methods for finding the best course of action for a situation.

CMP 208

15 UK  
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# Unit 9: Computer Systems Architecture

## Introduction

As technology develops, it is important to have a working foundation of computer systems architecture on which to build technical knowledge. Despite hardware and software being constantly updated and seemingly becoming more complex, students with a solid, underpinned knowledge of computer systems architecture will not only be able to answer questions such as, 'How does a central processor work?', 'What does an operating system do?', 'How is information stored?', 'What is an instruction set?' and 'How do I actually connect to the internet?', but will also be able to transfer and apply their knowledge and skills to many other areas.

This unit introduces students to the foundations of computer systems architecture, and the integrated hardware and software components and subsystems that enable and allow data to be input, processed and output. Students will explore the concepts of operating systems, hardware management and computer networks, and gain the practical skills needed to be able to diagnose, troubleshoot and maintain computer systems, taking the security of these systems into consideration.

Among the topics included in this unit are CPUs, memory, input and output devices, ALU operations, program execution, operating systems (including kernel, file systems, API and system calls), hardware management, installation, firmware, device drivers, networking (including OSI and TCP/IP models), error and information gathering, fault diagnostics, security and problem resolution.

On successful completion of this unit, students will be able to explain the purpose and role of operating systems, the relationship between the subsystems embedded in a central processing unit and the core hardware and software components associated with computer operations. Students will be able to configure the hardware and systems needed to establish a computer network, together with practical diagnostic and troubleshooting techniques. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Explain the relationships between hardware components and the subsystems used in a computer system
- LO2 Categorise the key features and services provided by different computer operating systems and hardware
- LO3 Use network communication technology and the associated services to connect computer systems
- LO4 Demonstrate diagnostic and troubleshooting skills to solve hardware, software and networking related issues.

CMP 209

15 UK  
Credits

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# Unit 10: Cyber Security

## Introduction

Digital technologies provide an opportunity for malicious hackers and cyberterrorists to exploit individuals, government, institutions and large organisation. Defending against cyber-attacks including insider threats is a priority within the digital technologies sector.

Cybercrime techniques and attack vectors are fast-growing taking advantage of the speed, anonymity and convenience of the internet as a facilitator for malicious and criminal activity.

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

On successful completion of the unit, students will have explored the nature of cybercrime and cyber threat actors; looked into the roles and responsibilities in relation to information assurance; assessed the threats to, and vulnerabilities in, ICT infrastructure; and investigated strategic responses to cyber security threats.

## Learning Outcomes

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

LO1 Explore the nature of cybercrime and cyber threat actors

LO2 Investigate cyber security threats and hazards

LO3 Examine the effectiveness of information assurance concepts applied to ICT infrastructure

LO4 Investigate incident response methods to cyber security threats.

CMP 210

15 UK  
Credits

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# Unit 11: Strategic Information Systems

## Introduction

Information is the most valuable resource that an organisation possesses. The effective gathering, protection, analysis, processing and dissemination of information is vital to the success of any organisation. As globalisation increases and the 24-hour economy develops, organisations must ensure that their information systems are reliable, efficient and able to cope with rapid change.

This unit introduces students to how important information is to organisations.

Students will examine how information systems can be used to support core business functions and how they enable organisations to be more productive and competitive in the global marketplace.

Students will analyse the information needs of an organisation at different levels and in different functional areas. It is important that computing professionals are able to understand how an organisation works and how it uses information so that they are able to design, implement, maintain and manage secure information systems to support its operations. The unit covers understanding organisations in terms of their information needs and the variances in different functional areas. Students will examine different information systems at the operational, tactical and strategic levels and will evaluate their effectiveness and role in terms of decision making and gaining competitive advantage.

On successful completion of this unit, students will have gained an insight into the types of systems and technologies available for effective information processing.

They will have used critical analysis to examine the integrated role that each type of system and technology plays in contributing to the efficiency and competitiveness of organisations. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Review the information requirements of organisations
- LO2 Explore the types of information systems that are used within all levels of an organisation
- LO3 Demonstrate the use of an information system to produce management information
- LO4 Review the effectiveness of strategic information systems for global competitiveness

CMP 211

15 UK  
Credits

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# Unit 12: Management in the Digital Economy

## Introduction

The Internet creates a borderless economy and over the last few decades has taken shape resulting from billions of everyday connections between people, business, data and processes. As the digital economy continues to evolve, each day it destabilizes traditional norms and practices in organisations, therefore requiring managers to reinvent and consider new ways of working. The way in which an organization structures and organises its workforce will affect the culture that develops within it. Its system of shared values and beliefs will determine and shape the accepted pattern of behaviour within the organisation. This structure and culture, along with the way that managers approach the workforce and motivate their staff, will directly affect performance. The management of structure and culture in digital sector organisations is now quite different to those in other sectors.

This unit introduces students to the concept of organisational behaviour and encourages them to apply this to the digital sector, developing an awareness of how organisations in the digital economy are organised and formed. It will explore topics including structures, culture, and the impact and influence stakeholders can have on digital organisations. Students will consider the use of communication and media channels to understand different stakeholders, discover a range of digital-led management styles and leadership skills to assess those most appropriate, before applying theories of motivation to digital teams.

On successful completion of this unit, students will have discussed different types of organisational structure and culture; evaluated the impact of stakeholders in a digital sector organisation; investigated digital-led approaches to management and leadership; and assessed the relationship between motivation, organizational behaviour, performance and reflection. Students will have the opportunity to progress to a range of roles within the digital sector, which could include, for example, the role of IT Manager, Team Leader, Digital Community Manager, or working within project management.

## Learning Outcomes

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

LO1 Investigate types of organisational structures and cultures in the digital economy sector.

LO2 Explore the role, impact and influence of stakeholders in a digital economy organisation.

LO3 Investigate digital-led approaches to management and leadership.

LO4 Assess the relationship between motivation, organisational behaviour, performance and reflection in a digital team.

CMP 212

15 UK  
Credits

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# Unit 13: Website Design & Development

## Introduction

Wireless, public hotspot, mobile broadband and unlimited network connections mean that accessing and using the internet to request, use and post information has never been so easy, or so important. As public, organisational and business demand increases so does user expectation. Designers need to use technology successfully to deliver high-quality and consistent User Experiences (UX) through friendly and functional User Interfaces (UI). However, as the software and hardware evolve so does the challenge of design.

This unit introduces students to the underpinning services required to host, manage and access a secure website. Students will then be introduced to and explore the methods used by designers and developers to blend back-end technologies (serverside) with front-end technologies (client-side). To help ensure that new designers are able to design and deliver a site that offers an outstanding User Experience (UX) supported by an innovative User Interface (UI), students will discuss the reasons, requirements, relationships, capabilities and features of the systems they will be

using. This gives them an opportunity to explore various tools, techniques and technologies with 'good design' principles in order to plan, design and review a multipage website.

Among the topics included in this unit are: domain structure, domain name systems, web protocols, database servers, development frameworks, website publishing, content management, search engine optimisation, web browsers, HTML standards, CSS and CSS pre-processing (LESS, SASS), presentation models, responsive design, integrated development environments, user requirements, interface design, user experience, branding, navigation, optimisation and validation.

On successful completion of the unit, students will be able to explain the server technologies and management services associated with the hosting and management of secure websites, categorise website technologies, tools and software used to develop websites, utilise website technologies, tools and techniques with good design principles to create a multipage website and create and use a Test Plan to review the performance and design of a multipage website.

## Learning Outcomes

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

- LO1 Explain server technologies and management services associated with hosting and managing websites
- LO2 Categorise website technologies, tools and software used to develop websites
- LO3 Utilise website technologies, tools and techniques with good design principles to create a multipage website
- LO4 Create and use a Test Plan to review the performance and design of a multipage website.

CMP 213

15 UK  
Credits

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# Unit 14: Maths for Computing

## Introduction

In 1837, English mathematicians Charles Babbage and Ada Lovelace in collaboration, described a machine that could perform arithmetical operations and store data in memory units. This design of their 'Analytical Engine' is the first representation of modern, general-purpose computer technology. Although modern computers have advanced far beyond Babbage and Lovelace's initial proposal, they still rely fundamentally on mathematics for their design and operation.

This unit introduces students to the mathematical principles and theory that underpin the computing curriculum. Through a series of case studies, scenarios and task-based assessments, students will explore number theory in a variety of scenarios; use applicable probability theory; apply geometrical and vector methodology; and, finally, evaluate problems concerning differential and integral calculus.

Among the topics included in this unit are: prime number theory, sequences and series, probability theory, geometry, differential calculus and integral calculus.

On successful completion of this unit, students will have gained confidence in the mathematics that is needed in other computing units. They will have developed skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Use applied number theory in practical computing scenarios
- LO2 Analyse events using probability theory and probability distributions
- LO3 Determine solutions of graphical examples using geometry and vector methods
- LO4 Evaluate problems concerning differential and integral calculus.

CMP 214

15 UK  
Credits

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

## Introduction

Intelligent Systems are revolutionizing industry and changing the way we accomplish daily routines. They help to introduce flexibility, quality and energy efficiency to name a few to an increasing range of applications. For example, transportation, healthcare, education, and the defense sector. Intelligent Systems are enabled by various underpinning technologies, especially Artificial Intelligence (AI). AI offers opportunities to gain insights from data or perceive the environment to take intelligent actions that maximize the chances of performing a task faster or not previously possible. The growth in AI potential offers companies opportunities to reduce costs, increase productivity and introduce new products to the market. Therefore, people skilled in AI and its applications are in high demand.

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.

On successful completion of this unit, students will be able to investigate AI fundamentals including data gathering, validation, and processing. Additionally, how the results can be visualised and explained. They will also develop their skillset to study deployed Intelligent Systems and evaluate technical and ethical challenges and opportunities.

## Learning Outcomes

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

- LO1 Discuss the theoretical foundation of Artificial Intelligence and its impact on users and organizations.
- LO2 Analyze the approaches, techniques and tools to deploy Intelligent Systems in an organization
- LO3 Modify an AI-based system to improve how exhibits intelligence in response to a real-world problem.
- LO4 Evaluate the technical and ethical challenges and opportunities of Intelligent Systems.

CMP 215

15 UK  
Credits

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# School of Computing (CMP)

## YEAR 3 – UK LEVEL 5

### 2 Mandatory core Units + 5 Optional/Mandatory Specialist Units + General Education Subjects

#### 2 x Mandatory Core Units/Subjects

1. Unit 16: [CMP316](#) Computing Research Project (30 UK Credits)
2. Unit 17: [CMP317](#) Business Process Support (15 UK Credits)

**5 x (Optional Units/Subjects + Mandatory Specialist Units/Subjects) - For General Computing Pathway, students can choose any FIVE Units/subjects from the list below. - For all other pathways, students MUST take the 3 x Mandatory specialist Units (in their Group) + any 2 x Optional Units/subjects from the remaining list of subjects below.**

#### ***Group A: Software Engineering***

1. Unit 18: [CMP318](#) Discrete Maths (15 UK Credits)
2. Unit 19: [CMP319](#) Data Structures & Algorithms (15 UK Credits)
3. Unit 20: [CMP320](#) Applied Programming and Design Principle (15 UK Credits) ☒

#### ***Group B: Data Analytics & Artificial Intelligence***

4. Unit 24: [CMP324](#) Advanced Programming for Data Analysis (15 UK Credits)
5. Unit 25: [CMP325](#) Machine Learning (15 UK Credits)
6. Unit 26: [CMP326](#) Big Data Analytics and Visualisation (15 UK Credits)

#### ***Group C: Cyber Security***

7. Unit 30: [CMP330](#) Applied Cryptography in the Cloud (15 UK Credits)
8. Unit 31: [CMP331](#) Forensics (15 UK Credits)
9. Unit 32: [CMP332](#) Information Security Management (15 UK Credits)



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12. Unit 35: [CMP335](#) Systems Analysis & Design (15 UK Credits)
13. Unit 36: [CMP336](#) User Experience & Interface Design (15 UK Credits)
14. Unit 37: [CMP337](#) Architecture (15 UK Credits)
15. Unit 38: [CMP338](#) Analytic Architecture Design (15 UK Credits)
16. Unit 39: [CMP339](#) Network Management (15 UK Credits)
17. Unit 40: [CMP340](#) Client/Server Computing Systems (15 UK Credits)
18. Unit 41: [CMP341](#) Database Management Systems (15 UK Credits)
19. Unit 42: [CMP342](#) Game Design Theory (15 UK Credits)
20. Unit 43: [CMP343](#) Games Development (15 UK Credits)
21. Unit 44: [CMP344](#) Games Engine & Scripting (15 UK Credits)
22. Unit 45: [CMP345](#) Internet of Things (15 UK Credits)
23. Unit 46: [CMP346](#) Robotics (15 UK Credits)
24. Unit 47: [CMP347](#) Emerging Technologies (15 UK Credits)
25. Unit 48: [CMP348](#) Virtual & Augmented Reality Development (15 UK Credits)
26. Unit 49: [CMP349](#) Systems Integration (15 UK Credits)
27. Unit 50: [CMP350](#) Operating Systems (15 UK Credits)
28. Unit 51: [CMP351](#) E-Commerce & Strategy (15 UK Credits)
29. Unit 52: [CMP352](#) Digital Sustainability (15 UK Credits)
30. Unit 53: [CMP353](#) Digital Technology as a Catalyst for Change (15 UK Credits)
31. Unit 54: [CMP354](#) Prototyping (15 UK Credits)



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# Unit 16: Computing Research Project (Pearson-set)

This unit is assessed through a Pearson-set assignment. Students will choose their own project based on a theme provided by Pearson (this will change annually).

The project must be related to their specialist pathway of study (unless the student is studying the general computing pathway). This will enable students to explore and examine a relevant and current topical aspect of computing in the context of a business environment and their chosen specialist pathway.

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.

On successful completion of this unit, students will have the confidence to engage in problem-solving and research activities. Students will have fundamental knowledge and skills that will enable them to investigate workplace issues and problems, determine appropriate solutions and present evidence to various stakeholders in an acceptable and understandable format.

Students will have developed skills such as communication literacy, critical thinking, analysis, synthesis, reasoning, and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Examine appropriate research methodologies and approaches as part of the research process

LO2 Conduct and analyse research relevant to a computing research project

LO3 Communicate the outcomes of a research project to identified stakeholders

LO4 Reflect on the application of research methodologies and concepts.

CMP 316

15 UK  
Credits

UK Level 5

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Computing

# Unit 17: Business Process Support

## Introduction

Data and information are core to any organisation and business process. Accurate data and meaningful information are of high value to an organisation and are key drivers for effective decision making and problem solving. Business intelligence relies on the use of data science, which makes use of a range of tools and methods, including data mining, data integration, data quality and data warehousing, in conjunction with other information management systems and applications.

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, the mechanisms to source and utilise data and turn it in to 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 practical application of data science techniques to support real-world business problems.

On successful completion of this unit, students will appreciate the importance and value of data and information in terms of optimising decision making and performance. By exploring the tools, techniques and systems that support business processes, students will be aware of the role and contribution of these technologies and methodologies, and their importance to organisations. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Discuss the use of data and information to support business processes and the value they have for an identified organisation
- LO2 Discuss the implications of the use of data and information to support business processes in a real-world scenario
- LO3 Explore the tools and technologies associated with data science and how it supports business processes
- LO4 Demonstrate the use of data science techniques to make recommendations to support real-world business problems.

CMP 317

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 18: Discrete Maths

## Introduction

Digital computer technologies operate with distinct steps and data is stored as separate bits. This method of finite operation is known as 'discrete', and the division of mathematics that describes computer science concepts such as software development, programming languages and cryptography is known as 'discrete mathematics'. This branch of mathematics is a major part of a computer science course and aids, ultimately, in the development of logical thinking and reasoning that lies at the core of all digital technology.

This unit introduces students to the discrete mathematical principles and theory that underpin software engineering. Through a series of case studies, scenarios and taskbased 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.

Among the topics included in this unit are set theory and functions, Eulerian and Hamiltonian graphs, binary problems, Boolean equations, algebraic structures and group theory.

On successful completion of this unit, students will have gained confidence in the discrete mathematics that is needed to understand software engineering concepts. As a result, they will have developed skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Examine set theory and functions applicable to software engineering
- LO2 Analyse mathematical structures of objects using graph theory
- LO3 Investigate solutions to problem situations using the application of Boolean algebra
- LO4 Explore applicable concepts within abstract algebra.

CMP 318

15 UK  
Credits

UK Level 5

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# Unit 19: Data Structures & Algorithms

## Introduction

Knowing how to implement algorithms and data structures that solve real problems, and knowing the purpose, complexity and use of algorithms is part of an essential toolkit for software engineers. An algorithm is a sequence of instructions used to manipulate data held in a structured form and together with data structures constitute design patterns for solving a diverse range of computer problems, including network analysis, cryptography, data compression and process control.

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.

Among the topics included in this unit are abstract data types specification, formal data notations, data encapsulation, complex data structures, programming language implementations using handles, pointers, classes and methods, algorithm types, data structure libraries, algorithm complexity, asymptotic testing and benchmarking.

On completion of this unit, students should be able to identify program data requirements, specify abstract data types using a formal notation, translate into concrete data structures and be able to develop, using a programming paradigm, different sorting, searching and navigational algorithms that implement complex data structures and evaluate their effectiveness. As a result, students will have developed skills such as communication literacy, critical thinking, analysis, synthesis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Examine abstract data types, concrete data structures and algorithms
- LO2 Specify abstract data types and algorithms in a formal notation
- LO3 Implement complex data structures and algorithms
- LO4 Assess the effectiveness of data structures and algorithms.

CMP 319

15 UK  
Credits

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# Unit 20: Applied Programming and Design Principle

## Introduction

The advanced features of programming languages are used to develop software that is efficient, robust and can be mathematically proven to work. Well-designed code can positively impact the performance of an application as well as the readability and extensibility of the code, thereby improving productivity and reducing cost.

Effective object orientated programming (OOP) should have low coupling, high cohesion and strong encapsulation, which is something that the SOLID principles help to obtain. The idea is that by applying those principles together, it makes it easier to write better quality code with greater diversity and robustness. The system created becomes easy to maintain, to reuse and to extend over time. SOLID principles help software developers to achieve scalability and avoid creating code that breaks every time it needs a change. Clean coding maintains the readability of the programs produced by encouraging descriptive naming of objects and keeping to a single purpose model for each entity. Programming patterns work to ensure that designs produced are language independent, encapsulate ideas and are reusable in multiple circumstances.

The development of an application to process a large data set is a practical example of how to solve a problem that can be used in many different situations, can help deepen the understanding of OOP and help improve software design and reusability.

The aim of this unit is to familiarise students with these concepts and their best practices to ensure that their code is in line with industry standards. Among the topics included in this unit are object-orientated 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:

- LO1 Investigate the impact of SOLID development principles on the OOP paradigm
- LO2 Design a large dataset processing application using SOLID principles and clean coding techniques
- LO3 Build a data processing application based on a developed design
- LO4 Perform automatic testing on a data processing application.

CMP 320

15 UK  
Credits

UK Level 5

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# Unit 21: Application Program Interfaces

## Introduction

Many applications in use today are a composite of other software. This is true of an application, be it web based, mobile or on a desktop where the functionality of one is taken and used to build on. Think of an application that locates nearby restaurants – this may utilise an already existing map service as its basis. Or a game application that enables players to invite other players to chat and post high scores to social media, all within the game environment. How an application interacts with another is through an Application Program Interface (API).

Typically, APIs consist of methods and tools that are developed by the software author and which can provide services and functionality to other application developers without having to ‘reinvent the wheel’. Existing APIs provide a huge range of functionality that can be integrated into an application by following the rules of the relevant API. One of the benefits in using APIs is access to existing and proven services that can help speed up development and help standardisation.

The aim of this unit is to introduce students to the nature of APIs by developing a proof-of-concept application that utilises existing APIs for common tasks, such as communication, displaying interactive visuals, audio playback and handling a range of user inputs. Among the topics included in this unit are identifying what an API is and the need for APIs; types of APIs; application design and development utilising relevant APIs in a suitable development environment; testing of the application; and a critical review of the APIs used.

On successful completion of this unit, students will be able to identify and select relevant APIs to use in an application from a given scenario. They will also be able to test and document the results against the initial design requirement. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Examine the role of an API and its suitability for a given scenario

LO2 Design a solution that extends an existing application using relevant APIs for a given scenario

LO3 Implement an application in a suitable development environment based on a designed solution

LO4 Test an API developed for a given scenario to determine security vulnerabilities.

CMP 321

15 UK  
Credits

UK Level 5

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# Unit 22: Application Development

## Introduction

Application development is a process of planning, creating, testing, and deploying an information system. Often applications are developed to automate a process, build a product to address business need or to get ahead of the competition by being innovative. Professionalism and critical thinking supported by an ability to work independently and as part of a team are core skills for a developer.

This unit introduces students to application development. It 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.

Among the topics included in this unit are design and developer documentation problem analysis; research, system and user requirements; design methodologies and principles; security considerations; development methodologies; software development lifecycles; teamwork, peer reviews, development tools and techniques; integrated development environments; debugging, testing, software versions and quality assurance.

On successful completion of this 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. They will be able to select and use design and development methodologies, with tools and techniques associated with the creation of a business application. They will also be able to work individually and as part of a team to plan, prepare and produce a functional business application with support documentation, and assess and plan improvements to a business application by evaluating its performance against its software design document and initial requirements. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Produce a software design document for a business-related problem based on requirements
- LO2 Research design and development tools and methodologies for the creation of a business application
- LO3 Plan and produce a functional business application with support documentation
- LO4 Evaluate the performance of a business application against its software design document and initial requirements

CMP 322

15 UK  
Credits

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# Unit 23: Risk Analysis & Systems Testing

## Introduction

Risk-based testing prioritises tests during the system testing phase, based on the highest impact and probability of system failure. The aim of this unit is to give students the knowledge and skills they need to use riskbased testing (RBT), using a medium-sized application, developing a full and detailed RBT procedure and documenting the results. Students will then be able to evaluate the effectiveness of the application and the testing procedures employed. RBT is used widely in industry to organise software testing and to use test resources more efficiently.

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. Among the topics included in this unit are: how to classify and evaluate software risks using the risk formula, risk matrix, RBT testing and test build strategies, priority test cycles, security testing, coverage analysis and risk reduction reports.

As a result of studying this unit, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Examine risk-based testing and requirements
- LO2 Create a customised, risk-based test strategy, plans and techniques for a given specification
- LO3 Demonstrate a risk-based Test Plan, producing associated outcomes
- LO4 Evaluate a risk-based Test Plan and its associated outcomes.

CMP 323

15 UK  
Credits

UK Level 5

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# Unit 24: Advanced Programming for Data Analysis

## Introduction

The world of programming and software engineering is vast and includes many occupational pathways to pursue. Most areas of modern computing involve some form of data analysis. These range from enhanced reality development through to robotic control and communication systems, to medical imaging machines.

All of these require significant management of data but the area with the most common requirements is in data analysis and manipulation for business intelligence.

An analyst's role is becoming increasingly complex. Experienced analysts use modelling and predictive analytics techniques to generate useful insights and actions, which they present to interested parties and decision makers in an appropriate, clearly understood way.

This unit is designed to develop the skills required to become a skilled data analyst. It includes investigation of a range of different programming languages, aimed at both data analytics and general use, good development guidelines and the design, development and testing of a sizeable tool to analyse and utilise a large data set.

These skills are especially relevant to today's data analyst, data scientist, social researcher, market researcher and others who utilise large data sets in their work.

## Learning Outcomes

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

- LO1 Explore the tools a programmer can use to manipulate large data sets for data analysis
- LO2 Design a software tool to analyse a large data set for a given scenario
- LO3 Develop a software tool to analyse a large data set for a given scenario
- LO4 Test a software tool used to analyse a large data set for quality of information produced.

CMP 324

15 UK  
Credits

UK Level 5

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# Unit 25: Machine Learning

## Introduction

Machine learning is the science of getting computers that have the ability to learn from data or experience to solve a given problem without being explicitly programmed. It has been around for many years, however it has become one of the hottest fields of study in the computing sector. Machine learning is in use in several areas such as predictive modelling, speech recognition, object recognition, computer vision, anomaly detection, medical diagnosis and prognosis, robot control, time series forecasting and many more.

This unit introduces students to the basic theory of machine learning, the most efficient machine learning algorithms and practical implementation of these algorithms. Students will gain hands-on experience of getting these algorithms to solve real-world problems. Topics included in this unit are: the foundations of machine learning, types of learning problems (classification, regression, clustering etc.), taxonomy of machine learning algorithms (supervised learning, unsupervised learning, reinforcement learning), machine learning algorithms (decision tree, naïve Bayes, k-nearest neighbor, support vector machine etc.).

On successful completion of this unit, students will understand the concept of machine learning and machine learning algorithms. They will have gained hands-on experience in implementing algorithms using a programming language such as C/C++, C#, Java, Python, R, or a machine learning tool such as Weka, KNIME, Microsoft AzureML. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Analyse the theoretical foundation of machine learning to determine how an intelligent machine works

LO2 Investigate the most popular and efficient machine learning algorithms used in industry

LO3 Develop a machine learning application using an appropriate programming language or machine learning tool for solving a real-world problem

LO4 Evaluate the outcome or the result of the application to determine the effectiveness of the learning algorithm used in the application.

CMP 325

15 UK  
Credits

UK Level 5

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# Unit 26: Big Data Analytics and Visualisation

## Introduction

Raw data can be complicated, confusing and a challenge to understand. But when raw data is organised and structured properly it can reveal patterns and information that can be very powerful in business decision making. Without the ability to organise and visualise data, key information would otherwise remain hidden in raw data. Once a business can understand historic patterns of data sets this information can help predict future trends and behaviours.

Data and visualisation is an area which has seen rapid advancement and there has been considerable challenges for data specialists to develop the skills, experience and growth required to maintain innovation in the sector. As data continues to be the fuel for the digital economy, this area remains a constant topic of conversation for organisations, governments and the public who share an interest in its growing commercial use, manipulation, and presentation.

This unit introduces students to the concepts of big data and visualisation and how this is used for decision making. It explores the industry software solutions available to investigate and present data, before assessing the role and responsibility of data specialists in this current environment. Topics including data driven decision-making, manipulating data and automation, and building ethics into a data-driven culture are examined.

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.

On successful completion of this unit students will be able to investigate the value of data for decision making to both end users and organisations, compare how different industry leading tools and software solutions are used to analyse and visualise data, carry-out queries to summarise and group a given data set and analyse the challenges faced when building ethics into a data-driven culture. Students will have the opportunity to progress to a range of roles within the digital sector, and will develop industry-led skills, analysis, and interpretation, which are crucial for developing practical experiences with big data and gaining employment.

## Learning Outcomes

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

- LO1 Examine data visualisation for decision making of complex data sets
- LO2 Discuss statistical and graphical tools and techniques used to present big data for a given use case
- LO3 Demonstrate statistical and graphical techniques used to present big data as a visualisation
- LO4 Investigate the challenges faced by data professionals in carrying out their role

CMP 326

15 UK  
Credits

UK Level 5

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# Unit 27: Transport Network Design

## Introduction

The exponential growth of the World Wide Web has put unprecedented demand on private and public networking infrastructures. The traffic generated by private and commercial networks has become dominated by Voice over Internet Protocol (VoIP) and video on demand. These developments require existing infrastructures to be adapted, that the design of new networks mitigates best-effort delivery issues, avoiding low bandwidths and high latency problems, and that they are based on traffic priority. For enterprise networks and internet infrastructures to meet expected demand, their design will have to take into consideration principles such as availability, scalability, resiliency, reliability and quality of service (QoS). As a result, network engineers designing and supporting enterprise or Internet Service Provider (ISP) networks will need the knowledge and skills to support diverse business needs, such as converged network traffics, centralised control and mission-critical applications.

This unit introduces students to enterprise network design principles, design models, scalable networks and their effectiveness in supporting business requirements.

After evaluating the features of scalable networks, such as availability, reliability and hierarchy, students will apply network design principles to the design and implementation of redundant networks to provide Layer 2 and Layer 3 redundant solutions. Students are expected to evaluate Wide Area Network (WAN) technologies and make choices based on specific enterprise requirements. They will implement a range of WAN connections and protocols, such as Point-to-Point (PPP), Frame Relay and Virtual Private Network (VPN) with Internet Protocol Security (IPSec), using network simulators or network lab equipment. They will also solve network-related issues using network monitoring and troubleshooting methods and techniques.

## Learning Outcomes

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

- LO1 Explore LAN design principles and their application in the network design process
- LO2 Implement a network using LAN design principles based on a predefined set of requirements
- LO3 Produce an appropriate WAN solution to a set of organisational requirements
- LO4 Solve a range of network-related problems using appropriate troubleshooting techniques and methods.

CMP 327

15 UK  
Credits

UK Level 5

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# Unit 28: Cloud Computing

## Introduction

Cloud computing has revolutionised the way IT services are delivered and has become an important part of the computing sector. Cloud computing is internet-hosted computing, which means that it uses the internet to deliver data and other IT services such as storage, printing, server facilities. In other words, end users and organisations no longer need to have their own extensive network environment on the premises but can get the same services provided virtually over the internet.

The fundamental difference between traditional networking and cloud computing is that the technical details of the system are hidden from the end user. This means the networking infrastructure does not have to be on the premises as it would be hosted off-site in the cloud. However, the end user can use the services without the fear of technical difficulties or disasters as they would be managed by the cloud service provider.

Cloud computing is a natural evolution of networking and is adapting modern network-oriented technologies such as virtualisation, service-oriented architecture, utility computing and ubiquitous computing.

This unit is designed to develop understanding of the fundamental concept of cloud computing, cloud segments and cloud deployment models and the need for cloud computing. Students will gain appreciation of issues associated with managing cloud service architecture and 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.

On successful completion of this unit, students will understand the concept, architecture and services of cloud computing. They will have hands-on experience of configuring a cloud service from major providers such as ECM, Google, Amazon, Microsoft and IBM and of implementing a simple cloud platform using open source software with an appropriate networking platform. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Demonstrate an understanding of the fundamentals of cloud computing and its architectures
- LO2 Evaluate the deployment models, service models and technological drivers of cloud computing and validate their use
- LO3 Develop cloud computing solutions using service provider frameworks and open source tools
- LO4 Analyse the technical challenges for cloud applications and assess their risks.

CMP 328

15 UK  
Credits

UK Level 5

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Computing

# Unit 29: Network Security

## Introduction

'Who is accessing my network?' 'A bank was hacked last week, did you hear about that?' 'Last night I blocked my neighbours from accessing their internet because they did not have a Wireless Equivalent Protection (WEP) or WPA (Wi-Fi Protected Access) key on their wireless.' It is estimated that network security (NS) breaches occur every second worldwide, from small home networks to massive corporate networks. The cost to businesses is in billions, if not trillions. There are several methods, techniques and procedures that need to be implemented on a network in order for it to be 'secure'.

Sometimes basic procedures such as locking your network room, changing your password regularly, and putting a password on all your network devices, are all that is needed to achieve some basic network security.

This unit introduces students to the fundamental principles of network security practices. As systems administration and management are important tasks in the day-to-day functioning and security of information systems, poor or improper practices can lead to loss of data, its integrity, performance reductions, security breaches and total system failure. Special planning and provision need to be made for ongoing support of systems and networks, which account for a significant proportion of the IT budget. With the widespread use of computers and the internet for business customers and home consumers, the topic of security continues to be a source for considerable concern.

Among the topics included in this unit are: historical network security principles and associated aspects such as firewalls, routers, switches, MD5, SSL, VPN, AES, SHA-1/2, RSA, DES, 3DES; different types of public and private key cryptography such as Caesar cipher, IPsec; types of attacks that can be carried out on a network and methods of preventing attacks such as man-in-the-middle (MITM) (eavesdropping), Denial of Service (DoS), Distributed Denial of Service (DDoS) (ping); certificate authority (CA);

'The Cloud' security aspects and associated counter-measures such as public cloud, private cloud, hybrid cloud, community cloud, Platform-as-a-Service (PaaS), Infrastructure-as-a-Service (IaaS), phishing, spoofing, DNS attack, SQL injection, Media Access Control (MAC) address spoofing/control. Firewalls and other Gateways can be used as a tool for Intrusion Detection and Prevention as they can be situated on the perimeter of the Network to provide security.

## Learning Outcomes

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

- LO1 Examine network security principles, protocols and standards
- LO2 Design a secure network for a corporate environment
- LO3 Configure network security measures for the corporate environment
- LO4 Undertake the testing of a network using a Test Plan.

CMP 329

15 UK  
Credits

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# Unit 30: Applied Cryptography in the Cloud

## Introduction

Almost every interaction we make with an electronic device will involve cryptography in some form. Cryptography is an indispensable tool for protecting information in computer systems. Applied cryptography for cloud services uses encryption techniques that protect data used, shared and stored in the cloud.

Cryptography underpins many aspects of security and is a crucial component in protecting the confidentiality and integrity of information. Given the considerable information on individuals and organisations identified in the cloud, concerns are often raised regarding the safety of the cloud environment. Dangers of uploading data into this new environment requires cryptographers and cryptanalysts to protect the cloud environment using a variety of technologies, processes and forms of encryption.

The complexity with how cloud computing manages data secrecy and information security is another reason people avoid the cloud. As a result, despite the hype surrounding cloud computing, some users remain reluctant to deploy their personal information or deploy commercial enterprises into the cloud. Understanding cloud security issues, the application of crypto algorithms and to ensure data is secured are vital to its continued functionality, longevity and sustainability. In addition, students are expected to understand the differences between the roles and responsibilities of a cryptographer and cryptanalyst.

This unit introduces students to the applied principles of cryptography and looks at its practical applications and methods, many of which are fundamental to secure data in the cloud. Students are expected to analyse fundamental symmetric, asymmetric and hashing encryption methods, and investigate examples of these in practice.

Students are expected to demonstrate the use of cryptography and cryptanalysis tools, methods and their applications. Students are also expected to appraise the inner workings of cryptographic protocols and principles, including transport layer security (TLS) and blockchain, and evaluate how they can be used by organisations to enhance security when considering a move to a cloud environment. Among the topics included in this unit are: the mathematical algorithms used in cryptography, the mechanisms by which cryptographic and cryptanalysis work, hashing and salting, cloud-hosted public key infrastructure (PKI), benefits of encryption techniques, quantum cryptography, secure multi-party computation, security risks and issues with public key encryption, practical applications of cryptography and Cryptography as a Service (CaaS).

## Learning Outcomes

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

- LO1 Analyse encryption ciphers and algorithms as methods to secure data in a cloud environment.
- LO2 Discuss security risks and issues related to public key encryption in practice
- LO3 Demonstrate the use of cryptographic and cryptanalysis tools for improving security in a virtual private network.
- LO4 Evaluate advanced encryption protocols and their application for an organisation considering a move to the cloud.

CMP 330

15 UK  
Credits

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# Unit 31: Forensics

## Introduction

This unit introduces students to digital forensics involving the use of specialized techniques to investigate the recovery, authentication and analysis of data on electronic data storage devices, as well as network security breaches and cyber attacks, using different tools and techniques.

With the current widespread use of digital devices, digital forensics has become an important part of the detection of crime by being able to identify details of what has been stored on digital devices in the past. Students will have the opportunity to learn about some of the lower-level structures of data storage devices and the techniques used to investigate them.

Among the topics included in this unit are: describing the process of carrying out digital forensics; forensic investigation legal guidelines and procedures; understanding low-level file structures of several operating systems (OS); creating a boot disk to enable forensic examination of devices and undertaking a forensic examination of a device(s) and/or network security breaches and cyber attacks.

On successful completion of this unit, students will be able to carry out digital forensics in accordance with industry and legal guidelines and procedures using different tools. They will also understand the low-level file structures of several OS and be able to undertake digital forensic investigation of devices. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Examine the processes and procedures for carrying out digital forensic investigation
- LO2 Discuss the legal and professional guidelines and procedures for carrying out digital forensic investigation
- LO3 Use a tool or tools to conduct digital forensic investigation on devices or networks or cyber attacks
- LO4 Develop a Test Plan and make some recommendations for use in digital forensic investigation.

CMP 331

15 UK  
Credits

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# Unit 32: Information Security Management

## Introduction

Organisations of all sizes need to protect their sensitive information from potential attackers, and simply having up-to-date firewalls, anti-virus and other infrastructure components is not enough to prevent breaches. All physical security devices, the teams who manage them, and the processes surrounding their management, need to be constantly monitored and evaluated to ensure that the organisation as a whole is protected. This is the concept behind an Information Security Management System (ISMS). An ongoing process to continually assess what the organisation deems its biggest threats, and what its most important assets are.

This unit introduces students to the basic principles of an ISMS and how businesses use them to manage the ongoing protection of sensitive information they hold effectively.

There are many reasons for establishing an ISMS for an organisation, but one of the main goals is to enable the organisation to manage information security as a single entity, which can be monitored and continually improved on.

This unit covers information security management in a business context and will give students an understanding of how modern organisations manage the ongoing threats to their sensitive assets.

On successful completion of this unit, students will be able to describe what an ISMS is, how one is established, maintained and improved and describe the role that international standards play in developing an ISMS. Students will develop skills such as communication literacy, critical thinking, analysis, reasoning, and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Explore the basic principles of information security management

LO2 Critically assess how an organisation can implement and maintain an Information Security Management System (ISMS)

LO3 Appraise an ISMS and describe any weaknesses it may contain

LO4 Examine the strengths and weaknesses of implementing ISMS standards.

CMP 332

15 UK  
Credits

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# Unit 33: Applied Analytical Models

## Introduction

Applied analytical modelling has become prevalent in many industries and has developed in terms of the mathematical techniques used and the diversity of modelling tools and techniques. Applied analytical modelling is carried out by a data scientist utilising modelling data, model building and model reporting skills. The aim of this unit is to give students knowledge of skills in analytical modelling skills, using computers to discover and interpret meaningful patterns in data by creating computer models.

This unit introduces students to applied analytical models used in business to discover, interpret and communicate meaningful patterns of data held in silos or data warehouses, and to derive knowledge to gain competitive advantage. Organisations may apply analytical methods and models to predict/prescribe business outcomes and improve performance in diverse areas such as stock control, financial risk and fraud analysis. Analytical models use mathematical algorithms and require extensive computation to process large amounts of data.

Among the topics included in this unit are: data preparation, fundamentals of applied analytical models and development of predictive or prescriptive models using a suitable algorithm and operating on a large data set.

Students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Examine applied analytical modelling methods
- LO2 Prepare a large data set for use in an applied analytical model.
- LO3 Demonstrate the use of an analytical model with a large data set
- LO4 Investigate improvements to an applied analytical model.

CMP 333

15 UK  
Credits

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# Unit 34: Analytical Methods

## Introduction

John von Neumann, a Hungarian mathematician, outlined the architecture for a stored-program computer in a paper he wrote in 1945. In order to fully develop the software and hardware technologies within this architecture, analytical skills and techniques needed to be applied to any proposed design. In the modern era, analytical methods still underpin theoretical computer science fundamentals and developing this mathematical knowledge will support development in many aspects of computing.

This unit introduces students to advanced analytical techniques that will be relevant to them as they progress with their studies in computing. The unit also advances their knowledge of mathematical modelling and application of theory.

Among the topics included in this unit are complex numbers, numerical methods, matrices, formal logic and Z specification.

On successful completion of this unit, students will be able to use applications of complex number theory, approximate solutions of contextualised examples with numerical methods, apply matrix theory to a variety of different scenarios and use formal methods of logic.

They will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Examine complex number theory in practical situations

LO2 Approximate solutions using numerical methods

LO3 Employ matrix methods to contextualised examples relevant to computing

LO4 Investigate the concepts of formal methods in computer science.

CMP 334

15 UK  
Credits

UK Level 5

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# Unit 35: Systems Analysis & Design

## Introduction

The world is constantly changing, with new and emerging digital technologies bringing many challenges to the commercial world. Organizations and the systems they use to run their businesses have to respond quickly to these transformations. Organisations can find themselves in a situation where they have to regularly upgrade old systems or develop new ones in order to continue operating successfully in the evolving competitive business environment. Before any system can be upgraded or a new system developed, the system requirements have to be analyzed and the system designed, whether a database system, or a web, game or mobile application, and failure to do this adequately could lead to a costly systems failure.

Students will explore the processes of systems analysis and design using two methodologies – the traditional systems development lifecycle methodology providing a comprehensive structured framework and the agile methodology with different framework models developed with the emphasis on variations of iterative incremental modelling. To provide perspective, students will examine the models in both these methodologies. They will consider the particular strengths and weaknesses of the two methodologies and examine the suitability of the methodologies using different examples.

## Learning Outcomes

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

- LO1 Evaluate the strengths and weaknesses of the traditional and agile systems analysis methodologies
- LO2 Produce a feasibility study for a system to be developed to solve a business-related problem
- LO3 Assess systems analysis methodologies to effectively solve business-related problems
- LO4 Design a system to meet user and system requirements

CMP 335

15 UK  
Credits

UK Level 5

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Computing

# Unit 36: User Experience and Interface Design

## Introduction

User Experience (UX) and User Interface (UI) Design is the process by which software applications and user interactions can be designed to be simple, accessible, effective and attractive for the end user. The objective of UX and UI Design is to create user interactions and software application experiences that are appropriate for specific platforms or devices and to provide desirable end-user outcomes utilising insight and understanding of the practical, emotional and experiential motivations and values of the end user. UX and UI Design explores the motivations and desires of the end user and seeks to design the user's interactions so that they satisfy those motivations and desires in a concise manner.

This unit introduces students to the role, basic concepts and benefits of UX and UI Design in the development process of software applications. The aim of the unit is to enhance understanding of the methodology, terminology and benefits of UX and UI Design in the development of software applications.

Among the topics included in this unit are: classification and terminology of UX and UI Design techniques, the relationship between UX and UI Design, how UX and UI Design relates to the rest of the software development lifecycle, understanding a user's emotions, desires and attitudes relating to using a particular feature, product, system, platform or software application, modes of interaction, human-computer interaction models, usability, accessibility, aesthetics, design thinking, value proposition design, user journey mapping and gathering meaningful insights from user feedback and research.

On successful completion of this unit, students will be able to explain the basic concepts of UX and UI Design. They will be able to plan, build and measure the success of an appropriate UI Design, and design an interface and experience with a specific end user in mind. Students will also be able to conduct testing to gather meaningful feedback in order to evaluate the success or failure of a user interface. They will develop skills such as communication literacy, design thinking, team working, critical thinking, analysis, reasoning and interpretation and computer software literacy, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Research User Experience and Interface Design in relation to end user requirements in a User Interface concept

LO2 Plan a User Experience map and Interface Design for a User Interface concept for a target end user.

LO3 Build a User Interface concept and test it with end users for enhancement purposes

LO4 Evaluate user feedback and test results from interaction with the User Interface concept to determine improvements

CMP 336

15 UK  
Credits

UK Level 5

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# Unit 37: Architecture

## Introduction

Computer architecture engineers work in industries such as telecoms, automotive and aerospace and the aim of this unit is to give students knowledge of computer systems, functionality and organisation. Students will examine systems architecture and elements of computing machines and the principles and fundamentals of how computer systems work.

The unit introduces students to the hardware and software architecture of computer systems and low-level language program development using CPU registers to manipulate data.

They will explore how program instructions and data types can be represented, stored in a computer system and used to carry out a computing task.

Among the topics included in this unit are: computer architecture elements, CPU instruction sets, fetch-execute cycle, CPU registers, binary calculations, use of PC and stack, reading/writing to peripherals, architectural security aspects, including protected memory segmentation and synchronous/asynchronous channel I/O operations, parallel machines, emerging computer architectures and security considerations. Students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Examine the functions of computer system components
- LO2 Discuss how data and programs can be represented within computer systems
- LO3 Demonstrate the principles of processor operations
- LO4 Investigate advanced computer architectures and performance.

CMP 337

15 UK  
Credits

UK Level 5

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# Unit 38: Analytic Architecture Design

## Introduction

Aircraft, trains and other high-tech machines improve our quality of life – none of these could function without automatic systems. The ability to analyse and design an automatic system is a vital subject. Architecture Analysis & Design Language (AADL) is designed for the specification, analysis, automated integration and code generation of real-time, performance-critical (timing, safety, scheduling ability, fault tolerant, security etc.) distributed computer systems.

This unit introduces students to the AADL. It introduces the language and AADL specifications, which is defined in the standards of SAE International.

The SAE International AADL standard provides formal modelling concepts for the description and analysis of application systems architecture in terms of distinct components and their interactions. Within the AADL, a component is characterised by its identity, possible interfaces with other components, distinguishing properties, sub-components and their interactions. The AADL is a useful tool to model and analyse existing systems and to design and integrate new systems.

Among the topics included in this unit are: AADL overview, system models and specification, security, components (software components, execution platform components), structure and instantiation, mode and flow, and properties.

On successful completion of this unit, students will be able to describe the abstractions that support the specification of component interactions; present the specification of alternative operational states of a system; understand the use of the AADL flows concept and present examples of the specification of abstract flows throughout a system and describe the constructs for organising an AADL specification. It includes examples of AADL architectural pattern sets. Students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Explore detailed and problem-oriented material to gain a conceptual overview of the AADL abstractions for a given function.

LO2 Demonstrate the software component and execution platform component abstractions for a system

LO3 Design composite systems and their instances, and describe the abstractions that support the specification of component interactions

LO4 Show the specification of alternative operational states of a system through AADL flow concepts for a composite system

CMP 338

15 UK  
Credits

UK Level 5

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Computing

# Unit 39: Network Management

## Introduction

Network management has become one of the most sought-after skills for government institutions, commercial organisations, financial institutions and academic institutions as they try to run their IT networks in a more cost-effective, efficient and secure way.

The art of network management needs to be perfected by those in charge of networks today and in the future, including multimedia applications such as VoIP, IPTV and mobile network, and virtualised environments.

This unit introduces students to simple network planning, configurations, setup, and management, including LAN, WAN, NAT, PAN, MAN, using a variety of tools and methods for managing networks, including network monitoring, network security such as Snort, firewalls and IPS, network protocols and standards such as Simple Network Management Protocol (SNMP), the Network Configuration Protocol (NETCONF), IEEE, MIBII, Remote Network Monitoring (RMON), MDIB & ANS.1, as well as industry's best practices.

Students will also be introduced to virtual networks, network operating systems, risk management and cloud network management.

Among the topics included in this unit are: network planning, network configurations, network setup and network management of LANs, PAN, MAN, WAN, NAT, using several tools and methods; network monitoring, network security, network load balancing, network protocols and standards, best practices, virtualisation, network operating systems, network risk management and cloud network management.

On successful completion of this unit, students will be able to plan a network, configure a network, setup a network, manage a network such as a LAN, PAN, MAN, WAN, and conduct network monitoring, network security, network protocols and standards. Students will also be able to apply industry best practices, manage virtualised networks, work with several operating systems vendors and plan and manage network risks and cloud computing. Students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Explore the concepts and principles of network management

LO2 Plan, design, setup and configure a network

LO3 Review the protocols and standards related with networking and network management

LO4 Use tools and methods to manage a network, including network security and risk management.

CMP 339

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 40: Client/Server Computing Systems

## Introduction

The client/server system is a distributed application structure that partitions tasks or workloads between the providers of a resource or service (called servers) and service requesters (called clients). It is the basis of most internet communication. When surfing the internet, sending and receiving emails, and using VoIP software and other application, these functions work by using client/server systems.

This unit introduces students to the client/server system, an exchange mode for different applications. It consists of communication processes between clients and servers, the operation of applications based on the client/server system, and the socket programming used to code the system.

Among the topics included in this unit are: an introduction to the internet (concept, history, operation), client/server systems, various application protocols based on client/server systems, an introduction to Linux, client/server system programming and security considerations.

On successful completion of this unit, students will be able to demonstrate an understanding of the concepts of servers, clients and processes; illustrate different application protocols based on a client/server model (such as the meaning of http in a website address, POP/IMAP in email) and reconstruct a client/server model in Linux systems. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competences.

## Learning Outcomes

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

- LO1 Explore the concepts of servers, clients and processes, and the differences between PPID and PID
- LO2 Analyse the communication processes between clients and servers in different application protocols
- LO3 Create a client/server model in a Linux system utilising a range of protocols

CMP 340

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 41: Database Management Systems

## Introduction

As globalisation increases and the 24-hour economy develops, organisations must ensure that their database management systems (DBMS) are reliable, secure, efficient and able to cope with rapid change. Database management systems will continue to service the many operations of our modern world. They are becoming increasingly complex to develop and manage owing to technological advancements and changes in the way that organisations do their business in a global market.

In this unit, students will examine the structure of data and how an efficient data design follows through into an effectively developed database management system.

Students will examine the merits of different DBMS platforms and investigate system administration and management tools of the platform.

Among the topics included in this unit are: examination of different database management systems, database design tools and techniques of relational database management systems, using an open source platform to develop and test and manage a client's system.

On successful completion of this unit, students will be able to demonstrate their knowledge of the fundamentals of database management systems, make informed choices between vendor and open source platforms for database management systems, design and develop a relational DBMS for a client using an open source platform and carry out system administration tasks. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Analyse different types of database management systems

LO2 Design a database management system using a relational model to meet client requirements

LO3 Develop a database management system using a suitable platform

LO4 Demonstrate the system administration and management tools available on the chosen platform.

CMP 341

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 42: Game Design Theory

## Introduction

What makes a great game? Although it's easy to say, 'This is a great game' when your character has just cleared a zone and your friend's voice buzzes in your headset letting you know that everybody is waiting for you to join the party – then another player interrupts, suggesting tactics to take down the next objective. It is a completely different story, however, when you (the designer) are sitting, staring at a blank sheet of paper and your producer is expecting you to present 'The next big title'.

This unit introduces students to an exploration of the practices, principles and skills needed to successfully design a game. The unit starts by establishing an overall history of games and reviews, and how they have evolved – and still are evolving.

Students are introduced to assessing common game features and identifying the roles and responsibilities of people involved in game design, and its challenges.

Students will become familiar with a range of standard documents associated with games design, including the 'Game Design Document'.

Before they embark on defining, designing and documenting their own game ideas they are given opportunities to work in groups to debate and review the elements of game design.

They will be introduced to the design process as well as the practices, principles, tools and techniques. As students progress, they are given opportunities to evolve their ideas through peer review, before finally presenting a 'High Concept' pitch. To help maximise student involvement, this unit should (where possible) simulate a real-world design experience.

Among the topics included in this unit are: design documentation, research, requirement gathering, idea generation, world design, storyboards, storytelling, characters, levels, gameplay, assets and asset management, tools and techniques, game engines and environments, genres, game mechanics, player motivation and challenge, rewards, game structure, game design vocabulary and preparing and presenting a pitch.

## Learning Outcomes

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

LO1 Critically assess the types, practices, principles and skills used in the design of games

LO2 Analyse the concepts and elements required for the production of a Games Design Document

LO3 Evaluate the game design process with regard to game development and production

LO4 Use game design practices and principles to create an original Game Design Document and present a High Concept pitch.

CMP 342

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 43: Games Development

## Introduction

In the field of computing, games development is a multidisciplinary art form creating worlds that blend player psychology, problem solving and artificial intelligence with knowledge of dedicated hardware and software platforms. This level of ability can often require significant effort on the part of students, in terms of time and practice but as students gain more experience, their skills and abilities quickly improve. The capabilities and flexibility of a good games developer can easily be transferred to other roles in the business sector.

This unit introduces students to games development. It is designed to simulate the roles and responsibilities of a games developer working in a suitable games development studio with access to a small team of colleagues. Students will discuss and review a number of original game ideas before synthesising them into a single game concept. Once the game concept is defined, students will need to adopt appropriate methods and practices to analyse, break down and discuss the issues, then decide on, design, create and test a functional game. Students should be free to debate, evaluate and select different design and development methodologies depending on their own judgement and consideration.

Among the topics included in this unit are: game design and developer documentation, problem analysis, research, system and user requirements, design methodologies, development methodologies, unified modelling language (UML), games engines, hardware platforms, graphic manipulation, physics, maths for games, sound, networking, collision detection, teamwork, peer review, development tools and techniques, integrated development environments, debugging, testing, software versions and quality assurance.

On successful completion of this unit, students will be able to develop a Game Design

Document by synthesising game ideas into an original video game concept, select and use different design and development methodologies with tools and techniques associated with the creation of a video game, work individually and as part of a team to plan, prepare and produce a functional video game including support documentation, and assess and plan improvements to a video game by evaluating its performance against its Game Design Document and original concept. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation.

## Learning Outcomes

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

LO1 Develop a Game Design Document by evaluating and synthesising game ideas into an original video game concept

LO2 Use different design and development methodologies with tools and techniques associated with the creation of a video game

LO3 Work individually and as part of a team to plan and produce a functional video game, including support documentation

LO4 Evaluate the performance of a video game against its Game Design Document and original concept.

CMP 343

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 44: Games Engine & Scripting

## Introduction

Professional game development typically represents a significant investment in time, effort, skill and money. This is further complicated by the generally increasing differences in hardware platforms (such as PCs, Mac, Xbox, PlayStation, tablets and other mobile devices). Before the use of a games engine, a developer would need highly-detailed and specific knowledge relating to the platform, device drivers and operating system calls. They would also need to be capable of writing efficient lowlevel maths functions to simulate physics, gravity, calculate trajectories and determine object collisions in 2D and 3D environments, including designing image transition algorithms. Using a games engine, a developer can implement more features more quickly and more effectively, and deploy them on more platforms than ever before.

Despite using a games engine, however, there are still plenty of unique challenges to be solved.

This unit introduces students to the origin and evolution of games engines and their effect on game design. After being introduced to the core services of most engines and their advantages, students will evaluate a range of different engines and debate their features. While students assimilate, reflect on and consider the advantages and technical challenges of a games engine they will be issued with an existing Game Design Document (supported with all appropriate assets) and challenged with planning and using a specific engine to develop the design into a functional game.

Students will review and reflect on the experience, and formally assess their functional game against the Game Design Document and user expectation.

Among the topics included in this unit are: games engine evolution and purpose, player expectation, types of engine, design documentation, research, system and user requirements, game design, ad management, monetisation, usage analytics, build services, graphics and animation, adding physics, storing world data, artificial and automated intelligence, collision detection, user interface and user control methods, gameplay, assets and asset management, hardware platforms, development tools and techniques, integrated development environments, scripting languages, debugging, testing, software versions and quality assurance.

## Learning Outcomes

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

LO1 Analyse the evolution, impact and possible future of games engines with regards to game development and expectation

LO2 Evaluate the features and architecture of different games engines

LO3 Use an existing Game Design Document (with assets) to synthesise key features of a selected games engine into a playable game

LO4 Assess and plan improvements to a playable game by evaluating its performance against its Game Design Document and user expectation.

CMP 344

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 45: Internet of Things

## Introduction

The Internet of Things (IoT) is a network of physical objects – devices, vehicles, drones and other objects embedded with electronics, software, sensors and network connectivity – that enables those objects to collect and exchange data. The objective of the IoT is to enable almost any object to become smart, accessible and data capable, thereby benefitting from advances in communications, computation and interconnectivity. IoT explores the mixture of hardware, software, data, platforms and services that can be combined to create innovative opportunities for more direct integration of the physical world and objects into computer-based systems, resulting in improved efficiency, accuracy, social and economic benefit to people.

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 understanding of the methodology, terminology and benefits of IoT in the design and development of software applications.

Among the topics included in this unit are: classification and terminology of IoT, the hardware, software, data, platforms and services used to enable IoT, common architecture, frameworks, tools, hardware and APIs that can be utilised to design IoT-enabled objects, problems and solutions resulting from widespread deployment and adoption of IoT, software application methodology for IoT-specific software application design and development, data models, network complexity, security, privacy, enabling technologies and how to simulate and test an IoT concept.

On successful completion of this unit, students will be able to explain the basic concepts of IoT; design, build and simulate an IoT application using any combination of hardware, software, data, platforms and services; be able to discuss the problems that IoT applications solve; the potential impact on society, business and the end user, and the problems encountered when integrating into the wider IoT ecosystem. As a result, students will develop skills such as communication literacy, design thinking, team working, critical thinking, analysis, reasoning and interpretation and computer software literacy, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Analyse what aspects of IoT are necessary and appropriate when designing software applications
- LO2 Outline a plan for an appropriate IoT application, using common architecture, frameworks, tools, hardware and APIs
- LO3 Develop an IoT application using any combination of hardware, software, data, platforms and services
- LO4 Evaluate your IoT application and the problems it might encounter when integrating into the wider IoT ecosystem.

CMP 345

15 UK  
Credits

UK Level 5

School of  
Computing



# Unit 46: Robotics

## Introduction

Robots are becoming much more widely used, with applications ranging from agriculture through to manufacturing, including an increasing interest in autonomous systems. These are mechanical devices produced in various forms, including human form. Robots can move by themselves, and their motion can be modelled, planned, sensed, actuated and controlled by programming.

This unit is designed for students to explore robotic systems, both historic and as an area of rapid contemporary development. Student will be introduced to the different types and applications of robotic systems and will be encouraged to discuss and reflect on the implications of using robots

Topics included in this unit are an introduction to robotic systems, types of robots, industrial robots, automation system components, developing a solution, sensors, and sensor-based robots, ethical considerations, safety, social and economic impacts.

On successful completion of this unit, students will gain experience in building a robot and will be exposed to a wide range of practical applications of robotic systems.

As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Explore different robotic systems commonly used in industry, taking into account different configurations and their advantages and disadvantages

LO2 Build and appraise a robot from the perspective of cost-benefit impact

LO3 Evaluate the operation and application of a range of sensors and how they can apply to a mobile or static robotic system

LO4 Evaluate the relevance of biologically inspired robotic systems and how they can benefit the understanding of biological systems and the design of individual or groups of robots.

CMP 346

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 47: Emerging Technologies

## Introduction

Emerging technologies have the ability to disrupt industries, radically change the progress and thinking of humankind, affect society at large and solve huge problems.

Computing underpins many emerging technologies, it allows rapid development and the sharing of ideas, products and scientific understanding across multiple fields in shorter and shorter timeframes. The objective and effect of emerging technologies is usually to change the status quo. This change might be to solve problems, increase performance, improve efficiency, or to create entirely new scientific fields and novel technologies by converging different systems, technology, thinking and disciplines.

Emerging technologies include changing technologies that display radical novelty, have the potential for significant commercial or social impact and fast growth and scalability, and which affect the future in uncertain ways.

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.

Among the topics included in this unit are classification and terminology of emerging technologies, review of the most promising and impactful emerging technologies, trends of convergence, the impact of emerging technologies on software development and an understanding of the scale, scope that emerging technologies may have on organisations their employees and the individuals served by them.

On successful completion of this unit, students will be able to explain some of the most promising and impactful emerging technologies and the advantages and disadvantages. Students will also understand the impact that emerging technologies have on the development of software applications. As a result, they will develop skills such as communication literacy, design thinking, team working, critical thinking, analysis, reasoning, interpretation and computer software literacy, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Review which emerging technologies are necessary and appropriate when designing software applications for the future

LO2 Research an emerging technology and its impact on a given end-user group

LO3 Develop multiple iterations of an emerging technology solution based on requirements

LO4 Consider the ethical, social, economic and legal factors that play a role in the success of emerging technologies

CMP 347

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 48: Virtual & Augmented Reality Development

## Introduction

Virtual (VR) and Augmented Reality (AR) is the process by which you can use computer software and hardware technologies to develop fully immersive, simulated virtual reality environments or augment the real world with virtual reality content. The objective of virtual and augmented reality development is to design virtual environments or real-world augmentations for numerous beneficial, experimental, educational and entertainment purposes. VR and AR offers the potential to work, interact, play, collaborate and communicate in expansive simulated environments as well as enhance the real world with some of the benefits and features of simulated virtual environments. This unit introduces students to the role, basic concepts and benefits of VR and AR technology and how to use them in the development of VR/AR computer applications.

Students will gain an understanding of the methodology, terminology and benefits of VR and AR software applications.

Among the topics included in this unit are: classification and terminology of VR and AR technology, the relationship between VR and AR design, how VR and AR development relates to and differs from other forms of software development, modes of interaction, human-computer interaction models, usability, accessibility, aesthetics, spatial design, 3D vision, motion tracking, understand the hardware, software, data, platforms and services available to develop VR and AR software applications.

On successful completion of this unit, students will be able to explain the basic concepts of VR and AR development. They will know how to plan, build and measure the success of an appropriate VR or AR software application and design a VR or AR software application. As a result, they will develop skills such as communication, literacy, design thinking, team working, critical thinking, analysis, reasoning, interpretation and computer software literacy, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- LO1 Examine aspects of VR and AR technology necessary when designing VR and AR software applications
- LO2 Plan a VR or AR software application using common architecture, frameworks, tools, hardware and APIs for a scenario
- LO3 Design, build and simulate a VR or AR software application for a given scenario
- LO4 Review a VR or AR software application developed, based on end user feedback, to judge success.

CMP 348

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 49: Systems Integration

## Introduction

Large organisations and businesses are composed of different functional areas, such as finance, HR, customer management, engineering services, product manufacturing, storage and warehousing. These functional areas carry out different operations in order to fulfil the goals of the business and often use a variety of different IT systems, for example stock control, accounts, human resources, from a range of different suppliers and vendors to service their needs. The success of any large business or enterprise in achieving its goals depends on the ability of IT systems to communicate effectively with each other. However, IT systems from different vendors or suppliers often use different hardware and/or software platforms and services, creating the need for systems integration.

This unit introduces students to enterprise business requirements and the need for and purpose of systems integration to support organisational goals. Students will gather and review business objectives with the aim of developing a systems specification document. As part of a feasibility analysis, students will evaluate factors and issues affecting the successful completion of integration, including describing and documenting the functional architecture and design of a system. Students will explore the hardware and software technologies used to connect systems and subsystems and will establish an integration methodology to design and implement an integrated solution. Students will also investigate and compare different cloud service models and evaluate deployment methods, considering their effect on systems integration.

Among the topics included in this unit are: enterprise business objectives, purpose and operation of systems integration, systems specification documents, feasibility analysis, risk assessments, architectural development, hardware and software technologies for systems integration, operational configuration, systems integration design framework, design, development and deployment of a systems integration solution, quality assurance, cloud services as a systems integration provision, cloud service models and different deployment models, such as private and public cloud services.

## Learning Outcomes

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

LO1 Analyse systems integration requirements in terms of business objectives

LO2 Investigate different hardware and software systems in terms of connectivity, communication and data transfer.

LO3 Prepare a suitable integrated solution based on a set of business requirements

LO4 Compare a range of cloud computing providers and evaluate their services in terms of the impact on systems integration.

CMP 349

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 50: Operating Systems

## Introduction

Although many computer users do not interact directly with systems software and hardware, it is important that computing students have the opportunity to learn about these underlying systems.

MS-DOS, Windows, UNIX, Linux, Android, OS2, MacOS are just a few examples of different types of both modern and legacy operating systems. The foundation of most, if not all of them, is MS-DOS (Microsoft Disk Operating System). Way back in the 1980s, this was used as the first operating system for personal computers (PCs).

In the 1990s, MS-DOS was transformed to a GUI (Graphic User Interface) WSWIG (What You See Is What You Get) operating system through the release of Windows 3.11/Windows for Workgroups. That has led to several iterations of the Windows Operating System.

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.

On successful completion of this unit, students will be able to operate any given operating system competently and undertake routine maintenance and optimization of operating systems. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Investigate different operating systems, their functions and user interfaces

LO2 Explore the processes managed by an operating system

LO3 Demonstrate the use of DOS, Windows, UNIX and Linux.

LO4 Analyse appropriate techniques and technologies used in distributed and concurrent systems.

CMP 350

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 51: E-Commerce & Strategy

## Introduction

Electronic Commerce, known as E-Commerce, refers to any type of commercial/business transaction where information, data, products and services are exchanged across the internet. These transactions can cover a wide diversity of business types, including consumer-based retail sites, for example Amazon, sites that provide facilities such as auctions, for example eBay and business exchanges between different organisations. E-Commerce allows consumers to exchange goods and services electronically, 24/7 with no barriers in terms of time or geography.

This unit gives students an understanding of how and why businesses and organisations develop E-Commerce strategies to remain competitive in the global market. Students will gain appreciation of the elements and resources required to set up an E-Commerce site.

They will engage in the design and implementation of strategies that would, in reality, form part of a secure E-Commerce site.

Students will examine the impact that E-Commerce has on society and the global market for consumers, buyers and sellers in terms of the benefits and drawbacks of online purchasing. Students will research the technologies involved in setting up a secure E-Commerce site in preparation for implementing their own E-Commerce strategy. Students will devise their strategy based on an element of E-Commerce, such as the design of a shopping cart, an ordering system, payment system or an online marketing system. Their design should be fully implemented and evaluated accordingly in terms of its success or failure. Students will explore standards and levels of support, marketing, CRM, promotion and supply chain management in the context of developing their implementation strategy.

On successful completion of this unit, students will have gained both a technical and practical insight into E-Commerce strategy, design and development. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Examine E-Commerce strategies and their impact on business organisations

LO2 Review the hardware, software, web-based and database technologies involved in setting up a secure E-commerce site

LO3 Design an E-Commerce strategy based on a given end-user requirement or specification

LO4 Implement an E-Commerce strategy based on a given end-user requirement or specification.

CMP 351

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 52: Digital Sustainability

## Introduction

Living and working in the 21st century in the digital technologies sector presents a range of unforeseen sustainability challenges. These challenges are based on, among other potential issues, mineral resource, ethical working and employment practices, economic impact, supply chain and climate impact.

The Brundtland Commission of the United Nations in March 1987 defined sustainability as: 'sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Digital technologies is a sector in the frontline of the battle to overcome the challenges of creating a sustainable economy, but no single discipline has the capability to tackle the problems.

Sustainability is a multidisciplinary challenge and technologists of the future will have to work collaboratively with a whole range of other stakeholders, such as engineers, scientists, governmental bodies and financiers, in order to find, within an urgent timescale, the practical and technological solutions needed.

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:

LO1 Determine the nature and scope of the technical challenges, ensuring sustainability, within the digital technologies sector.

LO2 Explore the importance of collaborating with other disciplines in developing digital technical solutions to sustainability problems.

LO3 Evaluate the use of sustainable techniques in relation to their contribution to a low carbon economy

LO4 Calculate the carbon footprint of a digital technologies' solution.

CMP 352

15 UK  
Credits

UK Level 5

School of  
Computing

# Unit 53: Digital Technology as a Catalyst for Change

## Introduction

Digital technology has transformed how people communicate, learn, and work. This sector is one of the most valuable and fastest growing economic areas in most of the world.

Although the first electronic digital computer was created in the 1930s, the digital revolution began between the late 1950s and 1970s, when key developments of technologies from mechanical and analogue to digital took place. It was during this time that the use of digital computers and digital record keeping became the norm.

The industry has grown rapidly in recent decades and digital technologies are now a part of our daily lives. The digital technologies we are familiar with today are the electronic tools, systems, devices and resources that generate, store or process data.

Most popular examples include mobile phones, social media, online games, virtual reality and multimedia. Spanning cultural, creative, educational and many other industries, digital technologies are a vibrant sector with growth that has surpassed the rest of the economy.

Digital technology has completely modified the way we live today and in years to come this will be even more incredible.

In this unit, students will explore the impact of both the current and emerging digital technologies across different industries and investigate how organisations and businesses use digital technologies to meet their needs. They will also look at how an organisations strategy and leadership decision making is impacted by digital technology implementation. They will plan a solution for a specific organisation to use a new or emerging technology.

This unit can be delivered alongside the Emerging Technologies unit where they must implement a planned solution, thus allowing students an opportunity to demonstrate putting their digital technology implementation plan into action.

On successful completion of the unit, students will have explored industry sectors that use digital technologies, the history of the industry, current and emerging digital technologies, and how organisations are adapting and solving problems using digital technologies and planning for the future.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Explore how digital technologies impacts organisational change

LO2 Evaluate how the use of digital technology impacts on an organisation's strategy and operations to meet its needs

LO3 Investigate how digital technologies influence leadership decision making in relation to a specific industry

LO4 Present a new or emerging digital technology solution to manage a change initiative within a specific organisation

CMP 353

15 UK  
Credits

UK Level 5

School of  
Computing



# Unit 54: Prototyping

## Introduction

A prototype is the first or early sample, model or demonstration version of a concept, design or idea used to test functionality and gather feedback. The objective of prototyping is to build a functional and demonstrable version of a concept and use this version to evaluate different aspects of the concept with end users.

A prototype may test a single or multiple facet of a concept and can range in functionality from very basic design mock-ups to fully functional features within complex software applications.

This unit introduces students to the role, basic concepts and benefits of prototyping in the design and development process of software applications. The aim of the unit is to enhance understanding of the methodology, terminology and benefits of prototyping in the design and development of secure software applications.

Among the topics included in this unit are: classification and terminology of prototyping tools and techniques, the relationship between prototypes and release candidate software applications, how prototypes differ from release candidate software applications, categorising prototypes by their intended target end-user, functionality and testing requirements, methods of prototyping, most appropriate forms of prototype for the different categories of testing, gathering meaningful insights and results from prototype testing, software release lifecycle and software prototyping concepts.

On successful completion of this unit, students will be able to explain the basic concepts of prototyping; plan, build and measure the success of an appropriate prototype with a specific end user in mind and conduct testing to gather meaningful feedback and data in order to improve a prototype or final software application. As a result, they will develop skills such as communication literacy, team working, critical thinking, analysis, reasoning and interpretation, business skills and computer software literacy and language, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Explore forms of prototypes appropriate for various functionality and end-user testing requirements

LO2 Plan a prototype and testing strategy for a specific end user

LO3 Develop multiple iterations of the prototype using appropriate tools

LO4 Evaluate user feedback and test results from multiple iterations of the prototype and end-user testing.

CMP 354

15 UK  
Credits

UK Level 5

School of  
Computing

# School of Computing (CMP)

## YEAR 4 – UK LEVEL 6 (Top-Up)

*With Teeside University, UK*

### 2 Mandatory core Units + 3 Mandatory Specialist Units + General Education Subjects

#### Subjects 2 x Mandatory Core Units/Subjects

1. Unit 1: CMP401/ CIS3004-N Computing Project (Part 1 & Part 2) (40 UK Credits)
2. Unit 2: CMP402/ CIS3011-N Internet of Things (20 UK Credits)

#### 3 x Mandatory Specialist Units/Subjects – Depending on the selected Pathway/Major

##### **Group A: Data Analytics & Artificial Intelligence**

1. Unit 3: CMP403/ CIS3022-N Applied Machine Learning (20 UK Credits)
2. Unit 4: CMP404/ CIS3021-N Agent Based System (20 UK Credits)
3. Unit 5: CMP405/ CIS3025 Deep Learning and Applications (20 UK Credits)

##### **Group B: Computing (General)**

1. Unit 6: CMP406/ CIS3014-N Software Reliability (20 UK Credits)
2. Unit 7: CMP407/ CIS3003-N Cloud System DevOps (20 UK Credits)
3. Unit 8: CMP408/ CIS3002-N Knowledge Based AI (20 UK Credits)



**British Applied College**  
الكلية البريطانية التطبيقية

# School of Construction & Built Environments (CBE)

## Year 1 - UK LEVEL 3 – For all Pathways

### 3 Mandatory core Units + 3 Optional Units + General Education Subjects

#### 3 x Mandatory Core Units/Subjects

1. Unit 1: [CBE101](#) - Construction Technology (60 GLH)
2. Unit 2: [CBE102](#) - Construction Design (60 GLH)
3. Unit 3: [CBE 103](#) - Construction Science (60 GLH)

#### 3 x Optional Units/Subjects

***Students can choose any 3 Units/subjects from the optional list below:***

1. Unit 7: [CBE107](#) - Graphical Detailing (60 GLH)
2. Unit 8: [CBE108](#) - Sustainability in Construction (60 GLH)
3. Unit 9: [CBE109](#) - Building Information Modelling and Artificial Intelligence (60 GLH)
4. Unit 11: [CBE111](#) - Management of a Construction Project (60 GLH)
5. Unit 12: [CBE112](#) - Building Surveying in Construction (60 GLH)
6. Unit 13: [CBE113](#) - Site Engineering for Construction (60 GLH)
7. Unit 14: [CBE114](#) - Low Temperature Hot Water Systems in Building Services (60 GLH)
8. Unit 15: [CBE115](#) - Measurement Techniques in Construction (60 GLH)
9. Unit 16: [CBE116](#) - Provision of Primary Services in Buildings (60 GLH)
10. Unit 18: [CBE118](#) - Work Experience (60 GLH)
11. Unit 19: [CBE119](#) - Projects in Construction (60 GLH)
12. Unit 20: [CBE120](#) - Quantity Surveying (60 GLH)
13. Unit 22: [CBE122](#) - Economics and Finance in Construction (60 GLH)



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# Unit 1: Construction Technology

## Unit in brief

Learners examine the underlying principles and construction methods used in the construction of new buildings and their associated external works.

## Unit introduction

The construction industry provides the population of the world with the built environment needed to sustain all aspects of life as we know it. Today's buildings can use combinations of modern and traditional techniques and materials in their construction, and this unit will give you an understanding of the technology used in the design and construction of low-rise domestic and commercial buildings.

In this unit, you will examine various forms of low-rise construction and consider the most appropriate forms for differing site conditions and client requirements. You will gain an understanding of the different types of foundations that could be used on a project and the factors that influence its selection. You will investigate superstructure, external works design, and construction, considering the most appropriate specifications and details for given scenarios.

This unit will give you the underlying knowledge and understanding of construction technology that supports a wide range of other units in this qualification. Sound knowledge of construction technology is an essential aspect of many roles, including architect, site manager, quantity surveyor, planner, buyer, estimator, etc.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

A Understand common forms of low-rise construction

B Examine foundation design and construction

C Examine superstructure design and construction

D Examine external works associated with construction projects.

CBE 101

60 GLH  
10 UK Credits

UK Level 3

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# Unit 2: Construction Design

## Unit in brief

Learners will apply the principles and practice of design and construction for low- and medium-rise buildings and structures.

## Unit introduction

Almost all human activity takes place in and around buildings and structures that are, for example, places of shelter, work, worship, culture, and sport, and these places have a strong influence on our quality of life. Buildings are deceptively complex and expensive to build and maintain, so their design requires careful consideration to ensure that they are fit for purpose and meet user requirements. Creating buildings and structures is a unique process that requires input from a team of built environment professionals, who take into consideration a wide variety of factors to resolve problems and meet client requirements.

In this unit, you will learn the principles and practice involved in the design and construction of low- and medium-rise buildings and structures, and gain an understanding of how design is influenced by client requirements and external constraints. You will consider the stages involved in the design and construction process and gain an understanding of the use of design techniques, including sketching and computer-aided design (CAD) to provide efficient methods of designing, constructing, and maintaining structures over their life cycle. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. The content of this unit will give you the knowledge and understanding of design and construction that will support your progression to employment as a trainee construction professional, or entry to a construction-related higher education programme including degree-level.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

- A Understand the construction design and build concepts and processes
- B Project information and building design production
- C Construction methods and techniques.

CBE 102

60 GLH  
10 UK Credits

UK Level 3

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# Unit 3: Construction Science

## Unit in brief

Learners demonstrate an understanding of the underlying scientific principles used in the design, construction and refurbishments of buildings and infrastructure.

## Unit introduction

Roles in the construction and built environment industry require the application of knowledge and understanding related to the design of structures and infrastructure, the selection and use of construction materials, and the provision of human comfort in buildings. Whether you want to become a site manager, designer, engineer, or surveyor, you will apply the knowledge and skills to ensure that materials are fit for purpose and that specified quantities are ordered and used on a construction project.

In this unit, you will develop the skills needed to solve a variety of practical construction problems by applying knowledge of materials and scientific principles. You will learn about the science that underpins the manufacture, properties, and degradation of construction materials. You will apply mathematical principles and techniques to carry out calculations that determine how materials behave under the action of forces or loads when used as structural members, and draw conclusions regarding whether a material is fit for purpose. You will understand scientific principles and apply them to heat loss, sound reduction, and lighting levels to provide human comfort during structure design, build, and refurbishment.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

- A Explore construction materials and their properties
- B Examine the behavior of construction materials
- C Examine thermal comfort in the built environment
- D Examine how acoustics and lighting affect human comfort in the built environment.

CBE 103

60 GLH  
10 UK Credits

UK Level 3

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# Unit 7: Graphical Detailing

## Unit in brief

Learners develop knowledge and apply skills to produce graphical information by manual and computer-aided design (CAD) methods.

## Unit introduction

The construction industry is heavily reliant on communicating through the use of graphical information. Whether you are a designer, builder or planner, an understanding of drawn information and the ability to produce it yourself is an essential part of your work. Information can be produced using manual or CAD methods. Although the industry is fast moving towards CAD, skills in the use of manual methods remain very important, especially those to make freehand sketches.

In this unit, you will develop an understanding of the range of media, equipment, and techniques required to produce drawings manually, and you will learn about CAD techniques and requirements.

You will produce a number of drawings using manual and CAD methods. This unit will help you develop the skills to produce freehand sketches.

The knowledge and skills gained in this unit are essential to prepare you for progression to various roles in architectural and landscape design. An understanding of graphical representation is essential in other roles too, such as site management, site engineering, planning, and quantity surveying. It will also help you progress to a higher education programme in construction and related disciplines.

## Learning aims

In this unit you will:

A Understand the resources required to produce construction drawings

B Develop construction drawing for a given construction brief

C Undertake production of two-dimensional and three-dimensional freehand construction sketches.

CBE 107

60 GLH  
10 UK Credits

UK Level 3

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# Unit 8: Sustainability in Construction

## Unit in brief

Learners develop knowledge and understanding of the impact of construction on the natural environment and the techniques and methods used to minimise that impact.

## Unit introduction

With global warming and declining natural resources becoming major issues, sustainable construction is increasingly important to protect the world for future generations. Emissions cause long-term health issues so there is pressure on all industries, including construction, to minimize these and ensure that where they are unavoidable, they are as clean as possible.

In this unit, you will learn about aspects of the environment that need to be protected, how construction design can minimise the long-term impact that buildings have on the natural environment, and how construction activities can be adapted to minimize their impact on the local natural environment and on communities.

This unit will support you in progressing to a higher-level construction programme, such as the Higher National in Construction, or to a general construction degree. It will also help you progress to the workplace as a technician, environmental officer or site manager with a construction company.

## Learning aims

In this unit you will:

- A Understand the impact of construction on the environment
- B Explore the methods of sustainable building design
- C Examine alternative energy sources.

CBE 108

60 GLH  
10 UK Credits

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# Unit 9: Building Information Modelling and Artificial Intelligence

## Unit in brief

Learners will develop knowledge and skills in the principles and use of building information modelling (BIM) technologies and artificial intelligence (AI) to streamline the design, construction and usage of building projects.

## Unit introduction

Working in the construction industry today means that you need to know more about BIM and AI, and how to use them.

BIM aims to coordinate all aspects of a building project, covering a building's design, construction and operation, and its repurposing and recycling at the end of its useful life. AI involves the development of computer systems that are as capable as people at performing problem-solving, pattern recognition and learning tasks.

Through carrying out a BIM-enabled design and construct project, this unit introduces you to using a Digital Plan of Work (DPoW) and the Common Data Environment (CDE) in which the DpoW operates. You will understand the information management environment, learning how, for example, Construction Operations Building information exchange (COBie) is used to transfer information. You will study the benefits of adopting BIM as a modern method of construction and consider how it will support future advancements with AI. Finally, you will investigate the effect of policies, standards and legislation of a BIM-enabled environment on a design and construct project.

## Learning aims

In this unit you will:

- A Examine the use of a Digital Plan of Work in an information management environment
- B Examine the construction information management environment
- C Investigate the contribution of information management technologies to a BIM-enabled design and construct project
- D Investigate the effect of policy, standards and legislation on the BIM-enabled environment.

CBE 109

60 GLH  
10 UK Credits

UK Level 3

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# Unit 11: Management of a Construction Project

## Unit in brief

Learners gain an understanding of management principles and their application to the construction industry

## Unit introduction

Managing and delivering a project to a client on time and within budget is key to modern construction. With so many variables and potential unforeseen challenges, the job of the site or project manager is interesting, demanding, and exacting. A satisfactory and rewarding conclusion to a project requires them to have the techniques to plan, programme, budget, and manage the workforce, as well as have the skills to control these techniques in many and varied situations

In this unit, you will examine the techniques needed to manage a project from start to completion. You will learn about the roles and responsibilities of the construction management team, which will include planning, forecasting, organising, buying, motivating and cost control. You will carry out planning and production control techniques and apply these skills to the design of building programmes.

This unit will help you to progress to a higher-level construction programme, such as the Higher National in Construction, or to a degree in project management. Additionally, the content of this unit will support progression to careers in site or project management, or to other professional roles in construction, such as architecture, quantity surveying, building services engineering and structural engineering.

## Learning aims

In this unit you will:

- A Understand the principles and application of management in construction
- B Understand purchasing and cost management techniques
- C Develop a programme of activities for construction works.

CBE 111

60 GLH  
10 UK Credits

UK Level 3

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# Unit 12: Building Surveying in Construction

## Unit in brief

Learners develop the skills needed to survey existing buildings, establish current condition and size, and enable detailed survey reports/plans that highlight defects and identify potential issues.

## Unit introduction

If something goes wrong with a building, how do you know what the problem is and how to fix it? A building surveyor carries out surveys on existing properties and advises the owners on how to repair, alter or extend the building to meet new needs.

In this unit, you will learn how to carry out a buildings survey, identify defects and record findings in a format suitable for a range of end users. You will gain a good understanding of building defects, their causes and the remedies available. You will learn how to undertake a measured survey of an existing property to produce scale plans and elevations of the building.

The skills in this unit are essential for employment as a building surveyor, building inspector or real estate professional and other related construction roles in a range of areas such as construction management, site supervision, quantity surveying, commercial management and architecture. This unit will give you a good foundation for studying construction-related subjects at a higher level, including degree-level programmes.

## Learning aims

In this unit you will:

- A Understand the impact of the methods used to construct existing buildings on current and future maintenance requirements
- B Explore different defects and methods of repair for low-rise residential properties
- C Undertake a building survey of a low-rise residential property.

CBE 112

60 GLH  
10 UK Credits

UK Level 3

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# Unit 13: Site Engineering for Construction

## Unit in brief

Learners undertake site engineering processes used to set out construction and built environment projects.

## Unit introduction

The skills required for setting out construction and civil engineering works involves a high degree of accuracy. This is essential in meeting the tolerances of the elements that form the substructure and the superstructure so that the building, and its components, fit into position correctly. For example, the specification for the installation of roads is often in terms of  $\pm 3$  mm in level. Also, as a site engineer, you will need to be able to read dimensions from drawings provided by the designer and produce calculations to assist in setting out the work. Building modern city landscapes requires the ability to control the verticality of multi-storey buildings to a high degree of accuracy from storey to storey.

In this unit, you will use a range of surveying equipment to set out construction work, including string lines, pegs and total stations to ensure that the completed structure meets the designer's specifications in terms of appearance and accurate positioning. This unit gives you the opportunity to progress to site management, project management and supervision roles in the construction sector as a site manager or site engineer, or to progress to specialist civil engineering qualifications.

## Learning aims

In this unit you will:

- A Undertake the setting out of construction work on the plan
- B Undertake the setting out of infrastructure works
- C Explore how to maintain horizontal and vertical control in setting out.

CBE 113

60 GLH  
10 UK Credits

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# Unit 14: Low Temperature Hot Water Systems in Building Services

## Unit in brief

Learners develop knowledge and understanding of low-temperature hot-water (LTHW) systems that provide hot water for domestic use and heating.

## Unit introduction

In many buildings around the world, heating installations are essential for providing hot water and heating. Modern heating systems are expected to do much more than maintain the temperature of a space. They must be efficient, functional and environmentally friendly, and should contribute to sustainable development. Space heating is a major consumer of energy and therefore a significant source of carbon dioxide (CO<sub>2</sub>) emissions. Plumbers and heating engineers are responsible for the installation of such systems.

In this unit, you will investigate the development of low-temperature hot water (LTHW) heating installations. This begins with the agreement of client needs and design requirements for a system, continues through the design of layouts, proceeds to the sizing, selection and specification of pipes and equipment, and concludes with the commissioning of a system and its subsequent maintenance. This ensures that hot water is delivered at the right temperature and the heating functions correctly when switched on.

This unit will support you in progressing to a higher-level construction programme such as the Higher National in Construction with the Building Services pathway, or a general construction or building services degree. Additionally, this unit will give an insight into LTHW systems for supporting site managers, quantity surveyors and other professionals, who need a generic understanding of these systems. It also supports progression to the workplace as a technician or direct entry as an assistant services engineer in a construction company.

## Learning aims

In this unit you will:

- A Understand the design requirements for a LTHW system
- B Undertake the design of a LTHW installation for a domestic property
- C Develop a specification for materials, components and ancillary equipment for a domestic LTHW system.

CBE 114

60 GLH  
10 UK Credits

UK Level 3

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# Unit 15: Measurement Techniques in Construction

## Unit in brief

Learners undertake the quantitative techniques used to apply measurement rules in the production of a building.

## Unit introduction

Measurement is the first process that turns a construction design into a monetary value. Measurement quantifies the physical resources required for a project to be constructed. Each element is measured using a standard method of measurement. These quantities are then abstracted and entered into a document with descriptions of the work and quantities in some countries known as bills of quantities, this is then used in the tendering process to obtain quotations from the main contractors, in the form of a written tender document. The total quantities can then be published in a form that is used to rate and value the total sum for the project.

In this unit, you will examine the processes of taking off quantities for the production of tender and contract documentation that are used for the financial control of a client's project. You will learn how employers and client organisations use agreed methods of measurement for construction and civil engineering work. These standard methods set out clearly the rules for measuring quantities from the drawings and schedules created by architects and other members of the design team. You will use these methods to produce quantities for structural elements and then undertake the production of a document that can be used when producing a tender, and for financial control of the project.

This unit gives you the opportunity to progress to construction sector roles, including estimator, bid writer, buyer, quantity surveyor, cost engineer, construction economist or costing surveyor. It can also give you the skills for progression to Higher Nationals in Construction and degrees in construction specialisms.

## Learning aims

In this unit you will:

- A Examine the measurement rules for building and civil engineering
- B Undertake the production of quantities for substructure and superstructure elements
- C Undertake the production of bills of quantities.

CBE 115

60 GLH  
10 UK Credits

UK Level 3

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# Unit 16: Provision of Primary Services in Buildings

## Unit in brief

Learners examine the four primary services to understand the installation, operation and integration of these services.

## Unit introduction

The provision of high-quality building services differentiates modern buildings from those constructed in earlier times. There are four primary services that are essential for a building to be habitable: hot and cold water, drainage, electricity and gas. You must therefore develop a basic understanding of building services and construction methods so that you can contribute to their safe and effective integration. You also need to learn the installation, operation and maintenance of all the primary services.

In this unit, you will learn the principles and practices that underpin the design and installation of hot and cold water systems, above-ground and below-ground drainage, single-phase electrical systems and gas installations. You will examine the specification of building services systems in terms of the materials used, the appropriate dimensions, capacities and falls, and any health and safety issues. You will gain an understanding of the advantages and disadvantages of the different systems available to justify the selection of the systems used.

This unit will help you to progress to relevant higher-level programmes. Entry to higher-level building services programmes is also possible if supported by evidence of competence in mathematics and science. The unit will support progression to work in a variety of construction roles, both on-site and off site, including trainee positions in architectural technology, site supervision, site engineering, estimating, buying, quantity surveying, building surveying, land surveying and town planning, among others.

## Learning aims

In this unit you will:

- A Examine the practices associated with the provision of hot- and cold-water systems
- B Examine the principles and approaches associated with the provision of above- and below-ground drainage systems
- C Understand the principles of the provision of simple, single-phase electrical systems and domestic gas installations.

CBE 116

60 GLH  
10 UK Credits

UK Level 3

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# Unit 18: Work Experience

## Unit in brief

Learners explore the benefits of work experience, carrying out and reflecting on a period of work experience and planning for their personal and professional development.

## Unit introduction

If you are thinking about a career in construction, you should carry out some work experience to make you aware of the kinds of tasks and activities you may be required to complete. It will help you to reflect on, and develop, the attributes and skills required for work in the construction sector. It will also help to extend your knowledge and understanding of the roles and responsibilities of construction professionals.

In this unit, you will learn about the benefits of work experience in construction. You will examine how work experience can help you to develop personal and professional skills, such as communication and teamwork, and it will help you to understand more about the expectations of different professional roles. You will develop a plan to support your learning when on a work experience placement and you will monitor your progress through a reflective journal. This is a practical unit that will support your work experience placement in construction and give you a foundation to develop, apply and reflect on knowledge and skills in a realistic situation.

A work experience placement will help you prepare for further study in a variety of higher education programmes. It is an important factor in the progression to higher education and is a component of many degree courses accredited by the construction sector professional bodies.

## Learning aims

In this unit you will:

A Examine the benefits of work experience in construction for own learning and development

B Develop a work experience plan to support own learning and development

C Carry out work experience to meet set objectives D Reflect on the development of your own personal and professional skills and practices.

CBE 118

60 GLH  
10 UK Credits

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# Unit 19: Projects in Construction

## Unit in brief

Learners explore a real-life construction project and consider the different aspects of the project, from design through to impact in use.

## Unit introduction

Every year across the globe both big and small construction projects take place. Have you ever considered what the thought process was for a design, why they chose to clad a building with stone and not glass, or why they designed a flat roof and not a pitched roof? What about the impact a building has on the local environment, or how the building design can impact on local climatic conditions?

In this unit, you will explore a real-life construction project. You will consider the categorisation of the project and the associated design considerations. You will examine the methods and techniques of construction, and the materials used in the project, before developing an understanding of the potential economic and social impacts of the project. You will consider the positive and negative impacts on the natural environment, locally and globally.

This unit will help you to progress to a higher-level construction programme, or to a degree in construction or architecture. Additionally, the content of this unit will support progression to careers in site or project management, or to other professional roles in construction, such as architecture, quantity surveying, building services engineering, and structural engineering.

## Learning aims

In this unit you will:

- A Examine the design of a construction project
- B Investigate methods and techniques used in a construction project
- C Explore the impact of a construction project.

CBE 119

60 GLH  
10 UK Credits

UK Level 3

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# Unit 20: Quantity Surveying

## Unit in brief

Learners understand the underlying principles of quantity surveying when working for both the client and main contractor.

## Unit introduction

The financial management of construction projects has to be closely monitored to ensure that projects meet the financial needs of both the client and the contractor. The client needs the project to be completed within budget and the contractor needs to maximise return on the project.

In this unit, you will gain an understanding of the role of a quantity surveyor or commercial manager and the differences when working for a client and a main contractor. You will learn about the financial management of contracts, including the preparation of valuations and the administration of variations, through to the preparation of the final account. You will also learn about the management of cash flow in an organisation, including valuations and payments to subcontractors, suppliers and manufacturers. You will complete a final account for a given project.

This unit will support you in progressing to a higher-level construction programme, or to a general construction or quantity surveying degree. It also supports progression to the workplace as a technician, or direct entry as an assistant quantity surveyor or assistant commercial manager with a construction company.

## Learning aims

In this unit you will:

- A Understand the functions of a quantity surveyor/commercial manager
- B Undertake the production of bills of quantities or a building price calculation document for a project
- C Undertake the production of a final account for a project.

CBE 120

60 GLH  
10 UK Credits

UK Level 3

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# Unit 22: Economics and Finance in Construction

## Unit in brief

Learners investigate economic principles and how the availability of resources and the impact of the economic environment affect the financial planning, costing and feasibility of construction projects.

## Unit introduction

The financial success of construction projects depends on timescales, location, the economic climate and meeting customer needs. This, in turn, creates employment, secures the efficient use of natural resources and underpins economic growth both locally and nationally.

In this unit, you will gain an insight into how the economic principles of demand, supply and price interact. You will learn how the availability of resources and the economic environment can determine which projects to develop, where they will be developed and when construction will commence, including how government policies on regeneration, taxation and sustainability impact on activities.

In developing a sound knowledge of construction economics and finance, this unit will help you to progress to employment or to study construction-related subjects at a higher level, including degree-level programmes in construction, quantity surveying, commercial management and building surveying.

## Learning aims

In this unit you will:

- A Examine how economic principles underpin the construction industry
- B Investigate the impact of economic factors on construction projects
- C Explore how to plan and control construction costs
- D Examine the factors determining the feasibility of construction projects.

CBE 120

60 GLH  
10 UK Credits

UK Level 3

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# School of Construction & Built Environments (CBE)

## YEAR 2 – UK LEVEL 4

### 4 Mandatory core Units + 4 (Mandatory specialist Units + Optional Units) + General Education Subjects

#### Subjects 4 x Mandatory Core Units - For all pathways/majors

1. Unit 1: [CBE201](#) - Individual Project (15 UK Credits)
2. Unit 2: [CBE202](#) - Construction Technology (15 UK Credits)
3. Unit 3: [CBE203](#) - Science & Materials (15 UK Credits)
4. Unit 4: [CBE204](#) - Construction Practice & Management (15 UK Credits)

**4 x (Mandatory specialist Units + Optional Units) divided according to Major/Pathway as follows:**

#### Civil Engineering: 3 x Mandatory Specialist Units

1. Unit 6: [CBE206](#) - Construction Information (Drawing, Detailing, Specification) (15 UK Credits)
2. Unit 8: [CBE208](#) - Mathematics for Construction (15 UK Credits)
3. Unit 20: [CBE220](#) - Principles of Structural Design (15 UK Credits)

**+ 1 x Optional Unit from the list of Optional Level 4 Subjects/Units**

#### Construction Management / Interior Architecture & Design : 2 x Mandatory Specialist Units

1. Unit 5: [CBE205](#) - Legal & Statutory Responsibilities in Construction (15 UK Credits)
2. Unit 6: [CBE206](#) - Construction Information (Drawing, Detailing, Specification) (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 4 Subjects/Units**



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## List of Optional Level 4 Subjects/Units

1. Unit 7: CBE207 - Surveying, Measuring & Setting-out (15 UK Credits)
2. Unit 13: [CBE213](#) - Tender & Procurement (15 UK Credits)
3. Unit 14: [CBE214](#) - Building Information Modelling (15 UK Credits)
4. Unit 15: [CBE215](#) - Principles of Refurbishment (15 UK Credits)
5. Unit 16: CBE216 - Principles of Alternative Energy (15 UK Credits)
6. Unit 17: CBE217 - Principles of Public Health Engineering (15 UK Credits)
7. Unit 18: CBE218 - Civil Engineering Technology (15 UK Credits)
8. Unit 19: CBE219 - Principles of Electrical Design & Installation (15 UK Credits)
9. Unit 21: [CBE221](#) - Site Supervision & Operations (15 UK Credits)



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# Unit 1: Individual Project

## Introduction

The ability to define, plan and undertake a project is a critical set of skills needed in various roles within the construction industry. Identifying appropriate information and analysing this, to formulate clear results or recommendations, is required to underpin many of the processes that inform construction projects.

The aim of this unit is to support students in using and applying the knowledge and skills they have developed through other areas of their studies to complete and present an individual project. In addition, this unit will provide students with key study skills that will support them in further study.

Students will be able to identify, define, plan, develop and execute a successful project by working through a clear process. They will develop a project brief; outlining a problem that requires a solution, as well as a project specification, the specific requirements of which the final outcome must meet. They will research the problem, undertaking a feasibility study, and consider a range of potential solutions using critical analysis and evaluation techniques to test, select and contextualise their preferred solution. Students will provide a work and time management plan, keeping a diary of all activities, reflecting on their process and their learning throughout the project.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Formulate a project that will provide a solution to an identified problem
- 2 Manage a project within agreed timescales and specification; documenting the process throughout
- 3 Evaluate potential project management solutions
- 4 Produce a project report and deliver a presentation of the final project outcomes

CBE 201

15 UK Credits

UK Level 4

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# Unit 2: Construction Technology

## Introduction

The basic principles of construction technology have not changed for hundreds of years. However, the materials and techniques used to achieve these basic principles are constantly evolving; to enable the construction industry to deliver better quality buildings. Scarcity of resources and the continuing demand of more sophisticated clients, end users and other stakeholder interests, are driving the construction industry to provide buildings which facilitate enhanced environmental and energy performance, and greater flexibility, in response to ever increasing financial, environmental, legal and economic constraints.

This unit will introduce the different technological concepts used to enable the construction of building elements; from substructure to completion, by understanding the different functional characteristics and design considerations to be borne in mind when selecting the most suitable technological solution.

Topics included in this unit are: substructure, superstructure, finishes, building services and infrastructure components. On successful completion of this unit a student will be able to analyse scenarios and select the most appropriate construction technology solution.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Explain the terminology used in construction technology
- 2 Describe the different techniques used to construct a range of substructures and superstructures, including their function and design selection criteria
- 3 Identify the different types of civil engineering/infrastructure technology used in support of buildings
- 4 Illustrate the supply and distribution of a range of building services and how they are accommodated within the building.

CBE 202

15 UK Credits

UK Level 4

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# Unit 3: Science & Materials

## Introduction

Science and material performance are intrinsically linked through the need to create structures and spaces that perform in both mechanical operation and in providing human comfort.

This unit aims to support students to make material choices to achieve the desired outcomes of a brief. This is approached from the perspective of materials being fit for purpose; as defined by testing standards and properties, but also by consideration of the environmental impact and sustainability. Awareness of Health & Safety is considered alongside the need to meet legislative requirements.

The topics covered in this unit include: Health & Safety; storage and use of materials; handling, and problems associated with misuse and unprotected use; environmental and sustainable consideration in material choices; and human comfort performance parameters. Material choice is developed through the understanding of testing procedures to establish conformity to standards and define performance properties. The performance of materials to satisfy regulations and provide appropriate comfort levels is addressed through design and calculations.

Upon successful completion of this unit students will be able to make informed decisions regarding material choices; based on understanding the structural behaviour of materials established through recognised testing methods, sustainability, context of build, and Health & Safety. Students will also be able to perform the calculations necessary to establish anticipated performance of the materials in-use and therefore determine their compliance with regulations and suitability.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Review health & safety regulations and legislation associated with the storage, handling and use of materials on a construction site
- 2 Discuss the environmental and sustainability factors which can impact on and influence the material choices for a construction project
- 3 Present material choices for a given building using performance properties, experimental data, sustainability and environmental consideration
- 4 Evaluate the performance of a given building in respect of its human comfort requirements.

CBE 203

15 UK Credits

UK Level 4

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# Unit 4: Construction Practice & Management

## Introduction

The aim of this unit is to develop and provide students with a holistic understanding of construction practice and management processes. Students will investigate and research the modern construction industry, both from the practical skills embedded within the industry through to its linkage with development on-site and the connection with construction management; including roles within the industry.

The unit compares and investigates small, medium and large construction companies within the market place and how construction processes, for development, have evolved.

Students will also explore how Health & Safety has evolved within the industry, including how the major stakeholders, from companies to site operatives, have embedded Health & Safety into their preferred areas of development and careers. In addition, students will explore Building Information Modelling and how it fits into construction processes/sequences ranging from domestic to large-scale and design and build projects. The knowledge from this unit will provide students with an understanding of modern construction and management; the skills, management of people and projects, and how Health & Safety have changed the perception of the construction industry.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Describe the construction industry with reference to company structures and other activities
- 2 Explain different types of construction companies in the market and their relationships within the tendering process
- 3 Discuss the key stages in a construction project, and how Building Information Modelling informs the different stages
- 4 Analyse how the construction industry has developed suitable collaboration strategies in support of greater recognition of Health & Safety.

CBE 204

15 UK Credits

UK Level 4

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# Unit 5: Legal & Statutory Responsibilities in Construction

## Introduction

The construction industry is perceived to be a dangerous, noisy and disruptive area of work which impacts on the use of land and buildings. It is, however, governed by a range of areas of law to ensure that professionals; such as architects, quantity surveyors and contractors, comply with legal and statutory requirements to design, construct and deliver buildings and alterations using safe working practices and utilising land appropriately.

This unit will introduce the different areas of law that are relevant to the construction industry throughout the development process. This includes applying for planning approval to undertake construction activities and using building control regulations to evaluate building design and alterations at the preconstruction stage.

The unit will explore the laws of occupiers' liability, trespass and nuisance to manage construction activities on-site, and the legal aspects of the sale and leasing process involved in the disposal of buildings; using the law of contract and land law. Topics included in this unit are: planning law, building control regulations, insurance, the law of tort and the law of contract and land law. On successful completion of this unit students will be able to apply legal and statutory requirements and processes common to the construction sector.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Examine the process used to obtain planning permission for the construction and alteration of buildings
- 2 Discuss the processes and regulations used to control design and to ensure safe buildings
- 3 Assess the laws used to ensure that construction sites operate safely and consider adjoining land-users
- 4 Analyse how the law of contract and land law are used to sell and lease land and buildings.

CBE 205

15 UK Credits

UK Level 4

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# Unit 6: Construction Information (Drawing, Detailing, Specification)

## Introduction

To achieve successful projects in the built environment requires a range of different types of information: to describe the project, quantify the materials, provide clear instructions for assembly and erection, and to allow for accurate costing and management. Throughout the process of design, construction and post-occupancy management, information is critical. Through this unit students will develop their awareness of different types of construction information and their uses in the process. Students will engage in the production, reading and editing of construction information, in order to understand how this information informs different stages of the process. Using industry standard tools and systems, students will consider the ways that information may be shared and, through this, the value of collaboration in the information process. Topics included in this unit are: construction drawing, detailing, Computer Aided Design (CAD), Building Information Modelling (BIM), schedules (door, window, hardware, etc.), specifications, schedules of work, bills of quantities and information distribution and collaboration.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Evaluate different types of construction information in the context of diverse project types
- 2 Develop construction drawings, details, schedules and specifications in support of a given construction project
- 3 Interpret different types of construction information in order to explain a construction project
- 4 Assess ways in which construction professionals collaborate in the production of construction information.

CBE 206

15 UK Credits

UK Level 4

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# Unit 8: Mathematics for Construction

## Introduction

The aim of this unit is to develop students' skills in the mathematical principles and theories that underpin the Construction, Civil Engineering and Building Services curriculum. Students will be introduced to mathematical methods and statistical techniques in order to analyse and solve problems within a construction engineering context. Topics included in this unit are: trigonometry and algebraic mathematical techniques; matrices; statistical techniques; differential and integral calculus, binomial and normal distribution; dimensional analysis, arithmetic progressions; vector analysis.

On successful completion of this unit students will be able to employ mathematical methods within a variety of contextualised examples; use analytical and computational methods to evaluate and solve engineering construction problems; interpret data using statistical techniques and apply calculus techniques. Students will gain crucial employability skills such as critical thinking, problem solving, analysis, reasoning, and data interpretation.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Use analytical and computational methods to solve construction related problems
- 2 Investigate applications of statistical techniques to interpret, organise and present data by using appropriate computer software packages
- 3 Illustrate the wide-ranging uses of calculus within different construction disciplines by solving problems of differential and integral calculus.
- 4 Use mathematical methods to solve vector analysis, arithmetic progression and dimensional analysis examples.

CBE 208

15 UK Credits

UK Level 4

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# Unit 13: Tender & Procurement

## Introduction

For a client, the process of procurement, obtaining the services of a main contractor to construct their project, is often complex. The selection of a contractor that will meet the expectations of a client is essential, so that time, quality and cost constraints are met and no delays, overruns or budgets exceeded.

Tendering is the process of obtaining a price for the designed and specified works. The importance associated with contractor selection cannot be overstated for the successful completion of a client's project.

The aim of this unit is to provide students with the knowledge to select a procurement route and an appropriate tendering method in the awarding of a project to a main contractor. Students will gain knowledge of how to prepare a tender package in procuring a contractor for a client's work. Many different procurement methods are available to achieve this: from open to closed systems.

Topics included within this unit are: tendering constraints and information, the documentation needed to send out a tender, the factors that affect procurement, and the procurement methods that can be used to select a contractor.

On successful completion of this unit students will be able to obtain an estimate for a client's project, at the design stage, using a suitable procurement method. In addition, students will have the fundamental knowledge and skills to progress on to a higher level of study.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Define what constitutes a tender and the information required for this process
- 2 Explain the procedures and contractual arrangements for tendering
- 3 Analyse the factors that affect the selection of construction procurement methods
- 4 Calculate an estimate for a work activity.

CBE 213

15 UK Credits

UK Level 4

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# Unit 14: Building Information Modelling

## Introduction

The aim of this unit is to provide students with the background knowledge and understanding of Building Information Modelling (BIM) in the context of the construction industry. Students will be introduced to the drivers and benefits associated with BIM, as well as the terminology which surrounds BIM.

Topics included in this unit are: the relationship between design, construction and operation, and the relevance of information management in regard to BIM and how these concepts influence the entire process of the way an asset is managed and maintained.

The knowledge and skills gained in this unit will allow students to understand the importance of Building Information Modelling in the context of current roles and responsibilities that exist within the construction industry, and effectively understand how this may influence future choices in their professional career.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Discuss the term Building Information Modelling in the context of local, national and global developments in the construction industry
- 2 Describe the basic concepts surrounding Building Information Modelling
- 3 Discuss the differences in purpose between Building Information Modelling and its associated outcomes, and traditional forms of construction information
- 4 Assess ways in which the design and construction process of an asset influences the way that asset is managed and maintained.

CBE 214

15 UK Credits

UK Level 4

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# Unit 15: Principles of Refurbishment

## Introduction

There are buildings all over the world of different types, styles, ages and conditions. Once a building has been built there comes a need to maintain and update the property; to keep it fit for the intended purpose. Refurbishment is a broad term that covers adaptation, alteration and extension. The value of refurbishment to the construction industry is significant; with nearly half of the total value of construction coming from work to existing buildings. With a reduction of available land, legislative changes, and a drive for increased sustainability, the need to understand refurbishment has never been as prevalent as it is today.

This unit will allow students an opportunity to analyse the underpinning concepts of refurbishment and the options available. Students will be able to use construction knowledge from other units and apply it to a refurbishment project, taking into account the key factors that influence a scheme.

On successful completion of this unit students will be able to assess the suitability of a property for refurbishment, taking into consideration all applicable factors. The knowledge gained from the unit will be beneficial to those working in all aspects of the industry as a successful refurbishment project requires skills from all disciplines.

## Learning Outcomes

By the end of this unit, a student will be able to:

- 1 Explain the need for refurbishment
- 2 Compare different options for refurbishment projects
- 3 Analyse the refurbishment process
- 4 Prepare a proposal for a refurbishment scheme.

CBE 215

15 UK Credits

UK Level 4

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# Unit 20: Principles of Structural Design

## Introduction

Buildings, bridges, roads, and many other types of man-made structures are critical to the economic and social well-being of our societies. We rely upon these structures to provide us with suitable spaces and infrastructure to support our daily lives. This unit explores the fundamental principles of structural design, codes of practice and standards required to construct safe, effective static civil engineering structures commonly used in today's infrastructure projects.

Topics included in this unit are: methods and techniques used to determine bending moments and shear forces in simply supported steel and reinforced concrete beams; deflection in simply supported steel beams; and axial load carrying capacity of steel and reinforced concrete columns.

On successful completion of this unit students will be able to determine and analyse forces within fixed structures and understand the fundamental concepts of structural design.

## Learning Outcomes

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

- 1 Calculate bending moments and shear forces for simply supported steel and concrete beams
- 2 Determine deflection for simply supported steel beams
- 3 Calculate the axial load carrying capacity of steel and reinforced concrete columns
- 4 Explore design methods for steel, reinforced concrete beams and columns.

CBE 220

15 UK Credits

UK Level 4

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# Unit 21: Site Supervision & Operations

## Introduction

The construction of buildings and infrastructure involves many different types of work and many different people. The skills required to successfully manage the diverse groups of people on a building site, and to monitor and assess their work, is critical to both the success of the project and to ensure the safety of those working.

Through this unit students will develop the skills and techniques necessary to manage the people and processes of a building site, ensuring the quality of work, safe working practices and the interactions of different 'trades'.

Topics covered in this unit include: evaluating construction information, monitoring quality, identifying and notifying of defects, sustainable methods of construction, site safety regulations, Health & Safety regulations, people management, performance management, site meetings, contractor and sub-contractor relations.

## Learning Outcomes

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

- 1 Evaluate construction information to determine quality requirements
- 2 Prepare a report on defects and recommended remedial actions
- 3 Assess a pre-construction Health & Safety plan for a given construction project, in relation to local and national regulations
- 4 Discuss methods for evaluating and improving the performance of site staff.

CBE 221

15 UK Credits

UK Level 4

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# School of Construction & Built Environments (CBE)

## YEAR 3 – UK LEVEL 5

### 1 Mandatory core Units + 3 Mandatory specialist Units + 3 Optional Units + General Education Subjects

#### 1x Mandatory Core Units - For all pathways/majors

1. Unit 22: [CBE322](#) – Group Project (30 UK Credits)

#### 3 x Mandatory Specialist Units – According to the selected pathways/Majors

##### **Civil Engineering:**

1. Unit 28: [CBE328](#) - Further Mathematics for Construction (15 UK Credits)
2. Unit 29: [CBE329](#) - Geotechnics & Soil Mechanics (15 UK Credits)
3. Unit 30: [CBE330](#) - Advanced Structural Design (15 UK Credits)

##### **Construction Management:**

1. Unit 23: [CBE323](#) – Contracts & Management (15 UK Credits)
2. Unit 24: [CBE324](#) – Project Management (15 UK Credits)
3. Unit 25: [CBE325](#) – Management for Complex Buildings Projects (15 UK Credits)

##### **Interior Architecture & Design / Construction – Architectural Technology:**

1. Unit 23: [CBE323](#) – Contracts & Management (15 UK Credits)
2. Unit 26: [CBE326](#) – Advanced Construction Drawing & Detailing (15 UK Credits)
3. Unit 27: [CBE327](#) – Construction Technology for Complex Buildings Projects (15 UK Credits)

#### 3 x Optional Units

##### **Students can choose THREE Units/subjects from the optional list below:**

1. Unit 35: [CBE335](#) - Alternative Methods of Construction (15 UK Credits)
2. Unit 36: [CBE336](#) - Advanced Building Information Modelling (15 UK Credits)



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3. Unit 37: [CBE337](#) - Environmental Assessment & Monitoring (15 UK Credits)
4. Unit 38: [CBE338](#) - Personal Professional Development (15 UK Credits)
5. Unit 39: CBE339 - Transport Systems for Buildings (15 UK Credits)
6. Unit 40: CBE340 - Alternative Energy Systems Design & Installation (15 UK Credits)
7. Unit 42: [CBE342](#) - Highway Engineering (15 UK Credits)
8. Unit 43: [CBE343](#) - Hydraulics (15 UK Credits)
9. Unit 44: CBE344 - Advanced Surveying & Measurement (15 UK Credits)
10. Unit 45: CBE345 - Maintenance & Operations (15 UK Credits)
11. Unit 46: CBE346 - Advanced Materials (15 UK Credits)
12. Unit 47: [CBE347](#) - Construction Data Management (15 UK Credits)



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# Unit 22: Group Project

## Introduction

While working in a team is an important skill in construction projects, collaboration goes beyond just teamwork. The success of a project relies not only on the ability of each person in a team to do their work, but on each individual's awareness of how their work relates to the work of others, how to ensure that information is shared effectively and that roles and responsibilities are clear.

Through this collaborative project-based unit, students will explore how to define roles within a collaborative team, recognising the skills (and 'skills gaps') of each member of the group. Together students will work to develop a construction project; based on their research and analysis, in response to the Pearson-set 'theme'.

Content in this unit will typically include role identification and allocation, collaborative structures, human resources management, project management, procurement, tender documentation, information/data sharing, meetings, Health & Safety, project costing and Building Information Modelling.

## Learning Outcomes

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

- 1 Assess individual and group skills in order to allocate roles within a collaborative team
- 2 Plan a construction project, based on the Pearson-set theme, in collaboration with others to ensure good practice in resource management, staffing and project scheduling
- 3 Prepare tender documentation; undertaking work appropriate to a defined role within a team
- 4 Evaluate own work, and the work of others, in a collaborative team.

CBE 322

15 UK Credits

UK Level 5

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# Unit 23: Contracts & Management

## Introduction

The successful management of a project relies upon ensuring that work is undertaken in accordance with the terms of the contract that exists between client and contractor. In construction, a contract is the legally binding agreement between the client (who wants a project built) and the main contractor (who is responsible for constructing the project). Time, quality and costs are covered by such contracts to ensure that a client receives a project that has been specified by their designer to a budget and at an agreed handover date for completion.

The overall aim of this unit is to provide students with a working knowledge of contracts, so they can manage a project team in accordance with the agreed terms and conditions of the contract. The principle person responsible for this is often the quantity surveyor and it is their responsibility to ensure compliance with the conditions of the contract.

On successful completion of this unit students will be in a position to run and administer a project using the contract terms and conditions that have been agreed between a client and the main contractor. In addition, students will have the fundamental knowledge and skills to progress on to a higher level of study.

## Learning Outcomes

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

- 1 Discuss the requirements for a contract in meeting stakeholders' interests
- 2 Determine the criteria for the selection of a contract
- 3 Analyse different types of contract and their application to the built environment
- 4 Select and prepare an appropriate form of contract for a specific project, specifying the terms and conditions.

CBE 323

15 UK Credits

UK Level 5

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# Unit 24: Project Management

## Introduction

Management is key feature of a project from conception, through design and construction stages, into end-user and end-of-life cycles. Throughout this process, a project manager is called upon to manage stakeholders, facilitate communication and information sharing, and support different groups to ensure they are working to schedule, budget and contract.

Project managers will need to have sound knowledge, skills and competencies to manage all aspects of a complex construction project. This role may be fulfilled by a client representative or an external appointment.

The aim of this unit is to explore theories and practices relating to project management, the project manager role, and managing stakeholders throughout the project process.

Topics covered in this unit include: project management as a discipline and suitability for a range of construction industry activities; project stakeholder types and their management; project manager roles and responsibilities; project management plans.

On completion of this unit students will be able to apply the theories and practices of project management to real-world scenarios, and in doing so they will develop transferrable skills as well as equip themselves with industry-standard tools to work as an effective member of a project management team.

## Learning Outcomes

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

- 1 Compare project management theories, practices and standards; and their appropriateness for different types of project
- 2 Discuss the roles of the major stakeholders in a construction project and how their needs are managed by the project management team
- 3 Specify the attributes and competencies of a project manager in leading complex construction works
- 4 Develop a project strategy plan that defines the key policies, procedures and priorities for a complex construction project.

CBE 324

15 UK Credits

UK Level 5

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# Unit 25: Management for Complex Building Projects

## Introduction

This unit is designed to focus on factors that are involved in the relationship between the complexity of large construction projects and the management strategies required to plan, organise and co-ordinate such projects.

This unit also supports students to analyse total Health & Safety management in the light of new and existing legislation and construction contracts, and the impact it has on issues surrounding construction management.

Topics included in this unit are: management strategies, contract planning, pre-project phase, planning and design, contract selection phase, project operations, project closeout and termination phase, management team, organisational systems, cash flow/funding.

Students will be able to gain an insight into the workings of all the stakeholders who are linked together through the process of managing complex buildings, including the identification of the various project delivery systems which form the basis of contractual relationships.

## Learning Outcomes

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

- 1 Specify the management strategies that may apply at the commencement of construction projects
- 2 Review the main functions of construction management and team management in relation to complex buildings
- 3 Analyse the professional relationships involved in managing, planning and co-ordinating complex projects
- 4 Discuss contract planning techniques for complex building projects, utilising systems, technologies and supporting instruments for planning/management.

CBE 325

15 UK Credits

UK Level 5

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# Unit 26: Advanced Construction Drawing & Detailing

## Introduction

The information required to construct buildings and infrastructure is at the heart of the construction process. As structures become more complex, the types of information required become equally complex. The ability to produce, manage and understand construction information continues to be a key skill at all levels of the industry.

The aim of this unit is to provide students with an in-depth consideration of the way that construction information is created, managed, and shared throughout the lifecycle of a built asset. In addition to understanding the types of information required for complex projects, students will explore the development and use of standards to ensure consistency and interoperability of data captured and shared, both in a geometric and non-geometric fashion. Through this unit students will engage in the ways construction drawing and detailing have evolved and will be able to gain knowledge and skills in documenting projects using modern methods and technologies.

## Learning Outcomes

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

- 1 Assemble complex construction information packages to meet diverse project needs
- 2 Integrate design and construction information data from multiple sources
- 3 Evaluate the relationship between CAD and BIM data in the production and management of construction information
- 4 Prepare construction information packages for a given complex building project.

CBE 326

15 UK Credits

UK Level 5

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# Unit 27: Construction Technology for Complex Building Projects

## Introduction

This unit focuses on the erection of buildings with complex requirements by the use of modern systems and methods of construction. The principles of buildability in terms of Health & Safety, efficiency, economy, sustainability and quality are analysed. The importance of developing a sustainable construction strategy is emphasised and students will explore the techniques and procedures involved in the safe and sustainable demolition of buildings. The importance of clear technical communication is also examined during and after the build process.

This unit is designed to provide students with a thorough understanding regarding the technology involved in complex buildings. Students will discover how scientific solutions are applied to complex building projects through technology, the choice of materials, buildability and construction methods. Particular emphasis will be on the consideration of sustainability and health & safety in the building of complex structures.

On successful completion of this unit students will have related suitable strategies, processes and means of construction to meet prevailing conditions. The student will justify selected materials and construction methods used in complex buildings against set criteria, and choose systems to facilitate alternative uses of buildings. A specification/design reasonably capable of meeting the requirements of a building throughout its life will be produced by each student.

## Learning Outcomes

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

- 1 Evaluate strategies, processes and construction technology for the substructure and superstructure requirements of complex buildings
- 2 Justify materials, technology and processes used to construct substructures and superstructures for complex buildings, against time, cost and quality
- 3 Select substructures, superstructures, building services systems and internal partition walling, flooring and ceilings to provide flexibility of conditioned spaces
- 4 Propose solutions that meet the requirements of safe demolition and disposal of materials and components with regard to buildability, performance and Health & Safety.

CBE 327

15 UK Credits

UK Level 5

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# Unit 28: Further Mathematics for Construction

## Introduction

The understanding of more advanced mathematics is important within the civil engineering and building services engineering industries. Students must be introduced to additional topics that will be relevant to them as they progress to the next level of their studies; advancing their knowledge of mathematical theory gained in the Level 4 Unit 8: Mathematics for Construction.

The aim of this unit is to teach students to analyse and model civil engineering or building services engineering situations using mathematical techniques.

Among the topics included in this unit are: number theory, complex numbers, matrix theory, linear equations, numerical integration, numerical differentiation, and graphical representations of curves for estimation within an engineering context.

Finally, students will expand their knowledge of calculus to discover how to model and solve problems using first and second order differential equations.

On successful completion of this unit students will be able to use applications of number theory in practical construction situations, solve systems of linear equations relevant to construction applications using matrix methods, approximate solutions of contextualised examples with graphical and numerical methods, and review models of construction systems using ordinary differential equations. As a result they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

- 1 Apply instances of number theory in practical construction situations
- 2 Solve systems of linear equations relevant to construction applications using matrix methods
- 3 Approximate solutions of contextualised examples with graphical and numerical methods
- 4 Review models of construction systems using ordinary differential equations.

CBE 328

15 UK Credits

UK Level 5

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# Unit 29: Geotechnics & Soil Mechanics

## Introduction

This unit explores the essential relationship between civil engineering and the Earth's crust, in the support of built structures and highways. The ability to understand, evaluate and develop solutions, related to soil and rock, is a key aspect of civil and structural engineering.

Topics included in this unit are: rock types, soil description and classification, methods and techniques used when undertaking site investigations and laboratory testing, determination of soil properties and the importance of these geotechnical procedures and resultant findings to civil engineers.

On successful completion of this unit students will be able to analyse and evaluate modern geotechnical methods and apply these skills and knowledge to the initial design of infrastructure.

## Learning Outcomes

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

- 1 Review rock types, their formation and uses within civil engineering
- 2 Explore and classify soils to current codes of practice
- 3 Analyse soil properties determined by geotechnical procedures
- 4 Produce a proposal to address identified geotechnical weaknesses and problems.

CBE 329

15 UK Credits

UK Level 5

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# Unit 30: Advanced Structural Design

## Introduction

With the development of new materials and processes, along with technologies that allow us to design and model more complex structures, the demands on structural design become more complex. The ability to conceive of and accurately model complex buildings, bridges, roads and other types of structure, pushes both the aesthetic and technical envelope.

In managing the design and construction of modern structures, the civil or structural engineer must be able to carry out more complex calculations; dealing with dynamic conditions, while maintaining an awareness of the overall design intention.

Extending areas of study, from Unit 20: Principles of Structural Design, this unit will support students to extend their ability to design, test and quantify more complex structural conditions.

## Learning Outcomes

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

- 1 Explore deflection due to wind loadings, on fixed structures, and strategies to resist wind loading
- 2 Determine bending, shear and deflection for complex support conditions
- 3 Design complex columns and piled foundations based on calculation
- 4 Explore the design of tensile structures.

CBE 330

15 UK Credits

UK Level 5

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# Unit 34: Advanced Quantities for Complex Building Projects

## Introduction

This unit aims to extend the skills gained in Unit 11: Measurement & Estimating by developing the composite measurement of more complex elements, components and building services of non-domestic and large-scale buildings.

This unit has been designed to enable students studying construction, civil engineering and building services engineering to apply, analyse and measure a range of components and elements found in large-scale buildings or structures, and to produce quantities within the function of a quantity surveyor.

Topics included within this unit are: estimating techniques, standard methods of measurement, taking-off dimensions, preparation of bills of quantities, estimating data collection and the assembly of an estimate for a work package.

On successful completion of this unit students will be in a position to take-off quantities from drawn information and to prepare estimates for work packages. In addition, students will have the fundamental knowledge and skills to progress on to a higher level of study.

## Learning Outcomes

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

- 1 Apply measurement techniques to a range of complex situations
- 2 Produce measured quantities for a range of elements and components on large- scale projects
- 3 Develop relevant preamble and preliminary items to given situations
- 4 Create measured bills of quantities and schedules using both manual and computer techniques.

CBE 334

15 UK Credits

UK Level 5

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# Unit 35: Alternative Methods of Construction

## Introduction

The construction industry seeks to be dynamic and forward thinking, but in reality most buildings are still constructed using many of the same materials and processes that have been utilised for centuries. While there is accumulated knowledge in the use of 'tried-and-tested' methods, these are not always the most efficient or cost effective. Combined with this is the fact that the construction industry is one of the largest contributors to CO2 emissions and is under increasing pressure, and legislation, to improve its processes and practices.

However, the industry also faces other challenges. As one of the most important sectors of the global economy, it is imperative that construction is able to meet the demands for housing, office, institutional and commercial development. Continuing to build, using traditional methods, will not be sufficient. One of the ways in which the sector is exploring how to address sustainability and increase productivity is through the development and implementation of alternative forms of construction.

On successful completion of this unit students will have examined how the construction industry impacts on the environment; explored alternative construction methods which are fit for purpose; government policy implications and Health & Safety constraints associated with alternative construction methods; and designed a fit-for-purpose structure using an alternative construction method.

## Learning Outcomes

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

- 1 Examine how the construction industry impacts on the environment, and how changes in the industry can create broader social and economic benefits
- 2 Explore alternative construction methods which are fit for purpose in a given context
- 3 Discuss government policy implications and Health & Safety constraints associated with alternative construction methods
- 4 Present a design proposal, utilising a selected alternative construction method.

CBE 335

15 UK Credits

UK Level 5

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# Unit 36: Advanced Building Information Modelling

## Introduction

The aim of this unit is to provide students with an understanding of the detailed processes that support and guide construction professionals within the context of Building Information Modelling (BIM). Students will be able to explore the relevance of BIM in the construction industry and understand how the standards and processes that support BIM will enable better information management across the life of a project.

This unit will also explore and detail the relevant changes to existing documentation and information within a project and how this information is developed across the various stages of a project. There are a series of standards that support BIM and students will begin to determine their relevance and utilise them within a BIM process.

The knowledge and skills provided within this unit will enable students to understand the context of BIM within the construction industry and relate this to further study or the realities of today's workplace. This will enable them to be able to effectively determine the relevance of BIM within the construction industry today and how this may affect future processes.

## Learning Outcomes

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

- 1 Evaluate the processes and procedures that are required in order to successfully implement BIM within the context of an organisation or a project
- 2 Explore BIM standards and how these support working in the context of a BIM-enabled project
- 3 Discuss key documentation that may be required for a BIM-enabled project
- 4 Assess how BIM can ensure data is created, shared, stored, managed and kept accessible to all stakeholders involved in a project.

CBE 336

15 UK Credits

UK Level 5

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# Unit 37: Environmental Assessment & Monitoring

## Introduction

The construction industry is one of the least sustainable industries in the world; using around half of all the resources that humankind consumes. Yet society depends on construction to grow; making it increasingly important to find ways to reduce its impact. Environmental assessment methods were conceived in order to drive improvements in the built environment. They provide common methodologies that enable the environmental impact of buildings and building products to be measured, evaluated and reduced.

This unit explores the important role that environmental assessment and monitoring plays in reducing the environmental impact of the built environment. On successful completion of this unit students will be able to undertake an environmental assessment of a building and compare its performance against other similar buildings. Students will understand the types of environmental impact that a building can have and how this affects the environment over time. They will evaluate the different environmental assessment methods that exist, and understand the motivations, methods and differences between them.

## Learning Outcomes

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

- 1 Discuss what is meant by sustainability and its relevance to the built environment
- 2 Compare the ways that sustainability in construction can be quantified, assessed and monitored, and how this can be used to drive change in the construction industry
- 3 Evaluate the features and drivers behind different environmental assessment methods
- 4 Carry out an environmental assessment on a building; comparing its performance with similar buildings.

CBE 337

15 UK Credits

UK Level 5

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Environments



# Unit 38: Personal Professional Development

## Introduction

As a professional, learning is a continuous and lifelong process. Within the construction industry there are constant changes in technology, materials, processes, legislation and practice. In order to remain up-to-date, it is necessary to recognise the potential of both structured, classroom-based learning and the learning that is gained through professional activities 'on the job'.

This unit provides a framework in which students have the opportunity to reflect upon and contextualise the learning that they gain from working within the industry. In co-ordination with tutors and their employer, students will define the scope, duration and content of their expected work-based learning experience. Throughout the period of their work-based learning experience, students will be expected to record and reflect upon their own learning.

## Learning Outcomes

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

- 1 Assess personal learning needs and opportunities within the context of employment
- 2 Plan and manage own personal learning journey, through consultation with employer and tutor/instructor
- 3 Record personal progress and the feedback of others; responding as appropriate to own future development
- 4 Evaluate own learning, based on personal experience and comments from others, in order to plan for the future.

CBE 337

15 UK Credits

UK Level 5

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# Unit 42: Highway Engineering

## Introduction

The quick and flexible means of transport, afforded to us by motor vehicles, has transformed modern life. This ease of mobility is afforded by the construction and maintenance of our road system. The increased volume of traffic and the need to have an efficient road network to transport resources requires us to become more proactive in developing innovative highway solutions. In recent years, we have seen the introduction of 'smart motorways' and 'guided bus-ways'; however, we will require more creative and resourceful solutions for the future.

This unit explores the planning, design, construction and maintenance of our road infrastructure; including the supporting structures such as tunnels, bridges and full pavement construction.

On successful completion of this unit students will be able describe a new route process for a highway as well as explaining civil engineering aspects, including pavement types. They will also be able appraise improvements to the existing road infrastructure.

## Learning Outcomes

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

- 1 Evaluate how a new highway route is identified, planned and designed
- 2 Assess the methods of earthwork operations, bridges and tunnelling which are used in connection with the provision of highways
- 3 Justify the selection of pavement construction type for a given highway provision
- 4 Present a report that specifies improvement that can be made to a given highway infrastructure project, including maintenance techniques and planning.

CBE 342

15 UK Credits

UK Level 5

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Environments

# Unit 43: Hydraulics

## Introduction

The action, management and distribution of fluids, in relation to built structures, is critical. In civil engineering, it is necessary to ensure that we are able to manage the pressures that water may put on structures, either through its flow or the forces exerted and how to resist these. In building services, the balance between necessary pressures to ensure flow and distribution of fluids (through heating/cooling systems or domestic water supplies), and the sizing of pipes to support this flow, will determine efficiency and effectiveness of a system.

However, fluids are dynamic; their behaviour changes based on a range of factors. Thus, the ability to estimate and manage their forces, rates of flow and suitable systems for control requires specialised calculations, equipment and maintenance.

Through this unit students will explore principles of hydrostatic and hydrodynamic fluids, calculate a range of factors and use these calculations to arrive at practical hydraulic solutions.

## Learning Outcomes

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

- 1 Apply concepts of physics to develop solutions for hydrostatic and hydrodynamic problems
- 2 Calculate forces related to fluids at rest and in motion
- 3 Develop practical solutions for the distribution of fluids within correctly sized pipes
- 4 Calculate the hydrostatic pressure exerted on substructures for a given context.

CBE 343

15 UK Credits

UK Level 5

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# Unit 47: Construction Data Management

## Introduction

A tremendous amount of information is shared, stored, managed and created as part of a complex construction project. It is for this reason that data management forms a critical component to the future of the construction industry. The skills required to be able to effectively manage and review this information intelligently are equally critical. This unit will draw upon the main concepts surrounding Building Information Management (BIM) and further explore the importance of information management.

This unit will detail the processes required to effectively communicate the information required by the client, or asset owner, and how to ensure data is managed throughout a project with the relevant skills and requirements necessary to avoid duplication, error or missing information.

The knowledge, skills and understanding of the importance of data within a BIM- enabled project is critical for the success of the project and students will begin to explore ways in which this process is managed intelligently and supported across a project lifecycle.

## Learning Outcomes

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

- 1 Assess the importance of information management within the construction industry
- 2 Evaluate the role of information management and how it can benefit and support intelligent information exchanges
- 3 Illustrate the information delivery cycle, in regard to BIM, and how the information management process aids the design, construction and occupation of an asset
- 4 Discuss the ways in which information can be captured, shared and managed throughout a project lifecycle.

CBE 347

15 UK Credits

UK Level 5

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# School of Construction & Built Environments (CBE)

## YEAR 4 – UK LEVEL 6 (Top-Up)

### 5 Mandatory core Units + General Education Subjects

### 5 x Mandatory Specialist Units/Subjects – Depending on the selected Pathway/Major<sup>1</sup>.

#### **Civil Engineering:**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 2: [CBE402/ ENG402 / MMD3058-N](#) Project (40 UK Credits)
3. Unit 3: [CBE403 / MMD3045-N](#) Design of Concrete Structures (20 UK Credits)
4. Unit 4: [CBE404 / MMD3046-N](#) Hydrology & Hydraulic Systems (20 UK Credits)
5. Unit 5 : [CBE405 / MMD3043-N](#) Construction Management & Contracts (20 UK Credits)

#### **Interior Architecture & Design**

1. Unit 6: [CBE406 /MMA3023-N](#) Building rehabilitation (20 UK Credits)
2. Unit 7: [CBE407 /MMA3014-N](#) Writing architecture (20 UK Credits)
3. Unit 8: [CBE408 /MMA3016-N](#) CAD: Visualization and BIM (20 UK Credits)
4. Unit 9 : [CBE409 /MMA3015-N](#) Major Project: Realization (20 UK Credits)
5. Unit 10: [CBE410 /MMA3013-N](#) Major Project: Research and Development (40 UK Credits)

#### **Construction Management**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 5 : [CBE405 / MMD3043-N](#) Construction Management & Contracts (20 UK Credits)
3. Unit 11: [CBE411 / ENG3022-N](#) Digital Information Management in Construction (20 UK Credits)
4. Unit 12: [CBE412 / ENG3023-N](#) Supply Chain Management in Construction (20 UK Credits)
5. Unit 15 : [CBE415 / ENG3024-N](#) Construction Project (40 UK Credits)



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## Unit 6: (MMA3023-N) Building rehabilitation

This module develops your critical thinking and an understanding of current issues and debates in the field of building rehabilitation and conservation. You are encouraged to explore a variety of themes to extend skills in building research, analysis of existing buildings, independent study and communication as you investigate and develop ideas. Applying analytical skills to reflect upon and evaluate research via a minor design project, and through this iterative practice prepare a personal standpoint for progression towards your final major project.

CBE  
406 MMA3023-N

20 UK Credits

UK Level 6

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## Unit 7: (MMA3014-N) Writing architecture

As spatial designers, you work within the boundaries, contexts, and histories of existing buildings and therefore need to develop skills in research, contextualization, critical thinking, and communication. This module provides you with the opportunity for extended independent research on a topic of personal interest within the broad field of spatial design.

CBE  
407 MMA3014-N

20 UK Credits

UK Level 6

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## Unit 8: (MMA3016-N) CAD: Visualization and BIM

Building performance and sustainability have become increasingly important in building design and refurbishment. This module will introduce you to the concepts and measurement of Building Information Modelling and some of the design technologies that the process can utilize.

CBE  
408 MMA3016-N

20 UK Credits

UK Level 6

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## Unit 9: (MMA3015-N) Major Project: Realization

This module enables you to bring your design project ideas to fruition, considering all aspects of research and development. You will be encouraged to demonstrate a high level of professional competence in the realization of your projects and to have a deep understanding of the social and theoretical context in which you are practicing. As a group, you will organize your work for presentation in either a physical or online digital exhibition involving technical work, interior visualization, model making, and the specification of materials, furniture, and finishes

CBE  
409 MMA3015-N

20 UK Credits

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## Unit 10: (MMA3013-N) Major Project: Research and Development

The selection, scope, and focus of the final project are agreed upon through negotiation with module tutors to ensure appropriate levels of complexity, rigor, and acceptable ethical content. This module aims to enable you to explore and define the parameters of your own professional practice and research interests. You will be helped and encouraged to develop an understanding and gain experience in research as both an academic discipline and as part of the creative process, leading to a final design project.

CBE  
410 MMA3013-N

20 UK Credits

UK Level 6

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## Unit 5: (MMD3043-N) Construction Management and Contracts

Students will gain an understanding of construction management techniques relevant to the construction industry with regards to estimating, cost and time control, quality issues and health & safety. This module will also provide the students with a working knowledge of procurement arrangements and cost analysis as used in the construction industry. The nature of contract law will be explored allowing the students to develop a knowledge and understanding of the common types of contract used in the construction industry.

CBE  
405 MMD3043-N

20 UK Credits

UK Level 6

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## Unit 3: (MMD3045-N) Design of Concrete Structures

The module examines engineering properties of concrete, analysis and design concepts and procedures used in structural design. The module provides the student with the analysis and design knowledge required to carry out the design of common structural elements and building frames built using reinforced concrete to the appropriate National and European Standards in structural design.

CBE  
403 MMD3045-N

20 UK Credits

UK Level 6

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## Unit 4: (MMD3046-N) Hydrology & Hydraulic Systems

The module examines engineering properties of concrete, analysis and design concepts and procedures used in structural design. The module provides the student with the analysis and design knowledge required to carry out the design of common structural elements and building frames built using reinforced concrete to the appropriate National and European Standards in structural design.

CBE  
404 MMD3045-N

20 UK Credits

UK Level 6

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## Unit 1: (EAC3019-N) Group Design

The module examines engineering properties of concrete, analysis and design concepts and procedures used in structural design. The module provides the student with the analysis and design knowledge required to carry out the design of common structural elements and building frames built using reinforced concrete to the appropriate National and European Standards in structural design

CBE  
401 EAC3019-N

20 UK Credits

UK Level 6

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## Unit 5: (MMD3043-N) Construction Management & Contracts

This module aims to provide students with an understanding of construction management techniques and procurement procedures relevant to the construction industry. They will develop the ability to apply and critique the use of standard techniques and procedures typically used by construction organizations to manage projects in order to meet cost and time control, quality issues and health & safety. They will also learn how these principles may be applied to the management of construction projects within project modules.

CBE  
4MMD3043-N

20 UK Credits

UK Level 6

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## Unit 2: (MMD3058-N) Project

The aims of the module are to provide an appropriate environment for students to research in depth a subject relevant to their programme and the continued development of transferable key skills. It further aims to expose students to problems which involve the consideration of relevant legal, social, ethical and professional issues and to enable students to develop and practice a professional approach to the presentation, delivery and appraisal of written and oral presentations.

CBE  
402 MMD3058-N

20 UK Credits

UK Level 6

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## Unit 15: (ENG3024-N) Construction Project

You investigate an area of engineering for an extended period, building on your knowledge acquired throughout the course and allowing you to develop your independent learning skills. The topic can be in the form of a research project, design project or industry-based project.

CBE  
415 ENG3024-N

40 UK Credits

UK Level 6

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## Unit 11 (ENG3022-N) Digital Information Management in Construction

Develop the knowledge and skills to become an information manager, or BIM manager in your future career. You study the methodologies to manage digital BIM based projects for the construction and engineering fields, learning how to create, manage and encourage other users to work within the BIM collaboration space.

CBE  
411 ENG3022-N

20 UK Credits

UK Level 6

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## Unit 12 (ENG3023-N) Supply Chain Management in Construction

You investigate a range of applied quality management techniques and develop the skills necessary to apply these techniques to your own work environment. You examine the appropriate statistical techniques in quality control, auditing, supply chain management and a range of accreditation schemes (including BRC, EFSIS, ISO, and UKAS) and industry standards.

CBE  
412 ENG3023-N

20 UK Credits

UK Level 6

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# School of Engineering (ENG)

## YEAR 1 – UK LEVEL 3 – For all Pathways

### 2 Mandatory core Units + 1 Mandatory specialist Units + 2 Optional Units + General Education Subjects

#### 2 x Mandatory Core Units

1. Unit 2: [ENG102](#) - Delivery of Engineering Processes Safely as a Team (60 GLH)
2. Unit 3: [ENG103](#) - Product Design and Manufacture in Engineering (120 GLH)

#### 1 x Mandatory Specialist Unit – Depending on the selected Pathway/Major

1. Unit 1: [ENG101](#) - Mechanical Principles (60 GLH)
2. Unit 57: [ENG157](#) - Electrical and Electronic Principles (60 GLH)

#### 2 x Optional Units/Subjects

1. Unit 1: [ENG101](#) - Mechanical Principles (60 GLH)
2. Unit 57: [ENG157](#) - Electrical and Electronic Principles (60 GLH)
3. Unit 4: [ENG104](#) - Applied Commercial and Quality Principles in Engineering (60 GLH)
4. Unit 5: [ENG105](#) - A Specialist Engineering Project (60 GLH)
5. Unit 7: [ENG107](#) - Calculus to Solve Engineering Problems (60 GLH)
6. Unit 9: [ENG109](#) - Work Experience in the Engineering Sector (60 GLH)
7. Unit 10: [ENG110](#) - Computer Aided Design in Engineering (60 GLH)
8. Unit 11: [ENG111](#) - Engineering Maintenance and Condition Monitoring Techniques (60 GLH)
9. Unit 12: [ENG112](#) - Pneumatic and Hydraulic Systems (60 GLH)
10. Unit 19: [ENG119](#) - Electronic Devices and Circuits (60 GLH)
11. Unit 25: [ENG125](#) - Mechanical Behaviour of Metallic Materials (60 GLH)
12. Unit 30: [ENG130](#) - Mechanical Measurement and Inspection Technology (60 GLH)
13. Unit 33: [ENG133](#) - Computer Systems Security (60 GLH)
14. Unit 35: [ENG135](#) - Computer Programming (60 GLH)
15. Unit 36: [ENG136](#) - Programmable Logic Controllers (60 GLH)
16. Unit 41: [ENG141](#) - Manufacturing Secondary Machining Processes (60 GLH)



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1. Unit 43: [ENG143](#) - Manufacturing Computer Numerical Control Machining Processes (60 GLH)
2. Unit 44: [ENG144](#) - Fabrication Manufacturing Processes (60 GLH)
3. Unit 45: [ENG145](#) - Additive Manufacturing Processes (60 GLH)
4. Unit 47: [ENG147](#) - Composites Manufacture and Repair Processes (60 GLH)
5. Unit 48: [ENG148](#) - Aircraft Flight Principles and Practice (60 GLH)
6. Unit 56: [ENG156](#) - Industrial Robotics (60 GLH)
7. Unit 58: [ENG158](#) - Entrepreneurship and Intrapreneurship in Practice (60 GLH)
8. Unit 59: [ENG159](#) - Principles of Electrical Machines (60 GLH)
9. Unit 60: [ENG160](#) - Autonomous Mobile Robotics (60 GLH)



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# Unit 1: Mechanical Principles

## Unit in brief

Learners will develop the skills and knowledge required to solve mechanical-based engineering problems by applying mathematical and physical science principles.

## Unit introduction

Modern life depends on engineers to develop, support and control the mechanical products and systems that are all around us, for example cars, machinery and manufacturing and transport systems. To make a contribution as an engineer, you must be able to draw on an important range of principles developed by early engineering scientists, such as Archimedes, Isaac Newton and James Watt.

There is an increasing demand for 'multi-skilled' engineers who can apply principles from several engineering disciplines to develop solutions to engineering problems. This unit will develop your mathematical and physical scientific knowledge, and understanding to enable you to solve problems set in an engineering context. You will explore and apply the algebraic and trigonometric mathematical methods required to solve engineering problems. The mathematical and physical science principles covered in this unit' or 'the engineering principles covered in this unit.

This sits at the heart of the qualification and gives you a foundation to support you in any engineering technician role, a trainee job role with an employer, or to help with your progression to higher education.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

- A** Examine how algebraic and trigonometric mathematical methods can be used to solve engineering problems
- B** Examine how static engineering systems can be used to solve engineering problems
- C** Examine how dynamic engineering systems can be used to solve engineering problems
- D** Examine how fluid engineering systems can be used to solve engineering problems.

ENG 101

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 2: Delivery of Engineering Processes Safely as a Team

## Unit in brief

Learners explore how processes are undertaken by teams to create engineered products or to deliver engineering services safely.

## Unit introduction

The use of engineering processes is integral to the manufacture of engineered products and the delivery of engineering services. Thousands of engineering processes are used in the manufacture and service of a complex product such as an aeroplane. To ensure that these engineering processes can be planned and carried out safely and effectively, engineers must be able to work together to get the job done. It is for this reason that so many engineering companies focus time and effort on understanding engineering processes and developing teamwork.

In this unit, you will examine common engineering processes, including health and safety legislation, regulations that apply to these processes and how individual and team performance can be affected by human factors. You will learn the principles of another important process, engineering drawing, and develop two-dimensional (2D) computeraided drawing skills while producing orthographic projections and circuit diagrams.

Finally, you will work as a team member and team leader to apply a range of practical engineering processes to manufacture a batch of an engineered product or to safely deliver a batch of an engineering service. To complete the assessment task within this unit, you will need to draw on your learning from across your programme.

It is important that engineers understand how engineering processes are used to safely transform ideas and materials into products and services, and how critical it is to be able to work as a valuable member of an effective team or as a team leader. This unit will enable you to apply the knowledge and understanding you gained in *Unit 1: Mechanical Principles*. The unit will help to prepare you for an engineering traineeship, a higher education engineering degree or a technician level role in a wide range of specialist engineering areas.

## Learning aims

In this unit you will:

- A** Examine common engineering processes to create products or deliver services safely and effectively as a team
- B** Develop two-dimensional computer-aided drawings that can be used in engineering processes
- C** Carry out engineering processes safely to manufacture a product or to deliver a service effectively as a team.

ENG 102

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 3: Product Design and Manufacture in Engineering

## Unit in brief

Learners will explore engineering product design and manufacturing processes, and will complete activities that consider function, sustainability, materials, form and other factors.

## Unit introduction

Engineering products are part of our daily lives, from aircraft to the smallest electronic circuits found in medical devices. Engineering products are designed as a result of the identification of a need or opportunity, and then engineers use creative skills and technical knowledge to devise and deliver a new design or improvements to an existing design. For example, advances in the development of fuels led to the first internal combustion engine, and engineers have been improving its design ever since.

In this unit, you will examine what triggers changes in the design of engineering products and the typical challenges that engineers face, such as designing out safety risks. You will learn how material properties and manufacturing processes impact on the design of an engineering product. You will also use an iterative process to develop a design for an engineering product by interpreting a brief, producing initial ideas and then communicating and justifying your suggested solution. You will draw on your learning from across your programme to complete the assessment tasks.

It is important that engineers use creative and technical knowledge, understanding and skills to transform ideas into viable products, and that they understand the critical importance of this activity in ensuring that products are both safe and effective. This unit will help prepare you for an engineering apprenticeship, engineering courses in higher education and for technician-level roles in a variety of engineering sectors.

## Assessment

This unit has a set assignment. Learners must complete a Pearson Set Assignment Brief.

## Learning aims

In this unit you will:

- A** Explore design triggers, challenges, constraints, opportunities and operational requirements
- B** Use an iterative process to develop ideas and a modified product design
- C** Generate technical justifications and validations for the design solution.

ENG 103

120 GLH  
20 UK Credits

UK Level 3

School of  
Engineering



# Unit 4: Applied Commercial and Quality Principles in Engineering

## Unit in brief

Learners explore commercial engineering, for example key business activities, cost control, quality systems and value management, which is used by engineering organisations to create value.

## Unit introduction

Engineering organisations use a wide range of systems and methods to ensure that they are competitive. For example, organisations can develop a competitive advantage by increasing the quality of their products, innovating with new product designs or reducing the cost of their operations. Well-known brands that have successfully produced a competitive advantage in this way include Dyson, Rolls-Royce and Škoda.

In this unit, you will explore how key business activities and trade considerations influence engineering organisations and are used to create a competitive advantage. You will understand why organisations need to control costs and how they make decisions, applying an activity-based costing methodology. You will also understand what is meant by quality and why it means different things to different people; you will investigate quality systems, including quality assurance and control. Finally, you will explore value management as a process to create value in an organisation.

The quality systems and value management principles and processes provide a foundation for business process improvement techniques, such as Lean and Six Sigma, which many engineering organisations follow to ensure continuous improvement. It has not been possible to include these methodologies as part of this unit; however, should you encounter them in the workplace then this unit provides a basis for understanding and applying them.

As an engineer, it is important that you understand some of the commercial and competitive considerations that ensure that engineering organisations thrive. You will need to apply these principles to technical engineering projects to ensure that they add value to the organisation and are profitable. This unit will help to prepare you for an engineering traineeship, higher education and technician-level engineering roles.

## Learning aims

In this unit you will:

- A** Examine business functions and trade considerations that help engineering organisations thrive
- B** Explore activity-based costing as a method to control costs and to determine if an engineering product or service is profitable
- C** Explore how engineering organisations use quality systems and value management to create value.

ENG 104

60 GLH  
10 UK Credits

UK Level 3

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# Unit 5: A Specialist Engineering Project

## Unit in brief

Learners apply project-management principles to undertake a 30-hour individual project and will produce a product, system or process relevant to their specialist area of study.

## Unit introduction

Project management, and understanding the project life cycle, is a fundamental part of all engineering disciplines, from aerospace and computing – which may involve the development of new products and services – to the manufacturing sector, which may involve refurbishing or installing equipment. The output from a project is varied and could be a product/service, system or process that is relevant to your specialist area of study.

There are many approaches to project management, and in this unit you will understand and apply one project-management approach over the life cycle of a project to solve an engineering-based problem on a given theme or idea. This will involve you researching an engineering-based problem and using your creative skills to generate a range of solutions to the problem. You will produce a feasibility study to select the most appropriate solution given the known constraints. Over the life cycle of the project you will make use of project-management processes, such as monitoring progress and managing risks, to design and develop a solution that is fit for audience and purpose.

You will demonstrate high-standard behaviours during the development of your solution and will present your solution in a portfolio of evidence. In this unit, you will draw on your learning from across your programme to complete assessment tasks.

The purpose of the specialist engineering project is for you to consolidate and build on the knowledge and skills gained throughout your BTEC National programme of study. The completion of this unit will help you to progress to employment as an engineering technician, or to a traineeship/apprenticeship or higher education.

## Learning aims

In this unit you will:

- A** Investigate an engineering project in a relevant specialist area
- B** Develop project-management processes and a design solution for the specialist engineering project as undertaken in industry
- C** Undertake the solution for a specialist engineering project and present the solution as undertaken in industry.

ENG 105

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 7: Calculus to Solve Engineering Problems

## Unit in brief

Learners use differential (rates of change) and integral (summing) calculus to solve engineering problems and develop a mathematical model of a local and relevant system.

## Unit introduction

Many of the products, components and systems that we use have been subject to a rigorous design process that will have involved the use of calculations, including mathematical calculus. During the design stage, it is important to be able to predict how a product will perform in service, for example the handling characteristics of a car or the power output from an electrical power supply. Also, investing time and resources in setting up manufacturing machinery and supply chains is very expensive – working with formulae and numbers on paper or using a computer involves a lot less cost and allows engineers to determine optimal (or near-optimal) solutions.

In this unit, you will investigate how to apply differential and integral calculus methods to solve engineering problems. You will learn about the rules and procedures of calculus mathematics to obtain solutions to a variety of engineering problems. You will solve a complex problem from your specialist area of study and perhaps from a local organisation by breaking it down into a series of linked, manageable steps. Each step will be solved using calculus methods learned through investigation and practice. These mathematical skills are transferable and will be used to support your study of other topics in the BTEC Nationals engineering programme, for example in mechanical principles and electrical systems.

As an engineer, you need to understand and develop the skills required to solve problems using calculus and other mathematical procedures. This unit will prepare you well for progressing to higher education to study for an engineering degree or a Higher National Diploma (HND). It will also help prepare you for a traineeship/apprenticeship or for employment in a range of engineering disciplines as a technician, and will help you work with professional engineers as part of a team working on cutting-edge products and systems.

## Learning aims

In this unit you will:

- A** Examine how differential calculus can be used to solve engineering problems
- B** Examine how integral calculus can be used to solve engineering problems
- C** Investigate the application of calculus to solve a defined specialist engineering problem.

ENG 107

60 GLH  
10 UK Credits

UK Level 3

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# Unit 9: Work Experience in the Engineering Sector

## Unit in brief

Learners explore the benefits of work experience. They carry out and reflect on a period of work experience, and plan for their personal and professional development.

## Unit introduction

If you are thinking about a career in engineering, you should do some work experience to make you aware of the kinds of tasks and activities you may be required to do. It will help you reflect on and develop your attributes and skills required for work in the sector, and will also help to extend your knowledge and understanding of the roles and responsibilities of engineering professionals.

In this unit, you will learn about the benefits of work experience in engineering. You will examine how work experience can help you to develop personal and professional skills such as communication and teamwork and help you to understand more about the expectations of different professional roles. You will develop a plan to support your learning in placement and you will monitor your progress through a reflective journal.

This is a very practical unit, which will support your work experience placement in engineering and provide a foundation for you to develop, apply and reflect on knowledge and skills in a realistic situation.

A work experience placement will help you prepare for further study in a variety of higher education programmes. It is an important factor in progression to higher education, and is a component of many degree courses.

## Learning aims

In this unit you will:

- A** Examine the benefits of work experience in engineering for own learning and development
- B** Develop a work experience plan to support own learning and development
- C** Carry out work experience tasks to meet set objectives
- D** Reflect on how work experience influences own personal and professional development.

ENG 109

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 10: Computer Aided Design in Engineering

## Unit in brief

Learners develop two-dimensional (2D) detailed drawings and three-dimensional (3D) models using a computer-aided design (CAD) system.

## Unit introduction

Computer-aided design (CAD) spans most areas of engineering, as well as aspects of other disciplines such as construction and media. Engineering is a multi-disciplinary vocational subject that uses CAD as part of other processes to develop (design and manufacture), improve and maintain cutting edge products and systems. For example, Formula 1® racing teams test all their cars on bespoke CAD packages to analyse performance and stresses, and make modifications to the cars as a result.

In this unit, you will use CAD software and hardware to produce 2D and 3D drawings. You will acquire the skills to produce models of products, editing and modifying these, and exploring materials and their properties. You will output a portfolio of drawings, for example orthogonal, 3D shaded or solid model, and detail view drawings, to an international standard.

As an engineer, it is important to be able to interpret and produce engineering drawings that help individuals and organisations to communicate ideas, design and manufacture products and improve product performance. Studying this unit will help you to progress to employment as a draftsman and gain other technician-level roles in engineering. It also prepares you for an engineering-based apprenticeship, and for higher education.

## Learning aims

In this unit you will:

- A** Develop a three-dimensional computer-aided model of an engineered product that can be used as part of other engineering processes
- B** Develop two-dimensional detailed computer-aided drawings of an engineered product that can be used as part of other engineering processes
- C** Develop a three-dimensional computer-aided model for a thin walled product and a fabricated product that can be used as part of other engineering processes.

ENG 110

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 11: Engineering Maintenance and Condition Monitoring Techniques

## Unit in brief

Learners explore types of engineering maintenance, their use and impact on the monitoring and maintenance of engineered plant and equipment.

## Unit introduction

The maintenance and monitoring of engineered plant and equipment are key to productivity, profitability, safety and efficiency wherever such items are used. For example, in manufacturing plant breakdowns, malfunctions and unscheduled stoppages cost money and can compromise quality and performance.

In this unit, you will investigate and explore different types of maintenance and condition monitoring techniques and their applications across a variety of engineered plant and equipment. You will examine the relative costs and benefits of monitoring and maintaining engineered plant and equipment in good order. Additionally, you will analyse condition monitoring data and undertake a practical, planned maintenance procedure on an item of engineered plant or equipment.

Engineering maintenance and condition monitoring are key functions across a range of sectors, for example advanced manufacturing, aerospace, automotive, power and chemical engineering. The knowledge, skills and understanding you gain in this unit are relevant to a range of job roles, for example facilities maintenance, manufacturing planning and control, specialist machine tool design and construction, installation and commissioning. This unit also helps to prepare you for a relevant traineeship/apprenticeship or entry to higher education.

## Learning aims

In this unit you will:

- A** Examine the characteristics of different types of engineering maintenance required for engineered plant and equipment to operate safely
- B** Examine the use of condition monitoring techniques to detect faults and potential failures before they occur
- C** Undertake a maintenance activity safely on a piece of plant or equipment to ensure its continued safe operation.

ENG 111

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 12: Pneumatic and Hydraulic Systems

## Unit in brief

Learners explore the safe operation of pneumatic and hydraulic systems, including simulation of circuits using software and practical system assembly and testing.

## Unit introduction

Pneumatic and hydraulic systems are an important part of many modern engineering products and systems. For example, aircraft landing gear relies on hydraulics, as do the robotic machines used in vehicle assembly plants. Pneumatic systems are widely used in the manufacturing industry and pneumatically operated tools are commonplace in garages and engineering workshops.

You will study the safe operation and maintenance of pneumatic and hydraulic power systems by investigating industrial case studies. You will learn how to use computeraided design (CAD) software to create circuit diagrams of pneumatic and hydraulic systems and then simulate their function before gaining practical experience of assembling and testing a physical system.

As an engineer, you may need to operate, maintain and repair pneumatic and/or hydraulic systems safely. This unit helps to prepare you for an engineering traineeship/apprenticeship, for higher education and for technician-level roles, such as in plant maintenance or as a hydraulic/pneumatic technician.

## Learning aims

In this unit you will:

- A** Examine the safe operation and maintenance of pneumatic and hydraulic powered systems
- B** Develop pneumatic and hydraulic circuit diagrams and simulate their operation
- C** Explore the safe development of pneumatic or hydraulic powered systems.

ENG 112

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 25: Mechanical Behaviour of Metallic Materials

## Unit in brief

Learners investigate and conduct tests on the mechanical properties of metals, consider suitable applications and explore failure modes to improve component design.

## Unit introduction

Selecting the most appropriate material and processing method for an engineered product or system is critical to ensure that it is fit for purpose. The materials used in the airframe of an aeroplane, car body pressings, cast components in domestic appliances and the 'T'-shaped electricity pylons (in the UK) all require careful selection and testing of appropriate metallic materials.

In this unit, you will investigate and research the microstructures of ferrous and non-ferrous metallic materials, some of which will have been processed, for example heat treated. You will inspect the microstructures of the materials you are investigating. You will also undertake destructive and non-destructive tests on the materials and use the results of the experimentation and research to determine the mechanical properties of, and suitable applications for, the materials. Finally, you will examine the reasons why components have failed in service and consider possible design improvements that could prevent failure.

As an engineer, it is important to know about and understand the capabilities of a range of metallic materials to create products and systems that are suitable for application. This unit will help to prepare you for a traineeship/apprenticeship or a technician-level role in industry. It will also help to prepare you for a range of higher education courses, such as a Higher National Diploma (HND) or a degree in any engineering discipline.

## Learning aims

In this unit you will:

- A** Investigate the microstructures of metallic materials, the effects of processing on them and how these effects influence their mechanical properties
- B** Explore safely the mechanical properties of metallic materials and the impact on their in-service requirements
- C** Explore the in-service failure of metallic components and consider improvements to their design.

ENG 125

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering



# Unit 30: Mechanical Measurement and Inspection Technology

## Unit in brief

Learners explore mechanical measurement equipment and inspection methods, including statistical process control (SPC). Also, learners undertake a process-capability study.

## Unit introduction

Many of the products we use daily rely on components being manufactured accurately. The selection of a process to manufacture a product or component is sometimes chosen because of its speed or ability to shape materials, and they are always chosen because of the level of accuracy. Unfortunately, there will always be variation in these processes, and engineers must control the variation to avoid faulty products and/or components being manufactured.

In this unit, you will cover the principles and technology applied to a range of mechanical measurement equipment and inspection methods. You will develop the skills required to use a range of equipment, including comparators and gauges. You will develop and use statistical process control (SPC) charts to inspect components and determine if the process is in control. You will also undertake a process-capability study on a precision manufacturing process to increase productivity and establish whether the process is capable.

As an engineer, you may need to understand and acquire the practical skills needed to control the manufacture of high-precision components. This unit prepares you for a mechanical or manufacturing engineering traineeship/apprenticeship or for progression to higher education, and for technician-level roles in industry, such as a quality inspector or a junior production engineer involved in shop-floor machine management.

## Learning aims

In this unit you will:

- A** Explore the principles applied to mechanical measurement and inspection methods as used in industry
- B** Carry out mechanical measurement and inspection methods to determine if components are fit for purpose
- C** Explore statistical process control to inspect components and increase productivity
- D** Carry out a process capability study to establish machine suitability for a given application.

ENG 130

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 41: Manufacturing Secondary Machining Processes

## Unit in brief

Learners explore and carry out secondary machining processes to manufacture shapes by the safe removal of material.

## Unit introduction

Many of the products and components we use daily rely on secondary machining processes. These processes are sometimes easy to spot in manufactured components or products, such as a machine bearing or the nut holding a brake shoe in place on a bicycle.

In this unit, you will cover the technology used in, and characteristics of, a range of traditional machining processes such as turning, and specialist machining processes such as broaching. You will develop knowledge of the health and safety requirements for working on secondary machining processes, and gain practical skills and understanding to be able to set up and operate traditional secondary machining processes to manufacture a component. Finally, you will reflect on the skills and understanding of secondary machining processes that you have acquired and the behaviours applied while manufacturing a component.

As an engineer, you need to understand machining processes and have practical skills in using a range of machines. This knowledge and the practical skills gained from the unit will enable you to create feasible solutions to engineering problems. This unit prepares you for a mechanical or manufacturing engineering traineeship/apprenticeship, for progression to higher education, and for employment in technician-level roles, for example as a machine setter and setter operator.

## Learning aims

In this unit you will:

- A** Examine the technology and characteristics of secondary machining processes that are widely used in industry
- B** Set up traditional secondary processing machines to manufacture a component safely
- C** Carry out traditional secondary machining processes to manufacture a component safely
- D** Review the processes used to machine a component and reflect on personal performance.

ENG 141

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 43: Manufacturing Computer Numerical Control Machining Processes

## Unit in brief

Learners examine the principles of Computer Numerical Control (CNC) machining, and develop a computer part program and manufacture a component using a CNC machine.

## Unit introduction

Many of the products and components we use daily rely on CNC machining processes. Manufacturers use CNC for highly complex components difficult to manufacture by traditional methods, for example mould manufacture, valves, and automotive and aerospace components. CNC machines are also used for the batch production of components, where it is more economical than traditional methods.

You will examine how CNC control systems work and the computer programming methods used to create products and components. You will investigate a range of theoretical and practical activities to plan and program a CNC machine tool to manufacture a product or component. As part of the process, you will edit and modify part programs, and use simulation software to safely determine if the program is fit for purpose. Finally, you will reflect on the skills and understanding you have acquired while building, modifying and testing analogue circuits, and the behaviours you have applied. As an engineer, it is important to understand the manufacturing systems and mechanisms of planning and creating products and components through programming CNC machine tools. This unit helps to prepare you for employment, for example as a manufacturing technician, for a traineeship/apprenticeship and for entry to higher education to study engineering.

## Learning aims

In this unit you will:

- A** Examine the control systems used in Computer Numerical Control machines and different computer programming methods
- B** Develop a Computer Numerical Control set-up sheet and part program to manufacture a component safely
- C** Carry out Computer Numerical Control machining processes to manufacture a component safely
- D** Review the processes used to machine a component and reflect on personal performance.

ENG 143

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 44: Fabrication Manufacturing Processes

## Unit in brief

Learners explore and carry out fabrication processes to safely manufacture products from sheet metal.

## Unit introduction

Fabrication processes are used to manufacture sheet metal products and components in a wide range of industries and applications. For example, sheet metal products and components are found in oil rigs, ships and aircraft, desktop computer cases, fridges and filing cabinets.

In this unit, you will cover the four main stages of manufacturing a sheet metal product: preparation, cutting out blank components, forming up the components and joining them into an assembled product. You will learn the safe use of a range of industrial hand tools, machinery and other equipment associated with fabrication processes. You will apply this knowledge in the manufacture of a sheet product, for example tool box, desktop computer or console casing, or a portable wood-burning stove. Finally, you will reflect on how your skills, knowledge, behaviours and organisational skills were applied during the fabrication of a product.

It is important that engineers have an appreciation of the materials and processes involved in manufacturing sheet metal products, and are capable of creating solutions to engineering-based problems. This unit will help prepare you for a mechanical or manufacturing engineering traineeship/apprenticeship, higher education and for employment in a technician-level role in the sheet metal fabrication industry.

## Learning aims

In this unit you will:

- A** Examine the processes and technology used in sheet metal fabrication that are widely used in industry
- B** Carry out the preparation necessary to manufacture a fabricated product safely
- C** Carry out fabrication processes to manufacture a fabricated product safely
- D** Review the processes used to manufacture a fabricated product and reflect on personal performance.

ENG 144

60 GLH  
10 UK Credits

UK Level 3

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Engineering

# Unit 45: Additive Manufacturing Processes

## Unit in brief

Learners cover the principles and practical methods used in additive manufacturing (AM) and develop a component using additive processes.

## Unit introduction

Additive manufacturing (AM) processes are set to revolutionise the manufacturing industry and provide mass customisation of products and components for consumers. For example, a human jawbone can be manufactured to the exact specification of a patient needing a transplant. In addition, additive processes are more sustainable than traditional subtractive manufacturing processes, such as computer numeric controlled machining.

In this unit, you will examine the technology and characteristics of the additive and finishing processes that are needed to manufacture a product or component. You will investigate design changes required to move from a traditional manufacturing process, such as machining and casting, to an additive process and the additional finishing processes that may be needed as a result. Finally, you will design a component that is suitable for manufacture using an additive process and manufacture your component using a 3D printer.

Technology is transforming our lives; therefore as an engineer it is important that you understand the new manufacturing processes that are providing opportunities in product design, mass customisation and sustainability. In the United Kingdom, additive AM processes have been estimated to be worth around £6 billion per annum and are expected to employ 63 000 people by 2020. This unit helps to prepare you for employment, for example as a manufacturing engineering technician, for a traineeship/apprenticeship, or for entry to higher education to study, for example, manufacturing engineering.

## Learning aims

In this unit you will:

- A** Examine the technology and characteristics of additive manufacturing processes as used in industry
- B** Investigate component design considerations and finishing processes required to effectively use additive manufacturing processes
- C** Develop a component using additive manufacturing processes safely.

ENG 145

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 47: Composites Manufacture and Repair Processes

## Unit in brief

Learners explore the wet and dry lay-up processes used to manufacture and repair fibre-based composite materials.

## Unit introduction

We may not realise it but most of us come into contact with products or components made from fibre-reinforced polymer (FRP) composite materials on a daily basis. Whether it is the diving board at your local pool or the aeroplane flying overhead, their use is commonplace and becoming more prevalent. Glass fibre-reinforced polymers (GFRP) have all but replaced conventional materials, such as wood, in the construction of speedboat hulls as they reduce manufacturing complexity, and carbon fibre-reinforced polymers (CFRP) have replaced aluminium alloy in motorsport structural components by providing the required tensile strength and stiffness and a considerable weight saving.

In this unit, you will explore the nature of FRP composites and their applications across a number of engineering sectors. You will also use different techniques to manufacture components from FRP composites and repair components that have sustained damage in service.

As an engineer, it is important to understand the properties and applications of FRP composites and the techniques that can be used to repair them. This unit helps to prepare you for employment, for example as a manufacturing or maintenance technician, for a traineeship/apprenticeship and for entry to higher education to study engineering.

## Learning aims

In this unit you will:

- A** Examine the characteristics and applications of fibre-reinforced polymer composites that are widely used in industry
- B** Investigate the processes used to manufacture and repair fibre-reinforced polymer composites
- C** Carry out processes to manufacture and repair fibre-reinforced polymer composite components.

ENG 147

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 48: Aircraft Flight Principles and Practice

## Unit in brief

Learners explore the principles and practice of aircraft flight. This involves experiments about aircraft lift and drag forces.

## Unit introduction

Large, modern passenger and transport aircraft can weigh more than 500 000 kg when they fly fully laden, yet this mass is lifted into the air with apparent ease. Light aircraft and military jet fighters are designed to be very manoeuvrable.

In this unit, you will gain an understanding of the atmosphere in which aircraft fly and the mechanical and fluid principles associated with their flight. Then you will explore, through practical experimentation, the effects of airflow over aerodynamic surfaces, as well as how lift and drag are generated and how they interact during flight. Finally, you will gain an understanding of the nature of stability and control, and the methods used to stabilise and control fixed-wing aircraft.

If you want to work in the aircraft industry, then understanding how aircraft lift is achieved and how aircraft are controlled and stabilised is essential. Studying this unit will help you progress to aircraft engineering technician roles in aircraft manufacture, maintenance, component overhaul and repair. It will also help you progress to higher education to study aerodynamics or flight mechanics or, alternatively, assist with gaining entry to other aeronautical engineering degrees.

## Learning aims

In this unit you will:

- A** Examine the atmospheric, mechanical and fluid principles affecting flight
- B** Explore safely the lift and drag force generation and interaction that create aircraft flight
- C** Investigate the nature and methods used to stabilise and control aircraft.

ENG 148

60 GLH  
10 UK Credits

UK Level 3

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# Unit 56: Industrial Robotics

## Unit in brief

Learners will investigate the health and safety and maintenance requirements, and the operation and design principles of industrial robotics. Learners will develop a program for a robot to solve an engineering-based problem.

ENG 156

## Unit introduction

Robotics is at the forefront of the latest industry developments that form part of 'Industry 4.0'. Industrial robots are used to mass produce many everyday objects, such as cars, computers and mobile phones, and their application is industry wide.

Learners will investigate the principles and operation of industrial robots used in modern manufacturing. This unit also gives learners an understanding of the health and safety and maintenance requirements associated with modern industrial robots. The unit covers robot control systems, the different types of sensors and end effectors used, and their application in an industrial robot installation. Learners will learn the

programming methods used and will produce a program for an industrial robot to solve an engineering-based problem.

This unit prepares learners for the roles of robotic maintenance engineer, robotic programmer and automation specialist.

Learners will develop research and study skills that will prepare them for a traineeship/apprenticeship or for study at university.

60 GLH  
10 UK Credits

UK Level 3

## Learning aims

In this unit you will:

- A** Investigate the health and safety and maintenance requirements associated with industrial robots
- B** Investigate the operation and design of industrial robots for different applications
- C** Investigate the operation of industrial robot sensors and end effectors
- D** Produce a program for an industrial robot to solve an engineering problem.

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# Unit 57: Electrical and Electronic Principles

## Unit in brief

Learners develop the skills and knowledge required to solve engineering problems related to electricity and magnetism by applying mathematical and physical science principles.

## Unit introduction

Modern life depends on engineers to develop, support and control the electrical and electronic products and systems that are all around us, for example communication systems, computers, electric vehicles and games consoles. To make a contribution as an engineer, you must be able to draw on an important range of principles developed by early engineering scientists, such as Faraday, Ohm and Edison. There is an increasing demand for 'multi-skilled' engineers who can apply principles from several engineering disciplines to develop solutions to engineering problems. This unit will develop your mathematical and physical scientific knowledge and understanding to enable you to solve problems set in an engineering context. You will explore and apply the algebraic, trigonometric and statistical methods required to solve engineering problems. The electrical and electronic problems you will encounter cover static and direct current electricity, alternating current electricity and magnetism. You may apply the engineering principles you have learned to solve problems involving more than one of these topic areas.

This unit sits at the heart of the qualification and gives you a foundation to support you in any engineering technician role, a trainee role in engineering and progression to higher education.

## Learning aims

In this unit you will:

- A** Examine how algebraic, trigonometric and statistical mathematical methods can be used to solve engineering problems
- B** Examine engineering problems involving static and direct current electricity and circuits
- C** Examine magnetism and electromagnetic induction in engineering
- D** Examine engineering problems involving alternating current electricity and circuits.

ENG 157

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 58: Entrepreneurship and Intrapreneurship in Practice

## Unit in brief

Learners study the characteristics of successful entrepreneurs and consider the strategies that can influence the development of intrapreneurship in an organisation.

## Unit introduction

Bringing new and unique products and services to the market requires people who have a clear understanding of the target market, coupled with the drive and ambition to take calculated risks in order to secure financial gains. Increasingly, organisations are recognising that the same qualities and skills required by an entrepreneur should be encouraged in their own workforce to develop a new breed of internal entrepreneurs,

based on a culture of innovation and intrapreneurship. These organisations recognise the potential for creativity in the workforce to contribute new ideas for the improvement of existing products or for new products.

In this unit, you will explore the characteristics of successful entrepreneurs. You will also investigate the strategies employed by organisations to develop and use entrepreneurial skills in their own workforce. This will involve you undertaking research on local organisations which could involve activities such as formal or informal work experience, interviewing local business owners/managers or visiting local organisations to investigate their structure and workplace practices.

This unit will help you to obtain a more in-depth understanding of what is required to be a successful entrepreneur or intrapreneur, and this will help you when making career choices. It will also support you when undertaking more advanced or specialist business related courses when progressing to higher education.

## Learning aims

In this unit you will:

- A** Explore the environment in which an entrepreneur operates
- B** Investigate how intrapreneurship can be developed and promoted within an organisation
- C** Examine the ways in which an intrapreneur can contribute to the success of an organisation

ENG 158

60 GLH  
10 UK Credits

UK Level 3

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Engineering

# Unit 59: Principles of Electrical Machines

## Unit in brief

Learners investigate the safe operation of electrical machines such as direct current (DC) motors and their practical applications in industry.

## Unit introduction

Electrical machines are an important but often unseen part of modern engineering products and systems. For example, the air-conditioning system on an aircraft contains an electric motor at its heart, while in the home, food processors and fan ovens have electric motors. All electrical machines use applications of electro-magnetic principles where electric currents create magnetic fields that either attract or repel each other. This is the basis of all electric motors, whether they operate on direct current (DC) or alternating current (AC).

In this unit, you will investigate the safe operation, including construction, of the most common electrical machines, from step-up/down transformers commonly used in stabilised power supplies, through to direct current (DC) and alternating current (AC) motors. You will study single-phase machines and the more common three-phase induction machines used in industry, including their control systems and circuitry. This unit prepares you for an electrical, electronic or mechatronic-based engineering apprenticeship, for higher education and for technician-level roles such as that of electrician and electrical fitter. As an electrical engineer you may need to safely operate, maintain and repair electrical machines, and consequently the requirement for a solid theoretical knowledge and understanding of them is vitally important.

## Learning aims

In this unit you will:

- A** Investigate the operation and applications of direct current (DC) electrical machines as used in industry
- B** Investigate the operation and applications of alternating current (AC) electrical machines as used in industry
- C** Investigate how electrical machine control circuitry and systems operate safely.

ENG 159

60 GLH  
10 UK Credits

UK Level 3

School of  
Engineering

# Unit 60: Autonomous Mobile Robotics

## Unit in brief

Learners investigate Autonomous Mobile Robots (AMRs) and develop an autonomous mobile robot solution to complete an activity.

## Unit introduction

Autonomous mobile robots are at the forefront of the latest 'Industry 4.0' revolution and they promise massive performance gains across industry and society more generally. For example, in warehouses, manufacturing, agriculture and healthcare settings, autonomous mobile robots are being used to improve performance, including operational efficiency, productivity, precision and safety.

An autonomous mobile robot can understand (to a degree) and move through its environment independently to carry out a task. For example, they can avoid colliding with an unexpected obstacle. They differ from standard automated guided vehicles (AGVs), which rely on tracks or predefined paths to carry out a task. In this unit, you will investigate the use of different types of autonomous mobile robot, by considering their requirements, environment, benefits and limitations. You will also investigate the sophisticated set of sensors, other hardware, software algorithms and artificial intelligence/machine learning that allow them to interpret and navigate through their environment independently. Finally, you will bring all the learning together to build (using an educational kit) and program an autonomous mobile robot to complete an activity.

Ideally, *Unit 6: Microcontroller Systems for Engineers* or *Unit 35: Computer Programming* should be well underway or completed before starting this unit, and possibly *Unit 7: Calculus to Solve Engineering Problems* and *Unit 56: Industrial Robotics*. This unit prepares you for an electrical, electronic or mechatronic-based engineering apprenticeship, for higher education and for technician-level roles, for example as an electrician or electrical fitter. As an electrical/electronic engineer you may need to safely operate, maintain, repair and even improve autonomous mobile robots, and consequently the requirement for a solid theoretical and practical knowledge and understanding of them is vitally important.

## Learning aims

In this unit you will:

- A** Investigate the use of different types of autonomous mobile robot
- B** Investigate the software and hardware used in autonomous mobile robots
- C** Develop an autonomous mobile robot to complete an activity defined in a client brief.

ENG 160

60 GLH  
10 UK Credits

UK Level 3

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# School of Engineering (ENG)

## YEAR 2 – UK LEVEL 4

### 4 Mandatory core Units + 4 (Mandatory specialist Units + Optional Units) + General Education Subjects

#### 4 x Mandatory Core Units - For all pathways/majors

1. Unit 1: [ENG201](#) – Engineering Design (15 UK Credits)
2. Unit 2: [ENG202](#) – Engineering Maths (15 UK Credits)
3. Unit 3: [ENG203](#) – Engineering Science (15 UK Credits)
4. Unit 4: [ENG204](#) – Managing a Professional Engineering Project (15 UK Credits)

#### 4 x (Mandatory specialist Units + Optional Units) divided according to Major/Pathway as follows:

##### Electrical & Electronic Engineering: 1 x Mandatory Specialist Unit

1. Unit 19: [ENG219](#) – Electrical and Electronic Principles\* (15 UK Credits)
- + 3 x Optional Units from the list of Optional Level 4 Subjects/Units (NOT in their Mandatory Specialist List)

##### Mechanical Engineering: 2 x Mandatory Specialist Units

1. Unit 8: [ENG208](#) – Mechanical Principles\* (15 UK Credits)
  2. Unit 13: [ENG213](#) – Fundamentals of Thermodynamics and Heat Engines\* (15 UK Credits)
- + 2 x Optional Units from the list of Optional Level 4 Subjects/Units (NOT in their Mandatory Specialist List)

##### List of Optional Level 4 Subjects/Units

1. Unit 5: [ENG205](#) – Renewable Energy (15 UK Credits)
2. Unit 6: [ENG206](#) – Mechatronics (15 UK Credits)
3. Unit 7: [ENG207](#) – Machining and Processing of Engineering Materials (15 UK Credits)
4. Unit 8: [ENG208](#) – Mechanical Principles\* (15 UK Credits)



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5. Unit 9: ENG209 – Materials, Properties and Testing (15 UK Credits)
6. Unit 10: [ENG210](#) – Mechanical Workshop Practices (15 UK Credits)
7. Unit 11: [ENG211](#) – Fluid Mechanics (15 UK Credits)
8. Unit 12: ENG212 – Engineering Management (15 UK Credits)
9. Unit 13: [ENG213](#) – Fundamentals of Thermodynamics and Heat Engines\* (15 UK Credits)
10. Unit 14: ENG214 – Production Engineering for Manufacture\* (15 UK Credits)
11. Unit 15: [ENG215](#) – Automation, Robotics and Programmable Logic Controllers (PLCs) (15 UK Credits)
12. Unit 16: ENG216 – Instrumentation and Control Systems (15 UK Credits)
13. Unit 17: ENG217 – Quality and Process Improvement\* (15 UK Credits)
14. Unit 18: ENG218 – Maintenance Engineering (15 UK Credits)
15. Unit 19: [ENG219](#) – Electrical and Electronic Principles\* (15 UK Credits)
16. Unit 20: [ENG220](#) – Digital Principles (15 UK Credits)
17. Unit 21: ENG221 – Electrical Machines (15 UK Credits)
18. Unit 22: [ENG222](#) – Electronic Circuits and Devices\* (15 UK Credits)
19. Unit 23: [ENG223](#) – Computer Aided Design and Manufacture (CAD/CAM) (15 UK Credits)
20. Unit 29: ENG229 – Electro, Pneumatic and Hydraulic Systems (15 UK Credits)
21. Unit 30: ENG230 – Operations and Plant Management (15 UK Credits)
22. Unit 31: ENG231 – Electrical Systems and Fault Finding (15 UK Credits)
23. Unit 32: ENG232 – CAD for Maintenance Engineers (15 UK Credits)
24. Unit 73: ENG273 – Materials Engineering with Polymers (15 UK Credits)
25. Unit 74: ENG274 – Polymer Manufacturing Processes (15 UK Credits)
26. Unit 75: ENG275 – Industry 4.0 (15 UK Credits)
27. Unit 76: ENG276 – Introduction to Professional Engineering Management (15 UK Credits)
28. Unit 77: ENG277 – Industrial Robots (15 UK Credits)
29. Unit 78: ENG278 – Programmable Logic Controllers (15 UK Credits)
30. Unit 79: ENG279 – Computer Aided Design (CAD) for Engineering (15 UK Credits)
31. Unit 82: ENG282 – Statistical Process Control (15 UK Credits)
32. Unit 83: ENG283 – Telecommunication Principles (15 UK Credits)
33. Unit 84: ENG284 – Semiconductor Manufacture\* (15 UK Credits)
34. Unit 85: ENG285 – Semiconductor Production Environments\* (15 UK Credits)



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# Unit 1: Engineering Design

The aim of this unit is to introduce students to the methodical steps that engineers use in creating functional products and processes; from a design brief to the work, and the stages involved in identifying and justifying a solution to a given engineering need.

Among the topics included in this unit are: Gantt charts and critical path analysis, stakeholder requirements, market analysis, design process management, modelling and prototyping, manufacturability, reliability life cycle, safety and risk, management, calculations, drawings and concepts and ergonomics.

On successful completion of this unit students will be able to prepare an engineering design specification that satisfies stakeholders' requirements, implement best practice when analysing and evaluating possible design solutions, prepare a written technical design report, and present their finalised design to a customer or audience.

## Learning Outcomes

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

1. Plan a design solution and prepare an engineering design specification in response to a stakeholder's design brief and requirements.
2. Formulate possible technical solutions to address the student-prepared design specification.
3. Prepare an industry-standard engineering technical design report.
4. Present to an audience a design solution based on the design report and evaluate the solution/presentation.

ENG 201

15 UK  
Credits

UK Level 4

School of  
Engineering  
(ME)

# Unit 2: Engineering Math

The aim of this unit is to develop students' skills in the mathematical principles and theories that underpin the engineering curriculum. Students will be introduced to mathematical methods and statistical techniques in order to analyse and solve problems within an engineering context.

On successful completion of this unit students will be able to employ mathematical methods within a variety of contextualised examples, interpret data using statistical techniques, and use analytical and computational methods to evaluate and solve engineering problems.

## Learning Outcomes

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

1. Identify the relevance of mathematical methods to a variety of conceptualised engineering examples.
2. Investigate applications of statistical techniques to interpret, organise and present data.
3. Use analytical and computational methods for solving problems by relating sinusoidal wave and vector functions to their respective engineering applications.
4. Examine how differential and integral calculus can be used to solve engineering problems.

ENG 202

15 UK  
Credits

UK Level 4

School of  
Engineering



# Unit 3: Engineering Science

This unit introduces students to the fundamental laws and applications of the physical sciences within engineering and how to apply this knowledge to find solutions to a variety of engineering problems.

Among the topics included in this unit are: international system of units, interpreting data, static and dynamic forces, fluid mechanics and thermodynamics, material properties and failure, and A.C./D.C. circuit theories.

On successful completion of this unit students will be able to interpret and present qualitative and quantitative data using computer software, calculate unknown parameters within mechanical systems, explain a variety of material properties and use electromagnetic theory in an applied context.

## Learning Outcomes

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

1. Examine scientific data using both quantitative and qualitative methods.
2. Determine parameters within mechanical engineering systems.
3. Explore the characteristics and properties of engineering materials.
4. Analyse applications of A.C./D.C. circuit theorems, electromagnetic principles and properties.

ENG 203

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 4: Managing a Professional Engineering Project

This unit introduces students to the techniques and best practices required to successfully create and manage an engineering project designed to identify a solution to an engineering need. While carrying out this project students will consider the role and function of engineering in our society, the professional duties and responsibilities expected of engineers together with the behaviours that accompany their actions.

Among the topics covered in this unit are: roles, responsibilities and behaviours of a professional engineer, planning a project, project management stages, devising solutions, theories and calculations, management using a Gantt chart, evaluation techniques, communication skills, and the creation and presentation of a project report.

## Learning Outcomes

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

1. Formulate and plan a project that will provide a solution to an identified engineering problem.
2. Conduct planned project activities to generate outcomes which provide a solution to the identified engineering problem.
3. Produce a project report analysing the outcomes of each of the project processes and stages.
4. Present the project report drawing conclusions on the outcomes of the project.

ENG 204

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 6: Mechatronics

Auto-focus cameras, car cruise control and automated airport baggage handling systems are examples of mechatronic systems. Mechatronics is the combination of mechanical, electrical and computer/controlled engineering working together in automated systems and 'smart' product design.

Among the topics included in this unit are: consideration of component compatibility, constraints on size and cost, control devices used, British and/or European standards relevant to application, sensor types and interfacing, simulation and modelling software functions, system function and operation, advantages and disadvantages of software simulation, component data sheets, systems drawings, flowcharts, wiring and schematic diagrams.

On successful completion of this unit students will be able to explain the basic mechatronic system components and functions, design a simple mechatronic system specification for a given application, use appropriate simulation and modelling software to examine its operation and function, and solve faults on mechatronic systems using a range of techniques and methods.

## Learning Outcomes

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

1. Explain the design and operational characteristics of a mechatronic system
2. Design a mechatronic system specification for a given application
3. Examine the operation and function of a mechatronics system using simulation and modelling software
4. Identify and correct faults in a mechatronic system.

ENG 206

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 8: Mechanical Principles

The aim of this unit is to introduce students to the essential mechanical principles associated with engineering applications.

Topics included in this unit are: behavioural characteristics of static, dynamic and oscillating engineering systems including shear forces, bending moments, torsion, linear and angular acceleration, conservation of energy and vibrating systems; and the movement and transfer of energy by considering parameters of mechanical power transmission systems.

On successful completion of this unit students will be able to explain the underlying principles, requirements and limitations of mechanical systems.

## Learning Outcomes

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

1. Identify solutions to problems within static mechanical systems.
2. Illustrate the effects that constraints have on the performance of a dynamic mechanical system.
3. Investigate elements of simple mechanical power transmission systems.
4. Analyse natural and damped vibrations within translational and rotational mass- spring systems.

ENG 208

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 10: Mechanical Workshop Practices

This unit introduces students to the effective use of textual, numeric and graphical information, how best to extract and interpret information from engineering drawings, and the practices of workshop-based turning and milling machining.

On successful completion of this unit students will be able to identify the mechanical measurement and quality control processes to analyse the dimensional accuracy of a machined component; operate machining equipment to produce a range of components to specification; explain the importance of material selection when choosing the most appropriate machining process; and apply safe working practices throughout.

## Learning Outcomes

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

1. Identify the potential hazards that exist when operating machine tools and bench fitting equipment, with reference to the appropriate health and safety regulations and risk assessment criteria.
2. Operate a manual lathe and milling machine to produce dimensionally accurate engineering components.
3. Interpret information from engineering drawings and operate measuring tools and work-holding equipment to check dimensional accuracy of machined components.
4. Explain mechanical measurement and quality control processes.

ENG 210

15 UK  
Credits

UK Level 4

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Engineering

# Unit 11: Fluid Mechanics

This unit introduces students to the fluid mechanics techniques used in mechanical engineering. The hydraulic devices and systems that incorporate the transmission of hydraulic pressure and forces exerted by a static fluid on immersed surfaces.

Topics included in this unit are: pressure and force, submerged surfaces, fluid flow theory, aerodynamics, and hydraulic machinery.

On successful completion of this unit students will be able to work with the concept and measurement of viscosity in fluids, and the characteristics of Newtonian and non-Newtonian fluids; examine fluid flow phenomena, including energy conservation, estimation of head loss in pipes and viscous drag; and examine the operational characteristics of hydraulic machines, in particular the operating principles of various water turbines and pumps.

## Learning Outcomes

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

1. Determine the behavioural characteristics of static fluid systems.
2. Examine the operating principles and limitations of viscosity measuring devices.
3. Investigate dynamic fluid parameters of real fluid flow.
4. Explore dynamic fluid parameters of real fluid flow.

ENG 211

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 13: Fundamentals of Thermodynamics and Heat Engines

This unit introduces students to the principles and concepts of thermodynamics and its application in modern engineering.

On successful completion of this unit students will be able to investigate fundamental thermodynamic systems and their properties, apply the steady flow energy equation to plant equipment, examine the principles of heat transfer to industrial applications, and determine the performance of internal combustion engines.

## Learning Outcomes

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

1. Investigate fundamental thermodynamic systems and their properties.
2. Apply the Steady Flow Energy Equation to plant equipment.
3. Examine the principles of heat transfer to industrial applications.
4. Determine the performance of internal combustion engines.

ENG 213

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 15: Automation, Robotics and Programmable Logic Controllers (PLCs)

The word automation was not used until the 1940s and it originated in the automotive manufacturing sector as a method designed to reduce labour costs and improve the quality, accuracy and precision of the finished products. We are all now very familiar with the sight of dancing robots, not only in the production of cars but also in everything from washing machines to pharmaceuticals. Because of this technology, human hands may have never touched the products we purchase and we all benefit from a reduction in costs and improvement in quality.

The aim of this unit is for students to investigate how Programmable Logic Controllers (PLCs) and industrial robots can be programmed to successfully implement automated engineering solutions. Among the topics included in this unit are: PLC system operational characteristics, different types of programming languages, types of robots and cell safety features.

## Learning Outcomes

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

1. Describe the design and operational characteristics of a PLC system.
2. Design a simple PLC program by considering PLC information, programming and communication techniques.
3. Describe the key elements of industrial robots and be able to program them with straightforward commands to perform a given task.
4. Investigate the design and safe operation of a robot within an industrial application.

ENG 215

15 UK  
Credits

UK Level 4

School of  
Engineering



# Unit 19: Electrical and Electronic Principles

The physical principles themselves build initially from our understanding of the atom, the concept of electrical charge, electric fields, and the behavior of the electron in different types of material. This understanding is readily applied to electric circuits of different types, and the basic circuit laws and electrical components emerge. Another set of principles is built around semiconductor devices, which become the basis of modern electronics. An introduction to semiconductor theory leads to a survey of the key electronic components, primarily different types of diodes and transistors. Electronics is very broadly divided into analogue and digital applications. The final section of the unit introduces the fundamentals of these, using simple applications. Thus, under analogue electronics, the amplifier and its characteristics are introduced. Under digital electronics, voltages are applied as logic values, and simple circuits made from logic gates are considered.

## Learning Outcomes

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

1. Apply an understanding of fundamental electrical quantities to evaluate circuits with constant voltages and currents.
2. Evaluate circuits with sinusoidal voltages and currents.
3. Describe the basis of semiconductor action, and its application to simple electronic devices.
4. Explain the difference between digital and analogue electronics, describing simple applications of each.

ENG 219

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 20: Digital Principles

The unit introduces the two main branches of digital electronics, combinational and sequential. Thus, the student gains familiarity in the fundamental elements of digital circuits, notably different types of logic gates and bistables. The techniques by which such circuits are analysed, introduced and applied, including Truth Tables, Boolean algebra, Karnaugh Maps, and Timing Diagrams. The theory of digital electronics has little use unless the circuits can be built – at low cost, high circuit density, and in large quantity. Thus, the key digital technologies are introduced. These include the conventional TTL (Transistor-Transistor Logic) and CMOS (Complementary Metal Oxide Semiconductor). Importantly, the unit moves on to programmable logic, including the Field Programmable Gate Array (FPGA). Finally, some standard digital subsystems, which become important elements of major systems such as microprocessors, are introduced and evaluated.

## Learning Outcomes

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

1. Explain and analyse simple combinational logic circuits.
2. Explain and analyse simple sequential logic circuits.
3. Describe and evaluate the technologies used to implement digital electronic circuits.
4. Describe and analyse a range of digital subsystems, hence establishing the building blocks for larger systems.

ENG 220

15 UK  
Credits

UK Level 4

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Engineering

# Unit 22: Electronic Circuits and Devices

This unit introduces students to the use of electronics manufacturers' data to analyze the performance of circuits and devices, the operational characteristics of amplifier circuits, the types and effects of feedback on a circuit performance, and the operation and application of oscillators. They will also be introduced to the application of testing procedures to electronic devices and circuits, and use the findings of the tests to evaluate their operation. Among the topics included in this unit are: power amplifiers, class A, B and AB; operational amplifiers, inverting, non-inverting, differential, summing, integrator, differentiator; types such as open, closed, positive and negative feedback; frequency, stability, frequency drift, distortion, amplitude, wave shapes and testing procedures.

## Learning Outcomes

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

1. Determine the operational characteristics of amplifier circuits.
2. Investigate the types and effects of feedback on an amplifier's performance.
3. Examine the operation and application of oscillators.
4. Apply testing procedures to electronic devices and circuits.

ENG 222

15 UK  
Credits

UK Level 4

School of  
Engineering

# School of Engineering (ENG)

## YEAR 3 – UK LEVEL 5

### 2 Mandatory core Units + 3 Mandatory specialist Units + 1 Optional Unit + General Education Subjects

#### 2x Mandatory Core Units /Subjects - For all pathways/majors

1. Unit 34: [ENG334](#) – Research Project (30 UK Credits)
2. Unit 35: [ENG335](#) – Professional Engineering Management (15 UK Credits)

#### 3 x Mandatory Specialist Units/Subjects – According to the selected Pathways/Majors

##### Electrical & Electronic Engineering:

1. Unit 39: [ENG339](#) - Further Mathematics (15 UK Credits)
2. Unit 44: [ENG344](#) – Industrial Power, Electronics and Storage\* (15 UK Credits)
3. Unit 45: [ENG345](#) – Industrial Systems (15 UK Credits)

##### Mechanical Engineering:

1. Unit 36: [ENG336](#) – Advanced Mechanical Principles (15 UK Credits)
2. Unit 37: [ENG337](#) – Virtual Engineering\* (15 UK Credits)
3. Unit 39: [ENG339](#) - Further Mathematics (15 UK Credits)

#### 1 x Optional Units/Subjects

##### Students can choose ONE Unit/subject from the optional list below:

1. Unit 36: [ENG336](#) – Advanced Mechanical Principles (15 UK Credits)
2. Unit 37: [ENG337](#) – Virtual Engineering\* (15 UK Credits)
3. Unit 38: [ENG338](#) – Further Thermodynamics (15 UK Credits)
4. Unit 39: [ENG339](#) – Further Mathematics\* (15 UK Credits)
5. Unit 40: [ENG340](#) – Commercial Programming Software (15 UK Credits)



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6. Unit 41: ENG341 – Distributed Control Systems (15 UK Credits)
7. Unit 42: ENG342 – Further PLCs (15 UK Credits)
8. Unit 43: ENG343 – Further Electrical Machines and Drives (15 UK Credits)
9. Unit 44: [ENG344](#) – Industrial Power, Electronics and Storage\* (15 UK Credits)
10. Unit 45: [ENG345](#) – Industrial Systems\* (15 UK Credits)
11. Unit 46: ENG346 – Embedded Systems (15 UK Credits)
12. Unit 47: ENG347 – Analogue Electronic Systems (15 UK Credits)
13. Unit 48: ENG348 – Manufacturing Systems Engineering\* (15 UK Credits)
14. Unit 49: ENG349 – Lean Manufacturing\* (15 UK Credits)
15. Unit 50: ENG350 – Advanced Manufacturing Technology\* (15 UK Credits)
16. Unit 51: ENG351 – Sustainability (15 UK Credits)
17. Unit 52: [ENG352](#) – Further Electrical, Electronic and Digital Principles(15 UK Credits)
18. Unit 53: [ENG353](#) – Utilisation of Electrical Power (15 UK Credits)
19. Unit 54: ENG354 – Further Control Systems Engineering (15 UK Credits)
20. Unit 62: ENG362 – Heating, Ventilation, Air Conditioning (HVAC)\* (15 UK Credits)
21. Unit 63: ENG363 – Industrial Services\* (15 UK Credits)
22. Unit 64: ENG364 – Thermofluids\* (15 UK Credits)
23. Unit 86: ENG386 – Emerging Semiconductor Technologies\* (15 UK Credits)
24. Unit 87: ENG387 – Semiconductor Integrated Electronics\* (15 UK Credits)



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# Unit 34: Research Project

This unit introduces students to the skills necessary to deliver a complex, independently conducted research project that fits within an engineering context.

On successful completion of this unit students will be able to deliver a complex and independent research project in line with the original objectives, explain the critical thinking skills associated with solving engineering problems, consider multiple perspectives in reaching a balanced and justifiable conclusion, and communicate effectively a research project's outcome. Therefore, students develop skills such as critical thinking, analysis, reasoning, interpretation, decision-making, information literacy, information and communication technology literacy, innovation, conflict resolution, creativity, collaboration, adaptability and written and oral communication.

## Learning Outcomes

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

1. Conduct the preliminary stages involved in the creation of an engineering research project.
2. Examine the analytical techniques used to work on all stages of the project and strategies required to overcome the challenges involved in a research project.
3. Reflect on the impact the research experience could have in enhancing personal or group performance within an engineering context.
4. Explore the communication approach used for the preparation and presentation of the research project's outcomes.

ENG 234

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 35: Professional Engineering Management

The aim of this unit is to continue building up on the knowledge gained in Unit 4: Managing a Professional Engineering Project, to provide students with the professional standards for engineers and to guide them on how to develop the range of employability skills needed by professional engineers.

Among the topics included in this unit are: engineering strategy and services delivery planning, the role of sustainability, Total Quality Management (TQM), engineering management tools, managing people and becoming a professional engineer.

On successful completion of this unit students will be able to construct a coherent engineering services delivery plan to meet the requirements of a sector-specific organisation or business. They will display personal commitment to professional standards and obligations to society, the engineering profession and the environment.

## Learning Outcomes

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

1. Evaluate the risk evaluation theories and practices associated with the management of projects for the production of current and developing technology.
2. Produce an engineering services delivery plan that meets the requirements of a sector-specific organisation.
3. Develop effective leadership, individual and group communication skills.
4. Develop personal commitment to professional standards and obligations to society, the engineering profession and the environment.

ENG 235

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 36: Advanced Mechanical Principles

The aim of this unit is to continue covering the topics discussed in Unit 9: Mechanical Principles. It will provide students with advanced knowledge of the mechanical theories associated with engineering applications.

Topics included in this unit are: Poisson's Ratio and typical values of common materials; the relationship between the elastic constants such as Bulk Modulus, Modulus of Elasticity, Modulus of Rigidity; the relationship between bending moment, slope and deflection in beams; calculating the slope and deflection for loaded beams using Macaulay's method; analysing the stresses in thin-walled pressure vessels; and stresses in thick-walled cylinders, flat and v-section belt drive theory.

On successful completion of this unit students will be able to have more advanced knowledge of mechanical principles to determine the behavioural characteristics of materials subjected to complex loading; assess the strength of loaded beams and pressurised vessels; determine specifications of power transmission system elements; and examine operational constraints of dynamic rotating systems.

## Learning Outcomes

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

1. Determine the behavioural characteristics of materials subjected to complex loading.
2. Assess the strength of loaded beams and pressurised vessels.
3. Analyse the specifications of power transmission system elements.
4. Examine operational constraints of dynamic rotating systems.

ENG 236

15 UK  
Credits

UK Level 4

School of  
Engineering



# Unit 37: Virtual Engineering

This unit introduces students to the application of relevant Computer Aided Design (CAD) and analysis engineering tools in contemporary engineering. They will learn about standards, regulations and legal compliance within the context of engineering.

Topics included in this unit are: dimensioning and tolerances, standardisation and regulatory compliance (BS, ASTM, ISO, etc.), material properties and selection, manufacturing processes, 2D, 3D, CAD, solid modelling, one-dimensional and multi-dimensional problems, meshing and boundary conditions, and the finite volume method.

On successful completion of this unit students will be able to consider how to perform computational fluid dynamics (CFD) simulations, develop finite element product and system models, explain the identification of faults in the application of simulation techniques and discuss the modelling method and data accuracy.

## Learning Outcomes

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

1. Explore the capabilities and limitations of computer-based models in meeting design fundamentals and their use in solving problems in engineering.
2. Analyse finite element product and system models in order to find and solve potential structural or performance issues.
3. Perform CFD simulations to evaluate pressure and velocity distributions within an engineering setting.
4. Determine faults in the application of simulation techniques to evaluate the modelling method and data accuracy.

ENG 237

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 38: Further Thermodynamics

The aim of this unit is to build on the techniques explored in Unit 13: Fundamentals of Thermodynamics and Heat Engines, to develop further students' skills in applied thermodynamics by investigating the relationships between theory and practice.

Among the topics included in this unit are: heat pumps and refrigeration, performance of air compressors, steam power plant and gas turbines.

On successful completion of this unit students will be able to determine the performance and operation of heat pumps and refrigeration systems, review the applications and efficiency of industrial compressors, use charts and/or tables to determine steam plant parameters and characteristics, describe the operation of gas turbines and assess their efficiency.

## Learning Outcomes

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

1. Evaluate the performance and operation of heat pumps and refrigeration systems.
2. Review the applications and efficiency of industrial compressors.
3. Determine steam plant parameters and characteristics using charts and/or tables.
4. Examine the operation of gas turbines and assess their efficiency.

ENG 238

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 39: Further Mathematics

The unit will prepare students to analyse and model engineering situations using mathematical techniques. Among the topics included in this unit are: number theory, complex numbers, matrix theory, linear equations, numerical integration, numerical differentiation, and graphical representations of curves for estimation within an engineering context. Finally, students will expand their knowledge of calculus to discover how to model and solve engineering problems using first and second order differential equations.

On successful completion of this unit students will be able to use applications of number theory in practical engineering situations, solve systems of linear equations relevant to engineering applications using matrix methods, approximate solutions of contextualised examples with graphical and numerical methods, and review models of engineering systems using ordinary differential equations.

## Learning Outcomes

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

1. Use applications of number theory in practical engineering situations.
2. Solve systems of linear equations relevant to engineering applications using matrix methods.
3. Approximate solutions of contextualised examples with graphical and numerical methods.
4. Review models of engineering systems using ordinary differential equations.

ENG 239

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 40: Commercial Programming Software

The use of Computer Aided Design (CAD) and simulation in the electronic and electrical engineering industry is ever growing. Commercial software packages enable an engineer to design, simulate, model and predict the outcome of a design before a product has been made. This enables time and cost savings in the development of a product whilst enabling the engineer to further develop their design. The aim of this unit is to introduce students to the availability and use of commercial software packages within electronics engineering, including design, simulation, simple microprocessor programming and evaluation of the tools available.

## Learning Outcomes

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

1. Research a range of software application tools to determine how they can support electronic engineering functions effectively.
2. Explain how a software package can be used to simulate the behaviour of an electronic circuit function and compare the results to real components and circuits.
3. Programme a microprocessor-based device to achieve a specified outcome or task using commercially available software.
4. Evaluate an electronics software application tool to report on its ability to replicate the real world and the resource savings this can bring to an organisation.

ENG 240

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 44: Industrial Power, Electronics and Storage

This unit presents a wide-ranging introduction to the field of existing and renewable energy systems. There are many alternative sources of energy (some 'green') which can be converted to an electrical form, providing energy for transport, heat/cooling and lighting, as well as energy for various industrial processes and applications. Power electronic converters are an essential component of renewable and distributed energy sources, including wind turbines, photovoltaics, marine energy systems and energy storage systems. It is necessary to gain a clear understanding of, and be able to examine, the technical implications of providing sustainable electrical energy to meet the energy demand of the future. The unit will also explore the potential impacts of climate change and why more, and different forms of, sustainable energy sources are required together with the need for energy efficiency measures.

## Learning Outcomes

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

1. Evaluate energy demand to determine the technology and methods of energy production.
2. Discuss current energy efficiency measures, technologies and policies specific to the building and transportation sectors.
3. Analyse the control techniques of power electronics for renewable energy systems.
4. Investigate the impacts of renewable resources to the grid and the various issues associated with integrating such resources to the grid.

ENG 244

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 45: Industrial Systems

This unit presents a structured approach to the development of advanced electronic solutions in a range of industrial situations. An essential requirement here is the engineer's ability to utilise the most appropriate technology for each application, to ensure the most efficient monitoring and control of variables such as pressure, temperature and speed. Among the topics included in this unit are techniques and applications of electrical and electronic engineering, as they apply to various branches of industry, such as component handling, controlling the speed or torque of a motor or responding to change of circumstances in a process.

## Learning Outcomes

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

1. Describe the main elements of an electronically controlled industrial system.
2. Identify and specify the interface requirements between electronic, electrical and mechanical transducers and controllers.
3. Apply practical and computer-based methods to design and test a measurement system.
4. Apply appropriate analytical techniques to predict the performance of a given system.

ENG 245

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 52: Further Electrical, Electronic and Digital Principles

This unit builds on the preliminary techniques and skills introduced in Unit 19: Electrical, Electronic and Unit 20: Digital Principles. The emphasis in this unit will be in developing a structured approach to the analysis of AC single-phase and three-phase powered circuitry. This will help students to arrive at the solution in the most efficient way, with the greatest probability of it being correct. In addition, students will be introduced to the expanding use of computers, using specialised software to solve electrical, electronic and digital circuits. This will allow students to develop the necessary confidence and competence in the four key areas of mathematical techniques, circuit analysis, circuit simulation and laboratory practice.

## Learning Outcomes

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

1. Use appropriate mathematical techniques to solve a range of electrical and electronic problems.
2. Apply appropriate circuit theorems to solve problems in electrical networks.
3. Use appropriate laboratory and computer simulation techniques to investigate both analogue and digital circuits and interpret the results.
4. Explain the characteristics of non-linear circuits to predict their behaviour under a variety of conditions.

ENG 252

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 4015: Automation, Robotics and Programmable Logic Controllers (PLCs)

The word automation was not used until the 1940s and it originated in the automotive manufacturing sector as a method designed to reduce labour costs and improve the quality, accuracy and precision of the finished products. We are all now very familiar with the sight of dancing robots, not only in the production of cars but also in everything from washing machines to pharmaceuticals. Because of this technology, human hands may have never touched the products we purchase and we all benefit from a reduction in costs and improvement in quality.

The aim of this unit is for students to investigate how Programmable Logic Controllers (PLCs) and industrial robots can be programmed to successfully implement automated engineering solutions. Among the topics included in this unit are: PLC system operational characteristics, different types of programming languages, types of robots and cell safety features.

## Learning Outcomes

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

1. Describe the design and operational characteristics of a PLC system
2. Design a simple PLC program by considering PLC information, programming and communication techniques
3. Describe the key elements of industrial robots and be able to program the with straightforward commands to perform a given task
4. Investigate the design and safe operation of a robot within an industrial application

ENG 24015

15 UK  
Credits

UK Level 4

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Engineering



# Unit 4061: Programming for Engineers

This unit provides engineering students with a comprehensive introduction to programming. Students will be able to investigate different software development platforms, programming paradigms, programming languages (e.g. Python, C or C++), and their engineering applications. They will gain the experience of going through a standard development process; from setting requirements through to design, implementation, testing and maintenance. The unit also covers program design, structure, and syntax through project activities. Students will be assessed on creating programs that are efficient, functional, reliable, and maintainable.

On completion of this unit, students will have acquired essential knowledge and skills in programming using a popular language that can be utilised in Level 5 units such as Machine Learning and Embedded Systems.

## Learning Outcomes

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

1. Discuss key aspects of software evolution and development in the context of engineering applications
2. Design a programming solution for an engineering problem
3. Implement a programming solution for an engineering problem
4. Perform testing of the programming solution to meet defined requirements and to ensure high-quality outputs.

ENG 24061

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 4062: Professional Engineering Practice

The work of the engineer is key to the development and progress of our society. The decisions they make in the course of their everyday work can be life-changing in positive ways or, if poorly made, can be life-threatening. Accordingly, the engineer must work to strict codes of professionalism in all aspects of their work.

This unit outlines the background to the legislation, professional codes of practice and operational competencies that underpin the development of the professional engineer. It also considers the roles of problem-solving, communication, team working and professional responsibility.

Elements of personal and professional development, reflective thinking, career planning and leadership are considered as well. The increasing necessity for a holistic approach to sustainability in design, manufacture, and reuse and recycling are emphasised.

On successful completion of this unit, the student will be well prepared for further study at levels 5 and 6, working towards membership of an appropriate professional institution at Incorporated Engineer level.

## Learning Outcomes

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

1. Identify the roles, responsibilities and competences of the professional engineer
2. Describe the regulatory, legislative and ethical frameworks that govern the work of the professional engineer
3. Review the roles of communication, team working and leadership in the development of professional engineers
4. Discuss how professional engineers can develop holistic approaches to the sustainability of manufacturing processes.

ENG 24062

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 4063: Engineering Mechanics and Materials

Every aspect of engineering depends upon the use and manipulation of materials. Whether naturally occurring or man-made, it is the properties of these materials that are fundamental to their creation, processing and application. This unit explores the fundamental structure of common engineering materials, their principal mechanical, chemical and electrical properties, and how these properties affect manufacture, application, service life and end-of-life management and recycling. Systems for categorising and ranking materials are also covered.

Finally, the service life performance of these materials is studied through calculations that measure their performance in static and dynamic applications, building on the work started in the associated level 4 unit, Engineering Science.

On successful completion of this unit, students will be able to identify the underlying structural properties of engineering materials and how these properties relate to their application and performance. They will also be confident in completing calculations relating to the static performance of these materials when in service.

## Learning Outcomes

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

1. Describe the fundamental structures of common engineering materials
2. Identify the most important properties of engineering materials
3. Assess the performance of engineering materials using key indicators, including materials constraints and established database resources
4. Calculate solutions to problems within static and dynamic mechanical systems, with consideration of constraints on performance.

ENG 24063

15 UK  
Credits

UK Level 4

School of  
Engineering

# Unit 4064: Analogue and Digital Electronics

The overall aim of the unit is to introduce students to the fundamental building blocks of analogue and digital systems. Engineers from the craft technician to the Chartered Engineer should have an understanding and working knowledge of these technologies because they underpin all of our electronic devices, both domestic and industrial. The unit's learning outcomes promote the development of skills and knowledge in the areas of digital and analogue electronics: digital electronics – developing an understanding of the basic logic components and how they are constructed, tested and used in circuit design; analogue electronics – developing an understanding of common transistors and transistor circuit design. Transistor and operational amplifier systems are another focus of the unit; these types of circuits are essential for signal processing and reproduction.

On successful completion of the unit, students will have developed skills and knowledge in analogue and digital electronics, which are the basis of all electronic systems and device, including the understanding and practice of the theory of logic circuits and how to construct and test such systems, and the understanding and measurement of analogue circuits.

## Learning Outcomes

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

1. Investigate logic functions
2. Produce tabular and Karnaugh map designs to implement logic systems
3. Examine the use of Class A and Class B amplifiers in modern systems
4. Investigate operational amplifier circuits and their application.

ENG 24064

15 UK  
Credits

UK Level 4

School of  
Engineering

# School of Engineering (ENG)

## YEAR 4 – UK LEVEL 6 (Top-Up)

### 5 Mandatory specialist Units + General Education Subjects

#### 5 x Mandatory Specialist Units – Depending on the selected Pathway/Major

##### **Electrical & Electronic Engineering**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 2: [CBE402/ ENG402 / MMD3058-N](#) Project (40 UK Credits)
3. Unit 3: [ENG403 / EAC3018-N Electronic Systems](#) (20 UK Credits)
4. Unit 4: [ENG404 / EAC3046-N Power Electronics & Drive Systems](#) (20 UK Credits)
5. Unit 5 : [ENG405 / EAC3027-N Power Systems](#) (20 UK Credits)

##### **Mechanical Engineering**

1. Unit 1: [CBE401/ ENG401 /EAC3019-N](#) Group Design (20 UK Credits)
2. Unit 2: [CBE402/ ENG402 / MMD3058-N](#) Project (40 UK Credits)
3. Unit 6: [ENG406 / EAC3029-N](#) Computer Aided Engineering (20 UK Credits)
4. Unit 7: [ENG407 / MMD3019-N](#) Mechanics of Materials 2 (20 UK Credits)
5. Unit 8 : [ENG408 / MMD3048-N](#) Product Quality & Reliability (20 UK Credits))



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# Unit 1: (EAC3019-N) Group Design

This module will provide students with the opportunity to work in a team in order to solve a complex engineering design and implementation problem related to their chosen BEng Tech pathway. It will give the students an understanding of their knowledge and limitations and the importance of bringing in and working with people with a different knowledge base and skill set. Working in a team will enable problems to be successfully resolved which otherwise would not have been possible within a single individual. It will develop a consolidated set of employability skills in project management, presentation of work, research and commercial awareness in order to support complex problem solving in a technical context and enhance the awareness of professional issues such as health, safety, environment and ethics in the workplace.

## Module Learning Outcomes

### Knowledge & Understanding

1. Demonstrate critical and detailed knowledge of, and the ability to apply, appropriate techniques to design or modelling.
2. Analyse and evaluate the impact of ethical, legal and commercial issues relevant to the generation of knowledge in the discipline.

### Cognitive & Intellectual Skills

3. Synthesise, appraise and evaluate data/evidence from appropriate sources to make independent judgements in design or modelling of processes or systems.
4. Apply confidence and flexibility in identifying and defining complex problems and the application of appropriate knowledge, tools/methods to their solution.
5. Organise role specific responsibilities within the team.

### Practical & Professional Skills

6. Act within a team with limited supervision or direction.

### Key Transferable Skills

7. Plan, manage and evaluate the acquisition of new knowledge and skills as part of a lifelong learning strategy.
8. Demonstrate both employment potential and ability to manage future professional development.
9. Communicate clearly, fluently and effectively in a range of styles appropriate to the context. Engage effectively in academic discussion and present arguments in a professional manner to other members of the team.
10. Recognise and evaluate factors which enhance group processes and team-working, and modify and evaluate own personal effectiveness within a team

ENG 401  
EAC3019-N

20 UK  
Credits

UK Level 6

School of  
Engineering

# Unit 2: (MMD3058-N) Project

This 40 credit module provides an opportunity for independent study on a topic of the student's own choosing. This is a major part of the final year of study, taking place in year long. Students will typically undertake in-depth research into a chosen subject area and then conduct their own research on some specific related problem. Each student is allocated a supervisor with whom they should liaise closely at all stages of the project. It is necessary to keep a detailed logbook recording all the stages of the project and meetings with the supervisor.

Assessment will be by submission of a research report and the project logbook. These will be marked by the supervisor and a designated second marker, who will assess both the conduct of the project and the quality of the report. There will also be an assessed presentation.

## Module Learning Outcomes

On successful completion of this module students will be able to:

Personal and Transferable Skills

1. Plan, manage and evaluate the acquisition of new knowledge and skills
2. Select, apply and evaluate appropriate numerical and/or statistical methods for complex tasks
3. Communicate complex issues clearly to peers
4. Demonstrate employment potential and the ability to manage future professional development

Research, Knowledge and Cognitive Skills

5. Plan, undertake and evaluate a negotiated, self-managed project
6. Demonstrate a comprehensive and detailed knowledge of the discipline investigated in the project
7. Demonstrate an awareness of current issues and developing technologies
8. Appraise and evaluate data/evidence from appropriate sources to make independent judgements
9. Question orthodoxy using balanced, logical and supported argument
10. Demonstrate intellectual flexibility and openness to new ideas

Practical & Professional Skills

11. Operate ethically and act responsibly in complex contexts, taking into account legal, environmental, social and economic factors
12. Act autonomously with limited supervision in planning, monitoring and revising project schedules

ENG 402  
MMD3058-N

40/2 UK  
Credits

UK Level 6

School of  
Engineering

# Unit 3: EAC3018-N Electronic Systems

This module extends previous knowledge of electronic principles to the pragmatic application of electronics in industrial, commercial and human-machine interface devices. The module explores the circuit design methodologies and technologies required to make fit for purpose devices to fulfil a wide range of industrial, commercial and scientific applications. The module will be delivered through a combination of lectures, guided reading, design studies and laboratories. Whenever appropriate, use will be made of practical applications to demonstrate principles.

The aim of the module is to familiarize and equip the student to creatively apply a range of modern discrete and integrated electronic technology. Students will use laboratory design tools to create functional digital circuits/systems for various applications. The principles and design procedures of state machines will be stressed, enabling creation and verification of sequential logic systems. It also aims to investigate rapid prototyping techniques and develop hands-on experience in the application and critical assessment of FPGA/EPLD realization, executed in dedicated hardware and software environments.

## Module Learning Outcomes

1. Demonstrate a comprehensive and detailed knowledge of examples of contemporary electronic system designs, understand and modify existing schematics and create new designs.
2. Derive the circuits/systems specified and evaluate the solutions from design to synthesise and optimise electronic systems.
3. Synthesize circuit blocks from a variety of topologies and components to implement required functionality.
4. Be able to complete a modest digital system design task independently with limited supervision within agreed design specifications and time scale.
5. Select and apply appropriate software to aid analysis of complex electronic circuits/systems.

ENG  
4EAC3018-N

20 UK  
Credits

UK Level 6

School of  
Engineering



# Unit 4: (EAC3046-N) Power Electronics and Drive Systems

This module provides students with the capability to analyse and design power electronic converters and to integrate them in electric drive systems. The module will be delivered through a combination of lectures and tutorials including guided exercises. There is also a series of practical classes designed to reinforce the theory and to demonstrate the dependence of the drive system performance on the characteristics of the power converter and the control scheme employed.

The module is assessed via a laboratory report (50%) and an examination (50%).

The aim of the module is to broaden the students' knowledge of the elements of modern electrical drive systems in terms of the power-conditioning units, control strategies and motors used. It also aims to develop their practical skills in respect of designing and controlling power electronic converters.

## Module Learning Outcomes

1. Demonstrate a comprehensive and detailed knowledge of key aspects of modern electrical drive systems analysis, design and application.
2. Demonstrate intellectual flexibility in synthesizing drive system topologies and systems to meet given specifications.
3. Critically evaluate complex drive systems in demanding and high-performance applications.
4. Operate ethically in situations of varying complexity and predictability requiring the use of power electronics in the speed control of DC and AC machines.
5. Identify and select CAD and experimental tools in open-ended engineering design and problem solving tasks.

ENG 404  
EAC3046-N

20 UK  
Credits

UK Level 6

School of  
Engineering

# Unit 6: MMD3029-N Computer Aided Analysis

In this module students' knowledge of advanced techniques is developed for the computer based analysis of designs and to use commercial software to solve more complex engineering problems. Students will gain a thorough understanding of computer methods for the analysis of detailed design. Nodes, elements and meshing techniques for Finite Element Analysis (FEA) will be covered. Types of boundary conditions such as loads and constraints are explained including how to apply them. Students will learn how to solve FEA problems and analyse the results. Advanced techniques utilising adaptive and optimisation methods for solving complex engineering problems will also be covered.

## Module Learning Outcomes

On successful completion of this module the student will be able to:

### Knowledge & Understanding

1. Demonstrate a comprehensive and detailed knowledge of Finite Element Analysis
2. Demonstrate a comprehensive and detailed knowledge of advanced analysis techniques

### Cognitive & Intellectual Skills

3. Synthesise, appraise and justify the size and type of element used to obtain convergent results
4. Compare and contrast a range of advanced analysis techniques.

### Practical/Professional Skills

5. Act autonomously in the solving of engineering problems using commercially available Finite Element software.
6. Interpret and reflect on results from a range of advanced analysis techniques to enable revision of pre-processed parameters

### Key Transferable Skills

7. Select and evaluate software applications for the solving of engineering problems
8. Select, apply and evaluate advanced techniques to solve complex and open ended problems

ENG  
4MMD3029-N

20 UK  
Credits

UK Level 6

School of  
Engineering

# Unit 8: (MMD3048-N) Product Quality and Reliability

This module will equip students with appropriate industrial concepts of quality systems and reliability methods relevant to industrial applications. Statistical methods relating to quality control and reliability problems are considered together with product quality and the use of quality tools. This module will be appropriate for any student who hopes to work in an engineering or manufacturing environment.

Material will be delivered using lectures and tutorials. Initial lectures will cover concepts of quality and reliability, using examples. Later, the students will be required to apply their knowledge to industrial examples, and develop an understanding of the difficulties implementing quality and reliability systems.

Assessment will be via two in course assignments 2000 words and presentations (50% weighting) and an end examination (50% weighting).

## Module Learning Outcomes

On successful completion of this module the students will be able to:

### Knowledge & Understanding

1. Demonstrate a comprehensive and detailed knowledge of national and international standards relating to quality and reliability.
2. Analyse and evaluate the impact of legal and ethical issues relevant to the generation of knowledge within quality and reliability systems

### Cognitive & Intellectual Skills

3. Synthesise, appraise and evaluate data / evidence from a variety of sources within the quality and reliability environment to make independent judgements
4. Apply confidence and flexibility in identifying and defining quality and reliability problems and the application of appropriate knowledge, tools/methods to their solution.

### Practical & Professional Skills

5. Operate ethically in complex and unpredictable contexts requiring selection and application from a wide range of standard or innovative techniques.
6. Act autonomously in solving engineering and manufacturing problems using appropriate quality and reliability tools.

### Key Transferable Skills

7. Select, apply and evaluate appropriate quality and reliability methods for solving engineering and manufacturing problems.
8. Plan, manage and evaluate the acquisition of new knowledge and skills as part of a lifelong learning strategy.

ENG 408  
MMD3048-N

20 UK  
Credits

UK Level 6

School of  
Engineering

# MMD3023-N Applied Mechanics of Materials

This module will develop the advance theory and the principles of mechanics of materials and apply them to the analysis of realistic engineering problems analytically.

Specific areas of study include: stresses under axial loading, torsion and bending, stress concentrations, inelastic deformation, deflection of beams and shafts; Thermal stresses, transverse shear, buckling of column; thick-walled cylinders, stresses and strain transformation, principal stresses, and interface fits and introduction of failure theory.

## Module Learning Outcomes

On successful completion of this module the students will be able to:

Personal and Transferable Skills

1. Communicate effectively, using technical report writing skills and selection of appropriate information presentation methods appropriate at the level of study. Research, Knowledge and Cognitive Skills
2. Demonstrate in-depth knowledge of the concepts and theories of mechanics of materials and the application to predict response of machine/ structural members to externally applied loads for stress, strain, and failure analysis.
3. Develop critical analysis and mathematical modelling skills relevant to the study of mechanics of material and apply them to solve realistic engineering problems.
4. Identify and justify selection of appropriate formula(s) to compute the static response of different structural members subjected to various loading conditions. Professional Skills
5. Apply standard analytical and mathematical skills with limited supervision or direction to develop system's response model; interpret model and predict the system's stress, strain, failure, etc responses.
6. Apply theoretical and analytical methods to analyse static response of structural members and structures subjected to externally applied loads.

ENG  
4MMD3023-N

20 UK  
Credits

UK Level 6

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Engineering

# EAC3044-N Power System, Generation Transmission & Distribution

This module provides methods of electrical power systems analysis to develop the knowledge already gained through study of 'Electrical Engineering'. Consideration is given to the generation of electrical energy through to the transmission and distribution to consumers and the associated design of appropriate systems. In addition to system design, analysis of faults and subsequent hazards is also undertaken. The knowledge gained from Lectures will be underpinned and developed through practical based laboratory sessions.

In the course of this module, students will develop employability skills such as complex problem solving, report writing, practical problem solving and experimentation.

The aims of this module are to broaden the students' knowledge of the elements of electrical power systems and to give a sound grounding in the essentials of power system analysis, design, operation and control.

The module will provide students with the opportunity to develop their knowledge of fundamental electrical engineering concepts through calculation and design whilst also developing their practical skills to prove these theoretical concepts. Through the analysis of practical data and simulation, students will be expected to form conclusions on the feasibility of designs against requirements.

## Module Learning Outcomes

1. Demonstrate a comprehensive and detailed knowledge of key aspects of high voltage generation and control in electrical power systems.
2. Critically analyze and evaluate power system problems with respect to generation, economic dispatch, frequency/voltage control and stability.
3. Identify and define complex electrical power systems problems and apply appropriate knowledge and tools to their solution.
4. Operate ethically in situations of varying complexity and predictability requiring the analysis of the power system components and system-wide issues.
5. Select and apply appropriate numerical methods to power systems problems.
6. Select and apply appropriate software to aid analysis of electrical power systems

ENG  
4EAC3044-N

20 UK  
Credits

UK Level 6

School of  
Engineering

# School of Business (BUS)

## YEAR 1 – UK LEVEL 3 – For all Pathways

### 2 Mandatory core Units + 3 Optional Units (180 GLH) + General Education Subjects

#### 2 x Mandatory Core Units

1. Unit 19: [BUS119](#) – Exploring Business (90 GLH)
2. Unit 20: [BUS120](#) – Research and Plan a Marketing Campaign (90 GLH)

#### 3 x Optional Units/Subjects

1. Unit 3: [BUS103](#) - Business Finance (90 GLH)
2. Unit 4: [BUS104](#) - Managing an Event (90 GLH)
3. Unit 5: [BUS105](#) - International Business (60 GLH)
4. Unit 6: [BUS106](#) - Principles of Management (60 GLH)
5. Unit 7: [BUS107](#) - Business Decision Making (120 GLH)
6. Unit 8: [BUS108](#) - Human Resources (60 GLH)
7. Unit 9: [BUS109](#) - Team Building in Business (60 GLH)
8. Unit 10: [BUS110](#) - Recording Financial Transactions (60 GLH)
9. Unit 11: [BUS111](#) - Financial Statements for Public Limited Companies (60 GLH)
10. Unit 12: [BUS112](#) - Financial Statements for Specific Businesses (60 GLH)
11. Unit 13: [BUS113](#) - Cost and Management Accounting (60 GLH)
12. Unit 14: [BUS114](#) - Investigating Customer Service (60 GLH)
13. Unit 15: [BUS115](#) - Investigating Retail Business (60 GLH)
14. Unit 16: [BUS116](#) - Visual Merchandising (60 GLH)
15. Unit 17: [BUS117](#) - Digital Marketing (60 GLH)
16. Unit 18: [BUS118](#) - Creative Promotion (60 GLH)
17. Unit 19: [BUS119](#) - Pitching for a New Business (60 GLH)
18. Unit 20: [BUS120](#) - Business Ethics (60 GLH)
19. Unit 21: [BUS121](#) - Training and Development (60 GLH)
20. Unit 22: [BUS122](#) - Market Research (60 GLH)
21. Unit 23: [BUS123](#) - Work Experience in Business (60 GLH)



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22. Unit 24: [BUS124](#) - Branding (60 GLH)
23. Unit 25: [BUS125](#) - Relationship Marketing (60 GLH)
24. Unit 26: [BUS126](#) - Procurement Processes in Business (60 GLH)
25. Unit 27: [BUS127](#) - International Logistics (60 GLH)
26. Unit 28: [BUS128](#) - Sales Techniques and Processes (60 GLH)
27. Unit 29: [BUS129](#) - Health and Safety in the Workplace (60 GLH)
28. Unit 30: [BUS130](#) - Career Planning (60 GLH)
29. Unit 31: [BUS131](#) - Effective Project Management (60 GLH)
30. Unit 32: [BUS132](#) - Business and Environmental Sustainability (60 GLH)

# Unit 19: BUS119 Exploring Business

## Unit in brief

Learners study the purposes, features, structures and operating environments of business organisations, and examine the link between innovation and business survival.

## Unit introduction

A business organization is one that provides goods or services, whether that is to make a profit or not. The common thread in business is that owners and employees are striving to satisfy customers. In today's world of international business, customers are well-informed and have many options in terms of what they buy and who they buy from, so a successful business is one that balances satisfying their customers with selling products or providing services. In this unit, you will gain an overview of the key ingredients for business success, how businesses are organized, how they communicate, the characteristics of the environment in which they operate, and how this shapes them and their activities. You will also look at the importance of innovation and enterprise to the success and survival of business organizations, with the associated risks and benefits. By developing relevant business knowledge and understanding, this unit will help you to progress to employment, vocational training and higher apprenticeships, or higher education.

BUS 119

90 GLH  
15 UK Credits

UK Level 3

School of  
Business

# Unit 20: BUS120 Research and Plan a Marketing Campaign

## Unit in brief

Learners develop an understanding of how marketing research is conducted in order to plan a marketing campaign.

## Unit introduction

A business organization may have an outstanding existing or planned product or service to offer prospective customers, but if those customers do not know about it, they cannot buy it. So a business organization must make sure it understands the needs of its prospective customers and then enable them to find out about the product or service and how it will benefit them. A careful marketing campaign will help the organization to achieve this. In this unit, you will learn how a marketing campaign is planned and developed. You will explore a range of different objectives that can be included in a marketing campaign such as increasing sales or market share, or establishing a brand image, and explore the various stages of the process an organization goes through when developing its campaign. Using your understanding of these factors, and of marketing models and tools, you will develop your own costed marketing campaign for a given product. You will examine the marketing aims and objectives for existing products and use your own independent market research data to make recommendations about the type of marketing campaign a business organization should undertake. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will give you an insight into how important marketing is to business. It will enable you to make an informed choice as to whether you want to specialise in marketing in employment, training or higher education.

BUS 120

90 GLH  
15 UK Credits

UK Level 3

School of  
Business



# Unit 3: BUS103 Business Finance

## Unit in brief

Learners develop the skills and knowledge required to analyze and interpret financial data, enabling them to assess the financial health of a business and suggest how its performance can be improved.

## Unit introduction

Business finance enables a business organization to operate on a day-to-day basis, and over the long term, develop new products and invest in new equipment in order to access new markets. Decisions relating to business finance require careful planning and monitoring, which involve deciding where to obtain the finance, calculating business costs, and understanding how to evaluate and improve the overall performance of a business. In this unit, you will consider the importance of business finance and the types of business finance available in different contexts. The unit will introduce you to accounting terminology, the purpose and importance of business accounts, and the different sources of finance available to businesses. You will prepare and analyze business finance planning tools such as cash flow forecasts and break-even analyses. Measuring the financial performance of an organization will require you to prepare and analyze statements of comprehensive income, and statements of financial position, in relation to the organization's profitability, efficiency and liquidity. This unit will give you a background to business finance and accounting as you progress to employment and further training.

BUS 103

90 GLH  
15 UK Credits

UK Level 3

School of  
Business

# Unit 4: BUS104 Managing an Event

## Unit in brief

Learners will work as part of a small group to plan, coordinate and manage a business or social enterprise event and evaluate the skills gained.

## Unit introduction

Events management is one of the most exciting and dynamic sectors of business. This unit combines your creativity and organizational skills to produce successful, memorable events, whether for profit or social enterprise. You will investigate a number of successful events, both large and small, and use this research to assess the feasibility of events to plan and run yourself. Examples could range from organizing meetings, product launches, exhibitions, promotions, charity events, team-building events and staff development, to a full-scale conference. Your chosen event will be carefully planned, demonstrating your ability to use planning tools. You will then stage the event, testing the effectiveness of your planning. This will require you to 'think on your feet', deal with financial and security issues, liaise with suppliers and venue personnel, and utilize your problem-solving skills. Afterwards you will evaluate the success of the event. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will develop your teamwork, communication, time-management, negotiation and problem-solving skills. It will help you develop the essential transferable skills that employers look for. The unit will provide a useful opportunity to consider whether to pursue a career in events management or to continue on to further study in this area.

BUS 104

90 GLH  
15 UK Credits

UK Level 3

School of  
Business

# Unit 5: BUS105 International Business

## Unit in brief

Learners explore the reasons why businesses trade globally and consider the factors that influence the implementation of international business strategies.

## Unit introduction

International business has a significant influence on a nation's economy. It takes place in a globally competitive environment, involving organisations of all types and sizes. Organisations engaged in international business activities need to take into account a number of factors, such as the culture and politics of the country with which they want to do business. Governments can influence international business to maximise the benefits to the national economy and countries join international trading blocs to promote and protect international business. In this unit, you will explore the benefits and issues associated with international business activities. You will investigate the economic and wider external environments that influence the choice of international markets. You will also examine the strategic and operational approaches to developing business in an international context. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will give you a greater understanding of the global business environment to help inform your career choices. The unit gives you the skills to undertake advanced or specialist studies in international business at higher education level.

BUS 105

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 6: BUS106 Principles of Management

## Unit in brief

Learners develop an understanding of how the role of management and leadership in the workplace contributes towards business success.

## Unit introduction

Managers are vital to the running of any business; they shape and influence business through their leadership and managerial performance. In this unit, you will examine how businesses adapt their approaches to management in response to challenges in the internal and external business environment. You will gain an understanding of how the implementation of different leadership styles and theories can impact on the workplace. Depending on their roles and responsibilities, managers need to develop skill sets that enable them to work effectively in areas such as the management and motivation of people, financial resources, quality management, and the management of change. You will investigate some of the issues that managers and leaders have to deal with in the workplace in making businesses more efficient and ensuring their survival and growth. This unit will help you to progress to employment by considering a career working in supervision and management, and/or to vocational training. Additionally, you might move on to related higher education having developed a knowledge and understanding of management.

BUS 106

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 7: BUS107 Business Decision Making

## Unit in brief

Learners use their knowledge and understanding of business concepts and processes from the mandatory content to formulate business decisions and solutions.

## Unit introduction

In this unit, you will apply the knowledge and skills you have gained in other units to interpret business data and formulate appropriate decisions and solutions to business problems. You will consider business situations and scenarios where you are required to select and use appropriate evidence drawn from several sources in order to make business decisions to support a business's objectives. Making business decisions will require you to analyze, interpret and compare business data drawn from a number of sources such as financial data, financial statements and market information. You will use appropriate business models to identify business risks and evaluate the costs and benefits of alternative solutions to a business problem. You will predict probable consequences, identify faulty arguments or misrepresentations of information or data, compare information and data, provide reasonable alternatives, and evaluate and justify your proposed solutions. This unit will help you to understand the importance of decision making and planning in a business and enable you to progress to employment, self-employment, training or higher education. This is a controlled assessed unit and will allow you to demonstrate your ability to extract relevant information and apply the knowledge and understanding you have developed.

BUS 107

120 GLH  
20 UK Credits

UK Level 3

School of  
Business

# Unit 8: BUS108 Human Resource

## Unit in brief

Learners develop knowledge and skills in human resource planning and management.

## Unit introduction

Effective human resource management, including recruitment and selection, is essential to the success of a business. It is important that the processes and procedures involved in human resource management meet the needs of the business and comply with current regulations. This will include understanding the importance of motivating employees and gaining their cooperation and commitment to the business. In this unit, you will learn the importance of human resource management and planning, the relationship between a motivated workforce and business success, and the processes and procedures involved in recruiting, training and appraising the performance of employees. This unit will give you a foundation for progression to employment, for example in a human resources role, or to higher education. You will have an opportunity to review the human resource practices in a large organisation, which will enable you to better understand how performance is managed.

BUS 108

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 9: BUS109 Team Building in Business

## Unit in brief

Learners study the dynamics of team building, examine the underpinning theory and participate in team activities.

## Unit introduction

The importance of teams that perform well cannot be underestimated. It is generally accepted that successful businesses have effective teams in place. An effective team is one that is led and managed well. The team is also motivated, well-briefed, and communicates well. In this unit you will learn how successful businesses draw on effective teams. For example, Formula One® motor racing relies on excellent teamwork, which is modelled by many businesses. A team allows its members to use their collective strength and to share ideas, perspectives and experiences. You will learn that nearly all individuals in a business belong to one or more groups or teams that contribute to the overall corporate strategy of the business. You will learn the different roles within a team and the importance of establishing a shared vision when making collaborative decisions. In this unit you will get to work in, and lead, a team. The unit and the team activities will give you the practical tools you need to support and lead a team. It develops key employability skills and will be useful both in the workplace and in your studies.

BUS 109

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 10: BUS110 Recording Financial Transactions

## Unit in brief

Learners explore how and why financial transactions are recorded as well as checking bank records and dealing with errors.

## Unit introduction

The accounting or bookkeeping system is the process that provides all the information for the final accounts of a business. It is essential that accounting records are clear, concise and accurate. In this unit, you will complete a set of accounts for a typical business. You will learn how source documents are recorded in the accounts, how to record this information into double entry ledger accounts and extract a trial balance. You will consider the importance of keeping accurate financial records, including the legal and professional obligations of a business relationship with stakeholders and the risk of fraud. You will also learn how control mechanisms such as bank reconciliation, and how control accounts are prepared and used to help keep accurate financial records. You will examine how and why errors may occur in the financial records of a business and make the necessary corrections. You will consider how these errors affect the financial statements for the business as well as understanding the wider implications of errors and inaccurate financial records for the success of a business. This unit provides a useful opportunity to gain the practical and professional skills of working in an accounting environment, which will enable you to decide if you want to progress to further study or training in this area.

BUS 110

60 GLH  
10 UK Credits

UK Level 3

School of  
Business



# Unit 11: BUS111 Financial Statements for Public Limited Companies

## Unit in brief

Learners will develop an understanding of the importance of completed and well-analysed financial statements for limited companies.

## Unit introduction

In this unit, you will gain a thorough understanding of why financial statements are prepared in the way they are. You will cover end-of-year financial statements for limited companies, learn about the importance of the information contained in them, and how this can be used by interested stakeholders. You will also consider the importance of complying with accounting concepts and standards so that financial statements are prepared accurately and consistently. You will learn how an analysis of a business's statement of cash flows can help to identify the amount of cash available from one accounting period to another, and enable users to understand why a large profit does not necessarily result in an abundance of cash. You will consider the importance of ratio analysis in helping shareholders and potential investors to make decisions about the likely future success of a limited company. This unit will help you to progress to an accounting apprenticeship or to one of the higher education routes in business and financial management.

BUS 111

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 12: BUS112 Financial Statements for Specific Businesses

## Unit in brief

Learners will apply financial accounting to different types of business, including partnerships, non-profit-making businesses and manufacturing businesses.

## Unit introduction

Financial accountants are concerned with the recording, summarising and interpreting of financial information and accounts. They must keep accurate and up-to-date records for different types of business. In this unit, you will develop a greater understanding of the accounting records for different types of business, in particular the end-of-year financial statements for partnerships, non-profit-making businesses and manufacturing businesses. You will learn how to produce the final accounts for these types of business along with other related accounting records and ledger accounts. You will need to use your analytical skills to consider the differing capital structures, legal requirements and financial information which are required by these types of business. The unit will help you to progress to an accounting apprenticeship or to one of the higher education routes in business financial management.

BUS 112

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 13: BUS113 Cost and Management Accounting

## Unit in brief

Learners study cost and management accounting and its involvement with financial planning, controlling, monitoring and evaluation of business costs and revenues.

## Unit introduction

Cost and management accountants are concerned with providing information to help the decision-making process in business. Cost accountants are primarily involved with the identification, classification and calculation of costs vital to helping managers make decisions about prices and potential profits. Management accountants provide management with the information they need to forecast, control and evaluate costs. In this unit, you will learn how to develop a more in-depth understanding and application of management accounts and their role in financial planning. Typical cost accounting methods and budgets will be applied to appropriate business scenarios. Control measures will involve calculating and analysing the difference between standard and actual costs. Finally, long-term management accounting decisions will be considered using capital investment appraisal. Management accounting is not just about numerical calculations, you will need to use your analytical skills to weigh up alternative courses of action, evaluate options and make reasoned judgements and recommendations. Cost and management accounting has clear links to all the other finance units and will help you to progress to employment and accounting apprenticeships. This unit will give you an excellent foundation for higher education routes such as accounting or professional courses.

BUS 113

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 14: BUS114 Investigating Customer Service

## Unit in brief

Learners will study how excellent customer service contributes to business success. The unit gives learners the opportunity to develop their customer service skills.

## Unit introduction

How is excellent customer service linked to business success? In this unit you will learn that attracting new customers costs a business more than keeping existing customers, so it is important to keep existing customers happy. You can do this by building relationships with internal and external customers and giving them excellent service that exceeds their needs and expectations. When working in a customer service role you need to understand the procedures to follow when dealing with customer requests and complaints. This unit will help you develop communication and interpersonal skills when dealing with customers, and to understand the importance of having good product or service knowledge. You will explore how a business builds effective relationships with customers through identifying and confirming the customer's needs. You will examine how businesses monitor and evaluate their level of customer service provision through obtaining feedback and see how this helps inform improvements to the level of service provided. The unit will enable you to evaluate your own customer service skills and to create a development plan for improvement. The unit also supports further training, study or employment in a business environment.

BUS 114

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 15: BUS115 Investigating Retail Business

## Unit in brief

Learners will explore the current structure of the retail sector and its supply chain through practical activities.

## Unit introduction

Retail is a broad sector and encompasses businesses of all sizes. You will probably already have some experience of the sector, either simply through purchasing goods, or selling them – perhaps while employed in a part-time capacity in a clothing or food outlet. In this unit, you will carry out research into local and national retail businesses, exploring how the supply chain supports retailing. You will consider how the sector responds to change, the opportunities for employment in the sector, and the types of job roles available. You will apply your research and findings to current businesses in the sector. Retail is important for the UK economy and trends in retail sales often mirror those of the country's economy as a whole. It is a sector with good opportunities for your future career and there is a tradition amongst the larger employers of excellent in-house training schemes that support progression opportunities and career advancement for employees. The unit will provide a useful opportunity for you to consider whether you wish to pursue employment or further specialist study in retail management at a higher education level.

BUS 115

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 16: BUS116 Visual Merchandising

## Unit in brief

Learners study the practice and techniques used to visually promote the sale of products in retail outlets.

## Unit introduction

Every time you go to a shopping centre you are faced with stimulating and engaging displays designed to encourage the sales of products or services. Visual merchandising (or VM) is the art of setting out stores in ways that customers will find attractive and appealing. Window and internal displays, product positioning and effective promotional techniques are all important aspects of visual merchandising designed to increase store traffic and sales volume. In this unit, you will look at different visual merchandising and display techniques. These techniques will vary according to the type and size of a retail business and the products it sells. If customers are to be persuaded to spend money there are many issues that have to be considered such as health and safety and other legislation, as well as creative and psychological factors. This unit will give you an insight into the elements used to create attractive displays, including product information, colour, light, space, smell, touch and sound. Digital technology can also be used to create displays and interactive installations. You will have the opportunity to investigate and demonstrate some of the practical skills and techniques that retailers use to tempt customers into their stores. The unit will also help you to decide if you would like to work in, or continue to further study in, this area.

BUS 116

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 17: BUS117 Digital Marketing

## Unit in brief

Learners examine the different aspects of web-based marketing, and the channels that can be used to deliver a successful digital marketing campaign.

## Unit introduction

This unit will allow you to develop your marketing skills and provide an understanding of the role of digital marketing in identifying and satisfying customers. In this unit, you will examine the purpose of digital marketing in a business, and consider the specific aims and objectives of this function. You will research how digital marketing is used today, and develop an understanding of the benefits of, and concerns about, digital marketing. You will investigate the different delivery methods and the use of key performance indicators (KPIs) used to evaluate the success of the digital message. You will use this knowledge to make recommendations for a digital marketing campaign for a selected business. This unit will give you an insight into the importance of digital marketing as part of the wider marketing function, and enable you to make an informed choice on the suitability of this area of marketing as an employment or training possibility.

BUS 117

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 18: BUS118 Creative Promotions

## Unit in brief

Learners study how creative promotion influences the buying decisions of customers, stimulates demand, creates brand personality, and promotes products and services.

## Unit introduction

Effective promotion attracts and persuades customers to buy products and services. It is used to stimulate sales and develop brand loyalty. Businesses use a range of marketing communications and activities to convey their messages. This unit will develop your understanding of the ways in which businesses communicate with current and potential customers for promotional purposes. You will explore the methods used by contrasting businesses and reflect on the suitability of specific methods used to achieve marketing objectives. In this unit, you will use your creative skills to produce a fully costed plan for a promotional campaign. The unit will help you to decide if you would like to work in or continue to further study in this area.

BUS 118

60 GLH  
10 UK Credits

UK Level 3

School of  
Business



# Unit 19: UnitBUS119 Pitching for a New Business

## Unit in brief

Learners study the practical skills and acquire the knowledge needed to undertake the necessary preparation and steps to set up and pitch for funding for a micro-business.

## Unit introduction

Entrepreneurs explore potential business opportunities, select viable business ideas, prepare appropriate business plans and pitch these to potential investors. This unit will teach you how to carry out these steps which are critical to the development of new businesses. This unit focuses upon pitching a new business idea for a micro-business – a business employing less than 10 people. This could be a business you want to start up yourself or in partnership with others. In this unit, you will investigate a potential micro-business idea and outline a business plan. You will present your business plan to potential investors with a view to securing appropriate funding. It is important that you are able to recognise what should be included in a pitch and how the process of idea formulation, selection, planning and presentation should be managed in order to secure funding. This unit will develop the skills needed if you decide to set up your own business, or if you want to work in or study further a sector or area that needs entrepreneurial or innovative skills.

BUS 119

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 20: BUS120 Business Ethics

## Unit in brief

Learners develop an understanding of how organisations promote ethical behaviour in the workplace and consider the business case for implementing socially-responsible business practices.

## Unit introduction

Business organisations are aware that the behaviour of consumers is increasingly influenced by the organisation's ethical behaviour, the way it conducts its working relationships, and how far it recognises the impact of its activities in a wider social and environmental context. To remain competitive in this environment, business organisations need to demonstrate high standards of ethical business behaviour and take account of the social and environmental impact of their production processes. In this unit, you will consider a business organisation's relationship with its internal and external stakeholders from the perspective of business ethics and corporate social responsibility (CSR). You will explore the nature of ethical behaviour in a business context and the impact of business ethics on costs, operations, and the roles and responsibilities of managers and employees in the workplace. You will also examine the role and importance of CSR and how it influences an organisation's relationship with stakeholders in the wider external business environment. This unit will help you progress to higher education courses exploring business ethics and CSR, and will enable you to make an informed choice of suitable CSR organisations for employment.

BUS 120

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 21: BUS121 Training and Development

## Unit in brief

Learners study training and development and recognise that successful businesses need to plan and manage the training programmes they offer.

## Unit introduction

What is the difference between training and development? Training can be defined as teaching someone new skills or knowledge, while development enables them to be more productive and effective at work. Training and development is an expense to the business but an investment that helps staff to perform better. Types of training and development differ, as they must meet both the objectives of the business and the individual. If the business is to compete effectively in today's market, it is important that training and development is updated constantly. In this unit, you will learn that training and development is the key to running a successful business; managers need to have well thought-out training plans in place. For a business to succeed, it needs staff with the correct range of up-to-date skills and knowledge that will allow them to perform effectively. A good manager will be able to identify training needs across the business, understand the cost that comes with training, and be able to provide and monitor training programmes in their training budgets. This unit will help you by developing relevant business knowledge and understanding to progress into employment, vocational training or higher education.

BUS 121

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 22: BUS122 Market Research

## Unit in brief

Learners examine the different aspects of market research used by businesses. They will undertake a research project, interpret their findings and produce a report.

## Unit introduction

This unit will develop your research skills and your understanding of the role marketing information plays in identifying and satisfying customers' needs. In this unit, you will examine the purpose and type of market research undertaken in a business, consider the objectives of the research and the processes followed. You will plan and undertake a research activity using the most appropriate design and sampling method. You will analyse and interpret market research data and present your findings. You will use this knowledge to make recommendations for improvements to the market research process for a selected business. This unit will give you an insight into the importance of collecting and interpreting marketing information as a tool for making wider marketing decisions, and enable you to make an informed choice on the suitability of this marketing area as a possible employment or training opportunity.

BUS 122

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 23: BUS123 Work Experience in Business

## Unit in brief

Learners study the benefits of work experience in business. They reflect on their practical workplace skills by completing forty hours of appropriate work experience.

## Unit introduction

Are you thinking about a career in business and would like to gain experience to prepare for the kind of job you would like to do? Work-related learning opens your eyes to a range of opportunities in business. It gives you first-hand practical experience and the chance to see what a variety of different jobs are really like, including some you may never have considered. It will give you a means of documenting practical experience, planning for personal and professional development and reflecting on your own skills. In this practical unit, you will learn about different types of work-related learning and their benefits. You will learn what information you need before starting the placement, and how the placement can help you to develop key competencies needed for employability such as self-management, team working, problem-solving and communication skills. You will learn more about the expectations of different roles. You will research and take on relevant work experience, and evaluate your performance through a reflective journal. Work experience is highly valued by employers for a variety of careers in the business sector; employers are looking to recruit those who have some knowledge of the world of work. A record of your work experience is also an advantage for higher-education-level study and courses

BUS 123

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 24: BUS124 Branding

## Unit in brief

Learners will investigate the role of branding and explore how it is used and will give recommendations for changes to a brand for a selected product.

## Unit introduction

Brands surround us in our everyday lives. People may judge others by their brand of car, their brand of clothes or the brand of drinks they consume. Brands can help give people identity and image. Because of this, marketing is often brand driven, with the objective of establishing a product (good or service) with a separate identity in consumers' minds, making the product desirable, wanted and even needed. Messages are carefully crafted to build customer views and expectations of the products associated with the brand. Constant advances in digital-based processes and systems, and changes in customer behaviour and their use of social media, present a challenge for businesses who work to maintain, develop or reinforce their brand identity. Businesses invest a huge amount of effort and resources to ensure that the customer recognises and responds to their brand identity in the right way. In this unit, you will consider the ways in which businesses use branding to achieve their marketing objectives and business aims. You will explore the ways in which branding influences the marketing mix and how brand-strategy recommendations are developed according to market needs. This unit will support your continuing studies of branding through a marketing-related degree or a professional qualification. The unit will also give you the skills you need to progress to employment in a branding-related role.

BUS 124

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 25: BUS125 Relationship Marketing

## Unit in brief

Learners will study the purposes and benefits of relationship marketing and the methods used by a selected business to attract and retain customers.

## Unit introduction

Relationship marketing puts the customer and customer retention at the centre of the business, rather than its products and services. Businesses engage in relationship marketing to continually attract repeat business. Strategies are designed to raise interaction, communication, customer loyalty and long-term engagement by providing information directly suited to customer needs and interests. You will learn how relationship marketing attempts to keep customers engaged by providing marketing information and responses to enquiries, as well as promoting and selling additional products and services. In this unit you will focus on how technology supports and facilitates this as businesses build databases of customer details that they then use to create tailored relationships with individual customers, known as customer relationship management. Similarly, you will understand how social media offers a direct and instant way for businesses and customers to communicate with each other. You will also learn how effective relationship marketing results in customers who continue to buy goods and services, satisfying their own needs and helping businesses meet their objectives. This unit will support you in continuing your study of relationship marketing through a marketing-related degree or a professional qualification. The unit will also give you the skills you need to progress to employment in this area.

BUS 125

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 26: BUS126 Procurement Processes in Business

## Unit in brief

Learners study the principles of procurement, focusing on how the efficient acquisition of resources and materials helps businesses to remain competitive by controlling their costs.

## Unit introduction

Resources and materials are used in the production of goods and services, which are then sold and distributed to customers. For businesses to remain competitive, buyers have specific requirements in terms of the quantity, quality and price of these resources and materials, as well as expecting suppliers to deliver them on time and to the correct location. As materials are a significant input cost, it is the buyer in a business who works to control these costs, while at the same time ensuring the quality and continuity of supply to meet customer demand. In this unit, you will examine how businesses buy the materials they need efficiently. You will investigate how businesses calculate their purchasing requirements and synchronise these activities with the anticipated demand from customers. You will explore how financial considerations ensure that all parties in the procurement process aim to make a profit, while the buyer's outcomes will focus on controlling costs. You will investigate the fundamental role of commercial agreements between buyers and suppliers and how they are formalised into binding contracts. You will learn how effective procurement practices ensure the continuity of cost-effective, efficient business operations. The knowledge you gain from this unit will help you to progress to higher education or to further specialist training in procurement and to a career in buying.

BUS 126

60 GLH  
10 UK Credits

UK Level 3

School of  
Business



# Unit 27: BUS127 International Logistics

## Unit in brief

Learners develop an understanding of factors that influence the movement of goods when they are transported between different countries, including the role of the supply chain.

## Unit introduction

Moving goods and materials around the world to enable manufacturers to produce more goods, as well as consumers to buy goods, involves many efficient processes. Logistics organisations must remain competitive in this environment, and need to demonstrate well-organised systems and high operational standards, while taking into account the demands of other organisations, and the impact of their operations on the natural environment. In this unit, you will consider the many methods used to transport goods from a range of destinations from primary, secondary and tertiary sectors. You will explore the role of the supply chain and how it integrates with logistics and the factors that affect the movement of goods, both within a country and around the world. You will examine the range of systems and management operations used to ensure goods are moved quickly to their destinations. You will also explore how logistics organisations must balance the need to continually improve their processes in order to meet the needs of their many stakeholders, respect the environment and comply with regulatory issues. This unit will help you to progress to higher education courses exploring logistics and the supply chain and will enable you to make an informed choice of suitable logistics organisations for employment.

BUS 127

60 GLH  
10 UK Credits

UK Level 3

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Business

# Unit 28: BUS128 Sales Techniques and Processes

## Unit in brief

Learners develop skills relating to all stages of the sales process for Business-to-Business (B2B) sales. (This unit is not designed for retail selling.)

## Unit introduction

The successful sale of products or services is key to any business organisation since the revenue generated will have a direct impact on profitability. The growth of e-commerce, the ease of access to data and information coupled with increased globalisation, means an organisation needs to have greater management control of the sales process to enhance customer loyalty and retention and maintain the reputation of their brand. In this unit, you will gain a comprehensive overview of the sales process from initial contact to completion, and of the importance of ethical sales practices. You will learn how to prepare for a professional sale and explore the immediate post-sales procedures including how the sales order process is monitored, and the development of an accurate quotation. Through practical activities, you will develop the skills and abilities needed to be successful in the sales process. This unit will enable you to make an informed decision about the suitability of sales as a career enabling you to move directly into employment, or into further training, such as higher education qualifications in sales and marketing.

BUS 128

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 29: BUS129 Health and Safety in the Workplace

## Unit in brief

Learners explore legislation and regulations relating to health and safety in the workplace, and develop the skills to conduct an audit and carry out a risk assessment.

## Unit introduction

In any workplace environment it is essential to be compliant with health and safety legislation and organisational requirements. Employers must take reasonable care to protect their employees and others from the risk of injury, disease or death, and employees must also take care to protect themselves and others. The consequences of non-compliance can have serious implications for both employers and employees. In this unit, you will explore legislation and regulations that exist to ensure safe working practices in your sector and investigate the procedures that organisations have in place to comply with these regulations. You will examine both physical and emotional health and safety issues that can arise in a work environment and methods used to manage them. You will learn methods for assessing workplace health and safety standards and risk, which can be used to identify and report potential or actual hazards, suggesting remedial measures to improve workplace practices. You conduct risk assessments using an accepted format. This unit will give you the understanding and skills to comply with health, safety, and welfare legislation and procedures in the workplace. It will enable you to investigate safe working practices in your sector, whether you progress to employment, training, or higher education.

BUS 129

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 30: BUS130 Career Planning

## Unit in brief

Learners research and plan for potential careers, completing personal skills audits and developing interview techniques, in order to improve their employment prospects.

## Unit introduction

Over the last 20–30 years employment opportunities have changed significantly. ‘Jobs for life’ are far less common, and, these days, you are likely to change your job or even career pathway many times, or work in different jobs simultaneously. In order to make the transition to employment successfully, you need to be able to research suitable career pathways and take the steps necessary to achieve your career goals. In this unit, you will research potential career pathways, examine your current skill set, and identify any gaps in your skills and knowledge. You will create a career development plan, identifying the training you will need to improve your skills and knowledge and other steps required to reach your goals. As part of your career plan you will also consider alternative pathways should your chosen career be affected by external influences such as a fall in the economic strength of your country. You will prepare job application documentation and take part in a simulated interview to develop your communication and interview skills, and consequently your employment prospects. This unit will help you to be fully prepared to either enter the workplace at the end of your school or college course or to enrol on higher education courses that will further develop the skills and knowledge required for your chosen career.

BUS 130

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 31: BUS131 Effective Project Management

## Unit in brief

Learners develop the skills to plan and manage a business project and assess the effectiveness of the techniques and tools available.

## Unit introduction

Project management is integral to the running of business organisations throughout the world, and can be applied to limitless operations from product development or infrastructure change, to introducing new internal processes or establishing a new team. Managing a project requires excellent communication, time management, and problem-solving skills. In this unit, you will learn the main principles and techniques involved in project management, from the planning stage through to managing a project from its inception to its completion. You will follow a project life cycle model: define its scope, agree stages and outcomes, set milestones for performance, quality and timescales, work to a budget, and consider different stakeholder requirements. Your project plan will consider a range of processes and tools used to ensure effective project management. You will conclude your study of the unit by reflecting on the success of the principles and tools used during the project and consider alternative approaches that could be used in future projects. This unit will develop your teamwork, communication, time management and problemsolving skills – essential transferable skills that employers look for in the contemporary workplace. The unit will provide a useful opportunity to consider a career in project management and prepare you for further study in this area.

BUS 131

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# Unit 32: BUS132 Business and Environmental Sustainability

## Unit in brief

Learners develop an understanding of factors that influence business procedures and activities and their impact on the environment.

## Unit introduction

An improved awareness of the environmental impact of business activities and a desire to operate more sustainably has meant that business organisations look more closely at their capacity to control pollution, manage waste and conserve energy. Additionally, increased public awareness of environmental issues has led to considerable investment in sustainable development and renewable energy sources. Many organisations have realised that it is both responsible practice and good business sense to develop more efficient processes, using fewer natural resources and producing less waste. In this unit, you will learn how business activities can impact the environment, and explore ways in which business organisations can aim to improve sustainability while still meeting the needs of their stakeholders. You will investigate the business and environmental practices of local business organisations and examine ways in which they can balance the need to improve their impact on the environment with the need to carry out their business operations and achieve commercial or operational aims. This unit will help you to progress to higher education courses exploring business practices, the environment and sustainability, and will enable you to make an informed choice of suitable organisations for employment or to partner with in business undertakings.

BUS 132

60 GLH  
10 UK Credits

UK Level 3

School of  
Business

# School of Business (BUS)

## YEAR 2 – UK LEVEL 4

### 6 Mandatory core Units + 2 Optional Units + General Education Subjects

#### 6 x Mandatory Core Units

1. Unit 1: [BUS201](#) - Business and the Business Environment (15 UK Credits)
2. Unit 2: [BUS202](#) - Marketing Processes and Planning (15 UK Credits)
3. Unit 3: [BUS203](#) - Human Resource Management (15 UK Credits)
4. Unit 4: [BUS204](#) - Leadership and Management (15 UK Credits)
5. Unit 5: [BUS205](#) - Accounting Principles (15 UK Credits)
6. Unit 6: [BUS206](#) - Managing a Successful Business Project (15 UK Credits)

#### 2 x Optional Units

#### List of Optional Level 4 Subjects/Units

1. Unit 7: [BUS207](#) - Business Law (15 UK Credits)
2. Unit 8: [BUS208](#) - Innovation and Commercialisation (15 UK Credits)
3. Unit 9: [BUS209](#) - Entrepreneurial Ventures (15 UK Credits)
4. Unit 10: [BUS210](#) - Recording Financial Transactions (15 UK Credits)
5. Unit 11: [BUS211](#) - Business Data and Numerical Skills (15 UK Credits)
6. Unit 12: [BUS212](#) - Executive Recruitment Solutions (15 UK Credits)
7. Unit 13: [BUS213](#) - Human Capital Management (15 UK Credits)
8. Unit 14: [BUS214](#) - Digital Business in Practice (15 UK Credits)
9. Unit 15: [BUS215](#) - Operations Management (15 UK Credits)
10. Unit 16: [BUS216](#) - Managing the Customer Experience (15 UK Credits)
11. Unit 17: [BUS217](#) - Professional Identity and Practice (15 UK Credits)
12. Unit 18: [BUS218](#) - Work Experience (15 UK Credits)

### In year 3, students have to choose their pathways:

- Accounting & Finance
- Business Management
- Human Resource Management
- Marketing

Construction Management, Automation, Business Management, Accounting and Finance, Marketing, HR among others



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# Unit 1: BUS201 Business and the Business Environment

## Introduction

Business activity is fundamental and universal to our everyday lives. Business organisations may differ in many ways, depending on the industry in which they operate globally, but they do share one common feature: the transformation of inputs into outputs. This transformation process takes place against a background of external influences that impact on business activity. The external environment in which business organisations operate is dynamic, complex, volatile and interactive. The aim of this unit is to give students background knowledge and understanding of business, of the functions of an organisation and of the wider business environments in which organisations operate. Students will examine the different types of organisations (including for profit and not for profit), their size and scope (for instance micro, SME, transnational and global) and how they operate. Students will explore the relationships that organisations have with their various stakeholders and how the wider external environments influence and shape business decision making. The knowledge, understanding and skill sets that students gain in this unit will help them to have an insight into different business functions, which will support them with further study, support the development of analytical thinking and the application of key analytical tools used throughout business planning, and enable them to choose their preferred areas of specialism in future studies and in their professional career.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Explain the different types, size and scope of organisations

LO2 Demonstrate the interrelationship of the various functions within an organisation and how they link to organisational structure

LO3 Use contemporary examples to demonstrate both the positive and negative influence/impact the macro environment has on business operations

LO4 Determine the internal strengths and weaknesses of specific businesses and their interrelationship with external macro factors.

BUS 201

15 UK  
Credits

UK Level 4

School of  
Business



# Unit 2: BUS202 Marketing Processes and Planning

## Introduction

Large-, medium- and small businesses that operate globally, internationally or locally have at least one thing in common – they all use marketing to influence us to engage with their products and/or services. Whether this means becoming a loyal customer buying a product and service or donating to a charity, organisations use a range of marketing techniques and tools to inform and influence us. This unit is designed to introduce students to the dynamic world of the marketing sector and the wealth of exciting career opportunities available to support their decision making in their career choices. Students will have the opportunity to learn about the competencies and behaviours required by employers to work in the marketing sector. They will be introduced to the key principles of marketing, enabling them to develop a marketing plan and to employ elements of the marketing mix to achieve results. They will study the underpinning theories and frameworks of marketing while relating them to real-world examples, including products/services that they encounter in their daily lives. The knowledge, understanding and skill sets that students will gain on successfully completing this unit will enhance their career opportunities; whether this is setting up their own business or employment in an organisation.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Explain the role of marketing and how it interrelates with other business units of an organisation
- LO2 Compare ways in which organisations use elements of the marketing mix to achieve overall business objectives
- LO3 Produce a marketing plan for an organisation that meets marketing objectives
- LO4 Develop a media plan to support a marketing campaign for an organisation.

BUS 202

15 UK  
Credits

UK Level 4

School of  
Business

# Unit 3: BUS203 Human Resource Management

## Introduction

People are the lifeblood of any organisation and the ability to attract, recruit and retain talented staff is critical to the success of any organisation, whether in business, in voluntary organisations or in government. Human Resource Management (HRM) provides organisations with the principles, knowledge and behaviours to focus people-management activities on supporting and enhancing organisational success and performance. This unit will give students the knowledge and skills associated with Human Resource (HR) occupational roles at either a generalist level, for example HR Assistant/HR Advisor/Business Partner, or more specialist roles in areas such as recruitment, talent acquisition and performance and reward management. Students will explore the nature and scope of HRM and the organisational context of people management, including recruitment and retention, training and development, reward systems, employment relations and associated legislative frameworks. The aim of the unit is to enable students to understand and be able to apply principles of effective HRM in order to enhance sustainable organisational performance and contribute to organisational success, holding business outcomes and people outcomes in equal balance. Students will apply HR practices in a workrelated context, utilising their knowledge and practising skills and behaviours in relevant professional areas, including resourcing, talent planning and recruitment, learning and development and employee engagement. On completion of the unit, students will understand the purpose and scope of HRM activities. They will be able to apply a range of people-management skills to enhance the performance of an organisation by finding solutions to people-related problems.

## Learning Outcomes

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

- LO1 Explain the impact of the role of HRM in creating sustainable organisational performance and contributing to business success
- LO2 Assess the contribution of HRM in recruiting and retaining talent and skills to achieve business objectives
- LO3 Examine how external and internal factors can affect HRM decision making in relation to organisational development
- LO4 Apply HRM practices in a work-related context for improving sustainable organisational performance..

BUS 203

15 UK  
Credits

UK Level 4

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# Unit 4: BUS204 Leadership and Management

## Introduction

The ability to lead and manage effectively is highly sought after by industry, as employers seek to produce and develop managers who can motivate, enthuse and build respect throughout their workforce. The hard and soft skills required by leaders and managers are frequently highlighted by employers as skills gaps in recruitment. Developing these skills will help students to meet career aspirations in leadership and management. The aim of this unit is to help students to understand the difference between the function of a manager and the role of a leader. Students will consider the characteristics, behaviours and traits that support effective management and leadership. Students will learn about the theories that have shaped the understanding of leadership and management and how these have provided a guide to action for managers and leaders who want to secure success for their businesses. Students will look at leadership styles, how and why they are used and the extent to which they are effective. This unit also gives students an understanding of motivational strategies. They will develop motivational strategies covering intrinsic and extrinsic aspects of motivation. Finally, students will evaluate the importance of managing performance in achieving continuous improvement.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Examine leadership and management theories and principles, and their impact on the effectiveness of an organisation

LO2 Review the influence of different leadership and management styles on the culture of organisations

LO3 Develop a motivational strategy to optimise organisational performance

LO4 Apply leadership and management approaches to managing performance to ensure continuous improvement

BUS 204

15 UK  
Credits

UK Level 4

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# Unit 5: BUS205 Accounting Principles

## Introduction

Management accounting is a profession that supports management decision making, planning and performance management systems. Management accountants provide expertise in financial reporting and control to assist management in the formulation and implementation of an organisation's strategy by providing appropriate financial information and undertaking related accounts administration. The overall aim of this unit is to introduce fundamental accounting principles that underpin financial operations and support good and sustainable decision making in any organisation. Students will develop a theoretical and practical understanding of a range of financial and management accounting techniques. On successful completion of this unit, students will be able to assist senior colleagues in producing and analysing budgets, drawing up simple financial statements and using financial ratios to interpret performance. Students will also explore wider aspects of accountancy, especially ethics, transparency and sustainability, and gain fundamental knowledge and skills that will enable them to progress to a higher level of study.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Examine the context and purpose of accounting

LO2 Prepare basic financial statements for unincorporated and small business organisations in accordance with accounting principles, conventions and standards

LO3 Interpret financial statements

LO4 Prepare budgets for planning, control and decision making using spreadsheets.

BUS 205

15 UK  
Credits

UK Level 4

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# Unit 6: BUS206 Managing a Successful Business Project

## Introduction

This unit is a Pearson-set unit. The project brief will be set by the centre, based on a theme provided by Pearson (this will change annually). The theme and chosen project within the theme will enable students to explore and examine a relevant and current topical aspect of business in the context of the business environment. The skills of project management are highly sought after by employers in all areas of business, as the ability to plan, procure and execute a business project efficiently requires a range of specific skills in leadership, time management, problem solving, budgeting and communication. The aim of this unit is to offer students an opportunity to demonstrate the skills required for managing and implementing a small-scale business project. They will undertake independent research and investigation for carrying out and executing a business project that meets appropriate business aims and objectives. On successful completion of this unit, students will have the confidence to engage in decision making, problem solving and research activities using project-management skills. They will have the fundamental knowledge and skills to enable them to investigate and examine relevant business concepts in a work-related context, determine appropriate outcomes, decisions or solutions and present evidence to various stakeholders in an acceptable and understandable format.

\*Please refer to the accompanying Pearson-set Assignment Guide and Theme and Topic Release document on HN Global for further support and guidance on the delivery of the Pearson-set unit

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Explain the key stages of the project lifecycle that should be considered when project managing

LO2 Produce a Project Management Plan (PMP) for a business project using primary and secondary research methods

LO3 Implement the Project Management Plan (PMP) to communicate results from the research and make conclusions from the evidence of findings

LO4 Reflect on value gained from implementing the project and the project management process.

BUS 206

15 UK  
Credits

UK Level 4

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# Unit 7: BUS207 Business Law

## Introduction

The aim of this unit is to enhance students' understanding of how business law is applied to the running of a business organisation. Students will gain knowledge of business law and examine the impact of the law on business operations and decision making. Throughout the unit, students will identify the legal solutions available to business owners and assess their suitability. The experience that students gain in this unit will help them to better understand the different areas of law that apply. The unit will enable students to illustrate the impact of the law on normal business operations and when registering a company and inviting shareholders to invest in it. They will gain an understanding of the law in relation to market abuse and director responsibilities. Students will be able to recognise the application of employment law while gaining a practical understanding of the skills and experiences undertaken by those practising in a business law context. This is a prerequisite unit for students studying the Law pathway.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Explain the nature of the legal system
- LO2 Illustrate the potential impact of the law on a business
- LO3 Examine the formation of different types of business organisations
- LO4 Recommend appropriate legal solutions to resolve areas of dispute.

BUS 207

15 UK  
Credits

UK Level 4

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# Unit 8: BUS208 Innovation and Commercialization

## Introduction

This unit aims to give students a comprehensive understanding of innovation and commercialisation. In today's competitive landscape it is critical that organisations continually innovate both their product offering and processes to ensure that they remain competitive in the market. Adopting a more commercially driven approach is vital to maximise the Return on Investment (ROI). In this unit, students will look at a number of tools and techniques that organisations use to drive innovation and become more commercial in their approach. The unit gives students cutting-edge knowledge as well as practical application of the key ways in which organisations become more innovative while remaining commercially driven. By the end of the unit, students will have gained an understanding of how innovation is fostered, harnessed and managed in organisations. They will learn the value of innovation and its importance to supporting commercial growth. They will also acquire knowledge that will enable them to develop a creative and innovative approach that will benefit them throughout their career.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Investigate how innovation is sourced and supported within different types of organisations
- LO2 Explore the processing of different types of innovation within organisations
- LO3 Apply the process required to commercialise innovation within an organisation
- LO4 Evaluate the range of methods for protecting innovation within organisations.

BUS 208

15 UK  
Credits

UK Level 4

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# Unit 9: BUS209 Entrepreneurial Ventures

## Introduction

Entrepreneurship is about people who have dreams and take their career into their own hands, leading it in the direction of their choice. More recently it has also become about transforming the world by solving big problems, for example initiating social change, creating an innovative product, presenting a new life-changing solution. This unit introduces the study of entrepreneurship and will benefit those thinking of starting up an entrepreneurial venture and those who are future leaders and managers. . The unit aims to illustrate the concept of entrepreneurship and how having an entrepreneurial mindset can make a contribution to all businesses, be that a new business start-up or existing public and corporate organisations. Students will explore the skills, traits and characteristics of entrepreneurs and entrepreneurship. Students will understand the importance of difference size businesses on the economy and the contribution they can all make to society. Students will also learn about the need for intrapreneurs and the impact of disruptive entrepreneurship. By the end of the unit, students will have gained research skills and the knowledge that they can develop an entrepreneurial mindset that will benefit them throughout their career. They will understand the contribution that businesses make to the economy and the importance of entrepreneurial activity for all businesses in all sectors

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Examine what it takes to be an entrepreneur and the scope of entrepreneurial ventures
- LO2 Explore the concept of the entrepreneurial mindset and its contribution to entrepreneurial ventures
- LO3 Assess the impact of SMEs (small medium enterprises) on the economy
- LO4 Explain the importance of intrapreneurship in both public and corporate organisations.

BUS 209

15 UK  
Credits

UK Level 4

School of  
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# Unit 10: BUS210 Recording Financial Transactions

## Introduction

Balancing the books is at the heart of all business management. Financial accountants are concerned with the recording, summarising and interpreting of financial information and accounts. They must keep accurate and up-to-date records for different types of businesses. The overall aim of this unit is to introduce students to the essential principles of recording and organising business and financial transactions to which every organisation will need to adhere. Students will identify sources of accounting information and how it is then gathered and organised, using the dual entry bookkeeping system, in order to produce a trial balance. On successful completion of this unit, students will be able to contribute effectively to the accounting and bookkeeping function of an organisation and understand how this is then the basis for producing financial statements. Students will be equipped with the knowledge and skills required to progress to a higher level of study.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Record business transactions using double entry bookkeeping, books of prime entry, journals and ledger accounts
- LO2 Prepare a trial balance for a given organisation from data provided
- LO3 Perform bank reconciliations to ensure organisation and bank records are correct
- LO4 Perform control account reconciliations for accounts receivable and accounts payable.

BUS 210

15 UK  
Credits

UK Level 4

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# Unit 11: BUS211 Business Data and Numerical Skills

## Introduction

The ability to understand and analyse numerical data and information is an essential skill in coming to the right conclusions and making the right decisions in any industry. The knowledge of numbers and figures, understanding relationships between numbers and interpreting mathematical information are all key to building a strong skills profile. To succeed, business organisations must collect and analyse data that concerns customers, markets, competitors and business processes, to support business decision making. In this unit, students will be introduced to the knowledge and skills needed to be able to support the collection, storage and interrogation of data for business decision making. They will explore methods of collecting data, both manually and online, and the techniques needed to interpret this quantitative and graphical data to produce information to assist business decision making. Students will also explore the numerical analysis techniques and digital platforms required to generate management information. They will gain the knowledge and skills required to present findings, conclusions and recommendations to a business audience. The skills and knowledge gained from the completion of this unit will support the higher education study of business and academic research projects.

## Learning Outcomes

By the end of this unit, a student will be able to:

LO1 Collect research data and apply business models for business decision making

LO2 Apply techniques to interpret data

LO3 Assess digital platforms for collection, storage and analysis of data and presentation of business information

LO4 Present information in appropriate formats to meet management needs.

BUS 211

15 UK  
Credits

UK Level 4

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# Unit 12: BUS212 Executive Recruitment Solutions

## Introduction

This is a practical unit designed to prepare students for the world of work in recruitment in the position of an executive recruiter. It is the role of executive recruiters, also known as 'headhunters', to source potential candidates for high-level executive positions in companies. This is often referred to as an 'executive search' as executive recruiters coordinate with hiring managers to help define the specific requirements for these vacant and often 'hard to fill' positions. Their main responsibility is to seek out highly qualified candidates through social media and face-to-face meetings. The aim of this unit is to give students the employment knowledge and skills required to carry out the role of executive recruitment. Students are introduced to the emerging practice of executive recruitment and the services provided in human resource management. Students will look at the job specification of an executive recruiter, including the key roles and responsibilities, skills requirements and career opportunities. Students will then cover executive recruitment methodology; managing the process and managing client expectations. Students will have the opportunity to conduct an executive search, using a business simulated scenario, to facilitate 'real life' application for a given client brief to demonstrate skills.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Explain the nature and scope of the recruitment industry

LO2 Examine the role of executive recruitment for effective talent acquisition

LO3 Present the process of executive recruitment and the required skills at each stage of the process

LO4 Apply skills for an executive search in a given business context to meet a client brief.

BUS 212

15 UK  
Credits

UK Level 4

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Business

# Unit 13: BUS213 Human Capital Management

## Introduction

The focus of human capital management is to attract, develop and manage people in the workplace. Human capital management provides opportunity for innovation in the pursuit of a high-performance workplace (HPW); it is seen as an asset that can be measured and enhanced through investment. This unit will explore the key aspects of human capital management and how it can be used by organisations. Students will explore the transition and evolution from the traditional personnel management function, through to human resource management and now human capital management. Students will have the opportunity to focus on the key aspects of human capital management, including analysis of internal and external factors affecting the labour market and employment demand, workforce acquisition, workforce management and workforce optimisation and review the key interventions used in effective human capital management. On successful completion of this unit, students will have developed sufficient knowledge and understanding of how human capital management can be used effectively by organisations to create value. Students will develop skills that enable them to adopt the techniques they have learnt.

## Learning Outcomes

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

LO1 Explore human capital management

LO2 Prepare a workforce acquisition and management plan using human capital management techniques

LO3 Assess the organisational environment to enable human capital management decisions to be made

LO4 Review external factors and trends impacting human capital management.

BUS 213

15 UK  
Credits

UK Level 4

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Business

# Unit 14: BUS214 Digital Business in Practice

## Introduction

As businesses across industries digitise their operations and processes, digital skills are highly valued by employers. Developing digital skills – ranging from data analysis, digital design, digital marketing and customer relationship management – is vital for progression in higher education but, crucially, also aids employability in a vast array of roles in the business environment. In today's world, new technologies play an increasingly important role in the economy and in society. To remain competitive, businesses need to continually update and upskill their workers' competences. There is also a responsibility and onus on individuals to keep up to date with the changing digital landscape. In this unit, students will explore the impact of a range of digital technologies on the workplace. They will examine how these technologies can support businesses aims and services, allow interaction with customers, for example to promote their business, to encourage people to visit their e-commerce site, to buy goods or services, to drive and increase sales and to provide high levels of customer service. The skills generated through an understanding of the practical and necessary use and application of relevant technologies will enable students to present themselves as being digitally literate to employers and give them the confidence to succeed in applying modern, digital methods.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Examine the digital business environment, emerging trends and contemporary approaches

LO2 Investigate the effectiveness of the use of digital technologies to achieve business objectives

LO3 Develop a transformational digital strategy plan to support the implementation of digital technologies within an organisation

LO4 Present the design of a selected mobile application to support a digital strategy within an organisation.

BUS 214

15 UK  
Credits

UK Level 4

School of  
Business

# Unit 15: BUS215 Operations Management

## Introduction

Operations management is everywhere, in every organisation, in every service experienced and in every product consumed. It is the administration of business practices to create the highest level of efficiency possible within an organisation. It is concerned with converting materials and labour into goods and services as efficiently as possible to maximise profits. The aim of this unit is to enable students to explore how operations management manages all business activities to efficiently create and deliver products and services. This includes the transformation of inputs into outputs of finished goods and services, and activities throughout the supply chain. Students will explore the approach to quality management and continuous improvement in the production process. They will review how operations managers have to look externally as well as at internal processes, considering suppliers' performance and customers throughout the supply chain. By the end of the unit, students will have an insight into the complex nature of operations, processes and supply chain management, fundamental for understanding the holistic work environment in any industry and organisation.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Examine the interrelationships of operations management with the other functions within an organisation

LO2 Explain the importance of operations management in achieving effective organisational performance

LO3 Investigate the importance of quality management and continuous improvement for optimising organisational performance

LO4 Assess the role of supply chain management in supporting an organisation to satisfy customer requirements.

BUS 215

15 UK  
Credits

UK Level 4

School of  
Business

# Unit 16: BUS216 Managing the Customer Experience

## Introduction

The aim of this unit is to give students background knowledge and understanding of how businesses manage the customer experience – from the initial needs analysis through to after-sales follow-up. Students will map the journey that a customer makes through a business, identifying crucial touch points and recognising how these touch points can be managed to optimise the customer's experience. Students will consider how technology is changing the way that customers interact with businesses and how digital initiatives should complement existing customer journeys while recognising that online and offline consumers are distinctly different. Students can then use this knowledge to provide customer service in business and services and in an online context to meet required business standards

## Learning Outcomes

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

- LO1 Explain the needs and expectations of market segments for products and/or services of a given business organisation
- LO2 Produce a customer experience map to create business opportunities and optimise customer touch points
- LO3 Investigate the impacts of digital technology on customer relationship management
- LO4 Apply effective customer experience management within an organisational context to maximise customer engagement.

BUS 216

15 UK  
Credits

UK Level 4

School of  
Business

# Unit 17: BUS217 Professional Identity and Practice

## Introduction

With employment opportunities and career progression becoming increasingly competitive, it is vital that new employees appreciate the value of the correct skills and competences that are expected by employers. The aim of this unit is to guide students through the process of self-assessment of skills and competences, personal career planning and the application of different learning and development approaches in a work environment. Students are not necessarily expected to engage in work activities but self-assessment and design must be applied in a specific work context to avoid the experience being generic. The unit will give students direction on how to prepare for job applications and interviews in a formalised way, with the aim of improving their career prospects. Students are expected to undertake a practical interview arranged and guided by their tutor or a relevant employer.

## Learning Outcomes

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

- LO1 Explore the importance of ongoing professional development and self-directed learning to enhance professional identity and career opportunities
- LO2 Assess own skills, competences and the different learning and development approaches
- LO3 Design a professional development plan in a specific work context
- LO4 Demonstrate a range of competences and transferable skills for a job application.

BUS 217

15 UK  
Credits

UK Level 4

School of  
Business



# Unit 18: BUS218 Work Experience

## Introduction

A crucial part of a professional's skills, abilities and competences are developed through work and they are refined through practical experiences and 'learning by doing'. Employers rate work experience above all else and HN qualifications aim to make students work ready by preparing them with the appropriate balanced skills profile that employers require. Integral to achieving 'work readiness' is the need for practical application and contextualisation of learning; a perspective that is increasingly sought after by employers. Curriculum that helps students gain real-world, relevant experience in their chosen careers has proven to be an enabler for graduate progression to employment and of considerable value to students' personal and professional development. This unit aims to enable students to develop personal and professional skills by engaging them in practical tasks and activities in a relevant workplace. The unit is designed to facilitate supervised learning in a workplace that can fit around full-time or part-time student commitments, it enables an employer and an academic supervisor to monitor and support students through a goal-orientated process. The minimum work experience hours required for completion is 80 hours. Students will be given the opportunity to identify and plan their own skills development in line with a chosen career path or direction. It is expected that students negotiate and agree work experience in an appropriate work context, agreed by the employer and academic supervisor. To allow students to evaluate the process and any shortcomings in their development going forward, they will monitor and record evidence from the tasks and activities they undertake.

## Learning Outcomes

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

- LO1 Investigate the value and benefits of practical work experience for career and personal development
- LO2 Plan suitable and relevant work experience in an appropriate sector organisation
- LO3 Undertake appropriate work experience to develop professional skills and competences
- LO4 Evaluate personal skills and competences developed during practical work experiences.

BUS 218

15 UK  
Credits

UK Level 4

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# School of Business (BUS)

## YEAR 3 – UK LEVEL 5

### **2 Mandatory core Units + 3 Mandatory specialist Units + 2 Optional Units + General Education Subjects**

#### **2x Mandatory Core Units /Subjects - For all pathways/majors**

1. Unit 19: [BUS319](#) – Research Project (30 UK Credits)
2. Unit 20: [BUS320](#) – Organizational Behavior (15 UK Credits)

#### **+ 3x Mandatory specialist Units – According to the selected Pathways/Majors**

#### **Accounting & Finance (3 x Mandatory Specialist Units)**

1. Unit 21: [BUS321](#) - Financial Reporting (15 UK Credits)
2. Unit 22: [BUS322](#) – Management Accounting (15 UK Credits)
3. Unit 23: [BUS323](#) – Financial Management (15 UK Credits)

#### **+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

#### **Business Management (General): (3 x Mandatory Specialist Units)**

1. Unit 24: [BUS324](#) - Understanding and Leading Change (15 UK Credits)
2. Unit 25: [BUS325](#) – Global Business Environment (15 UK Credits)
3. Unit 26: [BUS326](#) – Principles of Operations Management (15 UK Credits)

#### **+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**



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## **Entrepreneurship and Small Business Management: (3 x Mandatory Specialist Units)**

1. Unit 27: [BUS327](#) - Identifying Entrepreneurial Opportunities (15 UK Credits)
2. Unit 28: [BUS328](#) – Launching a New Venture (15 UK Credits)
3. Unit 29: [BUS329](#) – Managing and Running a Small Business (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

## **Human Resource Management: (3 x Mandatory Specialist Units)**

- Unit 30: [BUS330](#) - Resource and Talent Planning (15 UK Credits)  
Unit 31: [BUS331](#) – Employee Relations (15 UK Credits)  
Unit 32: [BUS332](#) – Strategic Human Resource Management (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

## **Marketing: (3 x Mandatory Specialist Units)**

- Unit 33: [BUS333](#) - Marketing Insights and Analytics (15 UK Credits)  
Unit 34: [BUS334](#) – Digital Marketing (15 UK Credits)  
Unit 35: [BUS335](#) – Integrated Marketing Communications (15 UK Credits)

**+ 2 x Optional Units from the list of Optional Level 5 Subjects/Units (or one from other specialist grouping)**

## **Level 5 Optional Units/Subjects**

1. Unit 41: [BUS341](#) – Taxation (15 UK Credits)
2. Unit 42: [BUS342](#) – Statistics for Management (15 UK Credits)
3. Unit 43: [BUS343](#) – Business Strategy (15 UK Credits)
4. Unit 44: [BUS344](#) – Business Information Technology Systems (15 UK Credits)
5. Unit 45: [BUS345](#) – Business Data Analytics and Insights (15 UK Credits)
6. Unit 46: [BUS346](#) – Developing Individuals, Teams and Organisations (15 UK Credits)
7. Unit 47: [BUS347](#) – Human Resources – Value and Contribution to Organisational Success (15 UK Credits)



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8. Unit 48: [BUS348](#) – Customer Value Management (15 UK Credits)
9. Unit 49: [BUS349](#) – Sales Management (15 UK Credits)
10. Unit 50: [BUS350](#) – International Marketing (15 UK Credits)
11. Unit 51: [BUS351](#) – Brand Management (15 UK Credits)
12. Unit 52: [BUS352](#) – Product Service and Development (15 UK Credits)
13. Unit 53: [BUS353](#) – Planning for Growth (15 UK Credits)
14. Unit 54: [BUS354](#) – E-Commerce and Strategy (15 UK Credits)
15. Unit 55: [BUS355](#) – Planning Social Media Campaigns (15 UK Credits)
16. Unit 56: [BUS356](#) – Tapping into New and International Markets (15 UK Credits)
17. Unit 57: [BUS357](#) – Business Intelligence (15 UK Credits)

# Unit 19: BUS319 Research Project

## Introduction

Research skills are as vital for the workplace as they are for academic development. Research skills enable students to identify a problem, collect informational resources that can help address the problem, evaluate the resources for quality and relevance, and come up with an effective solution to the problem. These are seen as essential skills by employers for most positions in industry, to support a range of duties, for example report writing, building a business case, business planning, launching a new product or service. This is a Pearson-set unit. Students will choose their own project based on a theme provided by Pearson (this will change annually). The project must be related to their specialist pathway of study (unless they are studying the general business pathway). This will enable students to explore and examine a relevant and current topical aspect of business in the context of the business environment and their chosen specialist pathway. The aim of this unit is to offer students the opportunity to engage in sustained research in a specific field of study. The unit enables students to demonstrate the capacity and ability to identify a research theme, to develop a research aim and objectives and to present the outcomes of such research in both written and verbal formats. The unit also encourages students to reflect on their engagement in the research process, during which recommendations for future, personal development are key learning points.

\*Please refer to the accompanying Pearson-set Assignment Guide and Theme Release document for further support and guidance on the delivery of the Pearson-set unit.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Examine appropriate research methodologies and methods to identify those appropriate to the research process
- LO2 Develop a research proposal, including a supporting literature review
- LO3 Analyse data using appropriate techniques to communicate research findings
- LO4 Reflect on the application of research methodologies and process.

BUS 319

30 UK  
Credits

UK Level 5

School of  
Business

# Unit 20: BUS320 Organizational Behavior

## Introduction

Organisational behaviour is concerned with understanding, explaining and predicting the behaviour of individuals in the workplace and can assist in the development of practical solutions to organisational and managerial problems. Individuals, whether acting in isolation or collectively as part of a group, engage in actions and behaviours that can have a positive or negative impact on company performance and the achievement of strategic goals. It is therefore essential that those who are involved in managing and leading people in organisations, acquire insight and expertise in organisational behaviour. The aim of this unit is to develop knowledge and understanding of how organisational behaviour concepts, theories and techniques can be applied in work and management settings in order to enhance individual, team and organisational performance. Students will be able to apply this knowledge in a variety of business situations. They will appreciate how effective application of organisational behaviour principles can be used to explain why people behave and act in particular ways and to predict how employees will respond to certain demands. The unit also develops student understanding of the influence of culture, the operation of power and politics in organisations and how these variables influence the actions and behaviour of people in an organisational context. On successful completion of this unit, students will have developed a range of transferable skills and knowledge. This includes core people management skills used to achieve positive organisational outcomes and to create value by recognising individual difference, team working and the creation of inclusive organisational cultures.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Reflect on own personality and perceptions to understand how individual difference informs and influences management approaches
- LO2 Apply content and process theories of motivation to create and maintain an effective workforce
- LO3 Participate in a group team activity for a given business situation to demonstrate effective team skills
- LO4 Examine how power, politics and culture can be used to influence employee behaviour and accomplish organisational goals.

BUS 320

15 UK  
Credits

UK Level 5

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Business

# Unit 21: BUS321 Financial Reporting

## Introduction

Financial reporting is the financial results of an organisation that are released to both stakeholders and the public. Reporting typically encompasses the following financial statements: the income statement, balance sheet, statement of cash flows. Financial reporting provides a clear roadmap for the business, identifying areas for improvement in spending on the return of investment to maximise business efficiency and act as a business health check to be shared with investors and newcomers. The overall aim of this unit is to develop the knowledge, understanding and skills required in the preparation and interpretation of financial statements for incorporated organisations. Students will become aware of regulatory frameworks, including the International Financial Reporting Standards Foundation (IFRS Foundation), which inform and govern the production of financial statements and reporting of financial performance. Students will explore and critique conceptual frameworks for financial reporting in both national and international contexts. Students will be assessed in the preparation and analysis of financial statements to inform decision making, which will enable them to contribute to the effectiveness and efficiency of organisations operating in diverse and complex environments. By the end of the unit, students will have the fundamental knowledge and skills to progress to a higher level of study or employment in the finance sector.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Analyse the context and purpose of financial reporting for high-performing organisations

LO2 Evaluate regulatory frameworks for financial reporting

LO3 Prepare financial statements for an incorporated organisation to meet legal requirements and business objectives

LO4 Interpret financial statements of an incorporated organisation to achieve performance metrics.

BUS 321

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 22: BUS322 Management Accounting

## Introduction

Management accounting is a profession that supports management decision making, planning and performance management systems. Management accountants provide expertise in financial reporting and control to assist management in the formulation and implementation of an organisation's strategy by providing appropriate financial information and undertaking related accounts administration. The overall aim of this unit is to develop students' understanding of the scope and purpose of management accounting. The focus of the unit is on critiquing cost and management accounting techniques and using management accounting to monitor and evaluate company performance in complex operating environments. Students will explore the significance of variance analysis and the application of different costing approaches. The contribution of the management accounting function in setting and negotiating performance measures across an organisation will also be analysed. On successful completion of this unit, students will be in a position to support an organisation to create value through effective decision making. Students will also have the fundamental knowledge and skills needed to progress to a higher level of study.

## Learning Outcomes

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

- LO1 Explore the nature, source and purpose of management accounting information
- LO2 Evaluate management accounting techniques to inform optimal resource allocation and decision making
- LO3 Analyse actual and standard costs to control and correct variances
- LO4 Evaluate how the management accounting function contributes to performance measurement and monitoring.

BUS 322

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 23: BUS323 Financial Management

## Introduction

Financial management means planning, organising, directing and controlling the financial activities of an organisation and applying general management principles to financial resources. Financial departments are responsible for calculating capital required, investing capital, allocating profits and managing the finance of the organisation. It is an important business function that enables organisations to increase their value and improve profitability. The overall aim of this unit is to introduce students to core financial management principles and strategies. Students will consider the significance of the financial management function in an organisation as it seeks to maximise shareholder value, manage risk and achieve business objectives in complex operating environments. Students will be introduced to alternative sources of internal and external business finance and gain confidence in recommending strategies for managing working capital. A range of investment appraisal techniques will be assessed in order to support long-term decision making and best use of organisational capital. On successful completion of this unit, students will be in a position to contribute effectively to the financial management function of an organisation. They will also develop fundamental knowledge of and skills in financial management to progress to higher-level study and employment in financial management, investment banking and financial analysis.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Evaluate the role and purpose of the financial management function

LO2 Determine alternative sources of business finance including contemporary methods for different business situations

LO3 Evaluate approaches to working capital management within an organisation

LO4 Recommend alternative investment appraisal techniques to inform decision making.

BUS 323

15 UK  
Credits

UK Level 5

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# Unit 24: BUS324 Understanding and Leading Change

## Introduction

'Change is the only constant in life' (Heraclitus, 500BCE). Whatever industry, whatever position you are employed in, there is always change. As such, businesses need to adapt and change with the changing business environment. Organisations are seeing change at a more rapid speed than ever before. Technology is playing a big part in this increased pace of change. Change leaders are evident in all business sectors and in a variety of roles within an organisation. In business, change is all around in all areas of an organisation, from minor process changes to large-scale structural change. The aim of this unit is for students to understand the different types and scope of change that may occur in an organisation. The unit will aim to illustrate the drivers/triggers for change and how they vary and affect organisations in different ways, including the degree of impact and management's response to change. Students will gain an appreciation of how the depth of change can influence organisational behaviour both during and after the change. On successful completion of this unit, students will be able to apply a range of change management concepts, including diagnosing driving/resisting forces, planning for change and dealing with change in organisational settings. This will put students in a strong position to contribute to change initiatives in the workplace.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Produce a comparative analysis of the different types and drivers of change in business
- LO2 Evaluate the impact of change on organisational behaviour
- LO3 Investigate how forces driving and resisting change influence leadership decision making
- LO4 Recommend a range of leadership approaches to change initiatives.

BUS 324

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 25: BUS325 Global Business Environment

## Introduction

As globalisation of business continues the world is becoming smaller, this means developing complex opportunities and risks for business operations as organisations expand and transform in this dynamic environment. Understanding business from a global perspective is about being open to new ideas, issues and solutions, and opening business up to new opportunities and growth. The aim of this unit is to explore the wider position that some organisations have in the global environment. Students will gain an appreciation of the complexities of operating in a global environment, enabling them insight in to an organisation's current or aspirational global presence. On successful completion of this unit, students will understand the wider global environment in which organisations operate. This enables students to add value to an organisation as they will be able to apply their knowledge in such a way that they could advise senior managers (in large and small organisations) on global matters that they might not have otherwise considered.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Analyse the key factors which drive globalisation
- LO2 Determine the strategic complexities associated with operating in a global environment
- LO3 Evaluate how operating in a global market influences an organisation's structure, culture and functions
- LO4 Develop a global strategy to support decision making for a given organisation.

BUS 325

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 26: BUS326 Principles of Operations Management

## Introduction

Operations management is everywhere, in every organisation, in every service experienced and in every product consumed. Operations management is the administration of business practices to create the highest level of efficiency possible in an organisation. It is concerned with converting materials and labour into goods and services as efficiently as possible to maximise profits. The aim of this unit is to introduce students to the role of operations in an organisation, how the nature of operations management has evolved and how it contributes to sustained competitive advantage. Students will understand the key concepts of operations management in an organisational and environmental context, and how this links to supply chain management, products and processes, organisational efficiency and effectiveness, and the achievement of tactical and strategic objectives. A variety of operations management techniques and frameworks will be explored, including continuous improvement, total quality management, benchmarking and risk analysis. By the end of this unit, students will have an appreciation of the dimensions of operations management and its central role for organisations across a wide range of sectors. Students will also have the knowledge and skills required to progress to higher levels of study or employment in positions in operations, logistics and supply.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Analyse the effectiveness of operations management in contributing to organisational objectives across a wide range of organisations and sectors

LO2 Apply a range of techniques and analysis frameworks used by operations managers to support decision-making and address problems

LO3 Apply the concept of continuous quality improvement in an operational context

LO4 Conduct a strategic risk analysis (SRA) on the operations functions of an organisation.

BUS 326

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 27: BUS327 Identifying Entrepreneurial Opportunities

## Introduction

The role of the entrepreneur is to weigh up opportunities, threats and personal skills, and abilities to translate an opportunity into a business idea. This unit gives students an understanding of where new entrepreneurial ideas come from and gives them the opportunity to investigate and evaluate a new entrepreneurial idea for a small- and medium sized enterprise (SME). Students will explore concepts of innovation, entrepreneurship and developing creativity. They will learn about and use methods and frameworks to help develop and assess new venture ideas, including defining product or service benefits, identifying target customers and understanding the industry and competitors from the perspective of a new entrant. They will also learn about market research and apply primary and secondary research techniques to investigate an entrepreneurial idea. They will then assess whether it is likely to be a commercially viable business or a social enterprise proposition. By the end of the unit, students will have acquired creative skills and thinking for innovation, preparing them for jobs and technologies that do not even exist yet in this rapidly changing landscape.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Explore the role of entrepreneurship and innovation for developing new entrepreneurial ideas
- LO2 Investigate a potential entrepreneurial idea from a gap in the market for a small to medium sized (SME) enterprise
- LO3 Analyse primary and secondary data to identify the market potential of an entrepreneurial idea
- LO4 Pitch the potential viability of an entrepreneurial idea in the context of the market and competitors.

BUS 327

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 28: BUS328 Launching a New Ventures

## Introduction

How do you get from idea to launching a new business venture? Many entrepreneurs take risks on the way, which can have expensive consequences if mistakes are made. This unit will prepare students to launch a business with less risk and pitfalls. The unit gives students a practical understanding of what is required to successfully launch a new venture. It gives students an opportunity to plan the launch of a specific new venture idea. They will learn about and work through the stages of planning to launch the venture. This will include an explanation of the idea and how it will attract customers and have competitive advantage. Students will also learn about the need for resourcefulness when starting a new venture, and about identifying and using personal networks, which can offer a valuable source of knowledge, resources, advice and opportunities. Students will develop a promotional plan to launch a new venture and prepare a budget and a cash flow forecast for the launch and the first 12–18 months of operation for the chosen venture.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Investigate the resources required to launch a new venture
- LO2 Explore the skills and capabilities required to support the launch of a new venture
- LO3 Develop promotional activities to support the launch of a new venture
- LO4 Produce a budget for launching a new venture for a small business or social enterprise.

BUS 328

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 29: BUS329 Managing and Running a Small Business

## Introduction

Every year new start-up businesses begin trading, but only two-thirds will survive into their third year of trading and just half will remain after five years. For most businesses, it is not a lack of customers or poor-quality products or services that are responsible for their failure but simply a lack of cash and business acumen. It is important to have a basic knowledge of managing a business and an overall understanding of the services offered to customers in order to survive. This unit will give students a practical understanding of the key aspects of running a small business or social enterprise. Students will learn about the activities involved in running a small business, including developing good relationships with customers, planning and allocating operational resources, forecasting and budgeting, interpreting financial statements, being an employer, dealing with legislation and regulation, and how to put a business plan together. Students will develop an understanding of how all the different aspects of running a business interrelate so as to achieve success and develop an appreciation of the benefits and importance of organisation and planning.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Explore how a small business or social enterprise plans and allocates resources to achieve objectives

LO2 Evaluate the customer relationship management process for a small business or social enterprise

LO3 Develop a cash flow forecast and break-even analysis for a small business or social enterprise

LO4 Discuss the financial statements, regulation and legislation that apply to a small business or social enterprise.

BUS 329

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 30: BUS330 Resource and Talent Planning

## Introduction

People are the central asset of any organisation and the ability to attract, recruit and retain talented staff is critical to the success of any organisation whether in business, in voluntary organisations or in government. Human resource management (HRM), through resource and talent planning, gives organisations the principles, knowledge and behaviours needed to support and enhance organisational performance and success. Sustainable organisation performance and growth requires a constant reassessment of skills and knowledge. This informs the training and development of existing employees and includes the identification and development of 'talent'. The aim of this unit is to develop students' understanding and ability to apply principles of effective workforce and talent planning to organisational development and to implement related approaches to the recruitment, retention and development of staff to enhance sustainable organisational performance and success. Students will consider the ethical implications of decision making in this area, taking account of the legal issues of fairness and justice, rules and organisational procedures. On completion of the unit, students will understand the purpose and scope of human resource and talent-planning activities. Students will be able to apply a range of workforce planning, evidence and people-management skills to enhance the performance of an organisation by solving problems and finding evidence-based solutions.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Analyse the impact of labour market trends on strategic resource and talent planning for achieving business goals

LO2 Apply strategic resource and talent planning for effective recruitment and selection

LO3 Examine the importance of performance management for improving people capability to achieve sustainable organisation performance.

LO4 Assess the relevance of the human resource lifecycle to managing change in workforce planning.

BUS 330

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 31: BUS331 Employee Relations

## Introduction

For an organisation to function effectively and if high performance is to be achieved and conflict avoided, the relationship between management and employees or employee representatives needs to be harmonious and constructive. HR practitioners and managers need to understand the nature of the employment relationship and the issues that can arise in developing and maintaining positive employee relations. In an increasingly competitive and globalised world, where management and employee contractual relationships, needs, expectations and interests are constantly changing and evolving, understanding the nature of the employment relationship becomes essential. It is therefore crucial for line managers and those who are responsible for developing and implementing employee relations strategy and policy to have insight and knowledge of the area of employee relations. The aim of this unit is to develop students' understanding of the wider external context that influences the employment relationship and priorities in the employee relations system. Students will recognise that good employee relations have implications beyond the employment contract. Aspects such as communication mechanisms and conflict management are important in building and maintaining positive employee experiences, effective relationships and higher levels of performance. On successful completion of the unit, students will have demonstrated a range of cognitive skills, in particular critical thinking, information handling and problemsolving abilities, as well as recognised professional capabilities. These include the ability to make evidence-based judgements on people-management issues generated through insight and evaluation of the employee relations specialist area.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Analyse how changes and developments in society, the work context and employment have influenced the employment relationship
- LO2 Devise mechanisms of employee communication and consultation for different types of organisations
- LO3 Apply negotiation skills to workplace disputes for effective conflict management approaches
- LO4 Develop HR solutions for an organisation's employee relations approach and practices in order to improve performance

BUS 331

15 UK  
Credits

UK Level 5

School of  
Business



# Unit 32: BUS332 Strategic Human Resource Management

## Introduction

It is increasingly recognised that an organisation's human resources are a critical factor in an organisation's performance and a key driver of sustainable competitive advantage. It is therefore crucial that attention be given to managing human resources strategically, as there are long-term implications for organisational performance and success. Understanding the nature of the human resource and how to effectively manage human resources strategically is a key competency for HR practitioners who act in advisory positions and those who hold strategic business partner roles. The aim of this unit is to explore the contribution that strategic Human Resource Management (HRM) makes towards the development and achievement of sustainable organisational strategies. Students will develop an understanding and appreciation of seminal and contemporary HR models, theories, concepts and practices, which enable HR practitioners to make a positive contribution to sustainable organisational performance from an HR perspective. On successful completion of this unit, students will have the confidence to contribute to strategic decision making in an HR context. The unit takes an evidence based and outcomes-driven perspective supporting the acquisition of core knowledge in the areas of business acumen and the adoption of a business-focused approach to managing people. An understanding of the range of people practices and their impact on people behaviour, and how to enable culture change effectively. Strong theoretical and applied foundations of learning will support student understanding and knowledge. The learning that takes place on this unit will enable students to add value to an organisation's HR function and role.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Assess how HR strategy and practices are influenced by developments in an organisation's external and contextual environment
- LO2 Appraise the theoretical perspectives of strategic HRM and their associated practices in different types of organisations
- LO3 Evaluate how strategic HR initiatives can be used to develop high-performance organisational cultures
- LO4 Develop an integrated HR strategy to support sustainable business performance and growth.

BUS 332

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 33: BUS333 Marketing Insights and Analytics

## Introduction

This unit is designed to enhance students' knowledge and understanding of the consumer's decision-making process. To gain competitive advantage and maintain market share, organisations understand the importance of seeking answers to questions such as:

- How do we buy products and services?
- What motivates us to seek out a particular product or service?
- What research do we undertake prior to making a decision?
- Do we seek out other people's opinions through social media and other digital technologies?
- To what extent do other people's opinions influence our own?
- How do we feel after we have made the purchase?

The answers to these types of questions help marketers to understand the processes behind consumer purchase decisions, which allows organisations to adapt the marketing mix and enhance the customer experience. Students will learn the underpinning theories and frameworks, and will be expected to relate them to real-world examples across a range of organisational contexts. The knowledge, understanding and skill sets that students gain on successfully completing this unit will enhance their career opportunities, whether they are starting their own business or working for an organisation in a marketing function.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Investigate characteristics and influences on consumer decision-making processes in different organisational contexts
- LO2 Apply techniques to enhance the customer experience and develop customer relationships for marketing purposes
- LO3 Evaluate measures and metrics that seek to improve customer experience for a range of products and services
- LO4 Devise measures and metrics to improve customer experience within a given organisational context.

BUS 333

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 34: BUS334 Digital Marketing

## Introduction

To support digital transformation and growth, business organisations are becoming more digital savvy and are developing digital marketing plans. The role of digital marketing is to help organisations gain new traffic, leads and sales for their business by expanding reach to consumers looking for products and services. The aim of this unit is to introduce students to digital marketing and its importance in the successful marketing of organisations. The unit will enable students to develop an understanding of how organisations use various digital tools and techniques to engage their customers and maintain a competitive advantage. Digital marketing is a major component of the successful marketing of organisations. The digital landscape is continually evolving, it is important for marketers to stay ahead of their competitors and deliver cutting-edge digital marketing approaches and strategies. This unit is designed to give students the knowledge and tools to work as part of a digital marketing team or to go on to further study in this specific area.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Investigate the influence of the digital environment for effective marketing of business organisations

LO2 Apply digital tools and techniques for an integrated marketing approach within a given business organisation

LO3 Design a digital marketing campaign using multimedia to optimise content that targets key audiences

LO4 Evaluate methods of monitoring and measuring a digital marketing campaign in line with marketing objectives to increase engagement and conversions.

BUS 334

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 35: BUS335 Integrated Marketing Communications

## Introduction

Creating brand awareness among customers at a minimal cost is key for all businesses as they strive to create a seamless experience for consumers to interact with their brand through multimedia options. Integrated marketing communication helps in integrating all the essential components of marketing to communicate a similar message to potential and existing end-users. This unit is designed to develop students' knowledge and understanding of marketing communications and the techniques used. They will learn underpinning theories and frameworks of marketing and be able to relate them to real-world examples, for example promotions they are likely to encounter in their daily lives. An organisation may create and develop a revolutionary new product or service but they need to use the most appropriate methods of promoting it to their target audience – this is the role of marketing communications. We encounter hundreds of promotions every day of our lives and the challenge for marketers is to be able to cut through the multitude of communications from potential competitors to deliver and reinforce the association with the brand. The knowledge, understanding and skill sets that students will gain on successfully completing this unit will enhance their career opportunities, whether they are setting up their own business or if they are employed by an organisation.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Evaluate marketing channels for achieving communication objectives as part of a communications strategy

LO2 Develop an integrated marketing communications plan to achieve specified communication objectives in a business context

LO3 Produce appropriate content for a marketing channel that meets specified communication objectives

LO4 Apply methods for monitoring an integrated marketing communications plan (IMC) to maximise reach and achieve positive return on investment (ROI).

BUS 335

15 UK  
Credits

UK Level 5

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Business

# Unit 41: BUS341 Taxation

## Introduction

This unit introduces students to a range of taxation principles and many of the issues that organisations need to consider to ensure that they comply with the taxation legislation of the country in which they operate. The unit also introduces students to the principles of personal and business taxation, the legal and ethical issues relating to taxation, the obligations of taxpayers, taxation systems and taxation planning. An integral part of an organisation's operations is managing its taxation responsibilities and liabilities. Having a fundamental understanding of these responsibilities and how to determine taxation liabilities is important for all those who are employed in a management role in an organisation. Successful completion of this unit will enable students to contribute positively to an organisation's responsibilities with regard to taxation. The unit will also prepare them for progression to a higher level of study.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Analyse taxation systems and the legislation that governs them
- LO2 Determine taxation liabilities for unincorporated organisations and individuals
- LO3 Determine taxation liabilities for incorporated organisations
- LO4 Evaluate the impact on organisations of the legal and ethical constraints associated with taxation responsibilities.

BUS 341

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 42: BUS342 Statistics for Management

## Introduction

Statistics play an important role in business. Using a range of statistical techniques, such as data sampling and analysis, business managers and organisations can analyse past performance, predict future business practices and lead organisations effectively. Statistics can also be used to describe markets, inform advertising, set prices and respond to changes in consumer demand. The aim of this unit is to give students an understanding of how management information and decision making are enhanced by applying statistical methods. Students will learn about a range of statistical techniques and how they can inform management thinking. While studying the unit, they will develop their numerical abilities and increase their confidence in handling data in order to turn data into information and knowledge. On completion of the unit, students will have the skills and knowledge to support further higher education research and data analysis, which is valued at higher education level. They will also have developed the essential skills required by business managers to build better products and deliver services that satisfy customers and increase their company's market share and profit margins

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Evaluate business and economic data/information obtained from published sources
- LO2 Analyse and evaluate raw business data using a number of statistical methods
- LO3 Apply statistical methods in business planning
- LO4 Communicate findings using appropriate charts and tables.

BUS 342

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 43: BUS343 Business Strategy

## Introduction

This unit supports individuals who are working in or towards managerial roles in all market sectors to develop and enhance strategic thinking and planning that will improve organisational performances of businesses in their respective competitive markets. General manager skills and competences are focused on through a range of themes and topics that can be applied in most contexts. The aim of this unit is to develop students' awareness of the different types of strategic approaches that could be used in an operational, tactical or strategic role for an organisation. This will be underpinned by a thorough knowledge and understanding of the theories, models and concepts that could significantly support an organisation's strategic choice and direction. On successful completion of this unit, students will have developed sufficient knowledge and understanding of strategy to make a positive, efficient and effective contribution to the development of business plans and operational direction. They could do this in the role of a junior manager responsible for having a specific input into an organisation's decision making and planning.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Analyse the impact and influence that the macro environment has on an organisation and its business strategies

LO2 Assess an organisation's internal environment and capabilities

LO3 Apply the outcomes of an analysis, using an appropriate strategic management tool, in a given market sector

LO4 Develop a strategic management plan in an organisation, informed by models, theories and concepts, to achieve competitive advantage in a given market sector.

BUS 343

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 44: BUS344 Business Information Technology Systems

## Introduction

Information is the most valuable resource that an organisation possesses. The effective gathering, protection, analysis, processing and dissemination of information is vital to the success of any organisation. As globalisation and the 24-hour economy develops and increases, organisations must ensure that their information systems are reliable, efficient and able to cope with rapid change. This unit introduces students to the importance of information to organisations. They will examine how systems can be used to support core business functions and enable organisations to be more productive and competitive in the global marketplace. The aim of this unit is to enhance students' understanding of contemporary business information technology (IT) systems and how organisations develop and continuously review their IT strategy in order to gain and maintain competitive advantage. Students will explore the areas of business that benefit from the support of IT systems and how organisations are using IT as a driver for business improvement. By the end of this unit, students will be able to critically analyse the application of current and future technologies and suggest best solutions for an organization

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Analyse the role of different IT systems in support of organisational objectives

LO2 Compare flexible and reliable IT systems that respond to organisational requirements in an organisational context

LO3 Evaluate IT systems that support value-added change in organisations

LO4 Recommend practical IT systems solutions to given organisational scenarios.

BUS 344

15 UK  
Credits

UK Level 5

School of  
Business



# Unit 45: BUS345 Business Data Analytics and Insights

## Introduction

The value of data to organisations is driving data management and governance to top-level priority in most business organisations and is generating a wealth of career opportunities and employer demand in this growing sector. Core competences in using technical knowledge to mine, inspect and interpret data before transforming it into useful information that will influence business decision making is highly valued, as is being able to design, develop, and implement data-collection databases and processes. This unit aims to give students an understanding of how organisations in different contexts improve their efficiency through the use of effective data management techniques. Students will look at the importance of data analysis and interpretation in informing business decision-making processes to enable organisations to stay current and competitive in a volatile macro environment. Students will learn how key decision makers, at various levels, are able to improve strategic outcomes by utilising more effective processes to gain an insight into the most appropriate data and information available to a business. This, in turn, informs effective business strategy. On completion of this unit, students will have greater understanding and awareness of fundamental data analysis processes, data mining and data transformation. Broader topics such as data management ethics, legislation relating to data and using data in strategic choices will also be explored. This will enable students to develop a career that focuses on the analysis, interpretation and effective use of data.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Analyse the contribution of effective data analytics and insight in business decision-making processes

LO2 Apply various data analysis methods and techniques that could inform business decisions

LO3 Examine the importance of ethics and conduct in data analytics and management

LO4 Develop data management processes that allow for improved decision making in ever-changing business environments.

BUS 345

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 46: BUS346 Developing Individuals, Teams and Organisations

## Introduction

This unit gives students knowledge of key areas for a career in human resource development and management positions where employee training and development are part of their role. This unit will give students knowledge of the different factors involved in diagnosing the skills, training and development requirements for their future employees and for their individual career goals. Students will be introduced to the concept of highperformance workplaces and the strategic benefits this can bring to an organisation. They will recognise that their professional development is just one route to improving the performance of the teams and organisations in which they work. Students will plan towards achieving their career goals while becoming aware of the context in which learning takes place and how development needs are linked to learning interventions aimed at supporting an organisation's strategy. On successful completion of this unit, students will have laid the foundations for their continuing professional development, which will support them in becoming engaged in lifelong learning. They will be able to contribute to the development of others and make a positive contribution to the sustainable growth of an organisation.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Appraise the use of high-performance working (HPW) and culture in supporting sustainable business performance

LO2 Evaluate the ways in which performance management can support highperformance culture and commitment

LO3 Review the factors to be considered when planning training and development activities in an organisation

LO4 Design a personal and professional development career plan for a named job role, based on reflection and evaluation.

BUS 346

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 47: BUS347 Human Resources – Value and Contribution to Organisational Success

## Introduction

Medium- to large-scale organisations, in any given context, require leadership teams and various levels of management to understand the significant impact the human resource (HR) function has in business. Strategic managers need to introduce effective HR practices that develop organisational efficiency and improve overall performance. This unit gives students the opportunity to make links between the role and function of HR and emerging HR developments. This will make them aware that HR is a key contributor to organisational success. On successful completion of this unit, students will have a greater understanding and appreciation of the role played by HR management in adding value to activities that contribute to the success of an organisation. Students will understand the typical aims and objectives of the HR function in a contemporary context, enabling them to make an effective contribution to the HR department of an organisation.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Evaluate the importance of organisational design to the delivery of sustainable performance

LO2 Analyse the workforce development needs to inform a human capital management strategy that will increase engagement in an organisation

LO3 Apply contemporary knowledge and research to support emerging HR developments

LO4 Evaluate the relationship between organisational design and high-performing workforce practices that achieve organisational success.

BUS 347

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 48: BUS348 Customer Value Management

## Introduction

This unit is designed to enhance students' knowledge and understanding of why it is important for marketers to enhance and manage the value of customer interactions. Students will learn underpinning theories and frameworks, and will be expected to relate them to real-world examples, including their own experiences. Organisations ideally seek a mutually beneficial relationship between themselves and their customers. This is particularly important when considering the costs associated with acquiring a new customer. It has been suggested that it can cost five times as much to gain a new customer as it is to retain an existing one. Moreover, there is no guarantee that a new customer will be as loyal as a current one. Any organisation, whether for profit, NGO or a charity, seeks ways of retaining customers through enhanced customer experiences. To retain loyal (and profitable) customers, organisations seek to understand them better. By understanding customers through the capture of relevant data, organisations can enhance a customer's lifetime value. They then aim to build a relationship with the customer where they remain loyal and continue to purchase a range of products and services. The knowledge, understanding and skill sets that students will gain on successfully completing this unit will enhance their career opportunities, whether they are setting up in business independently or if they are employed by an organisation.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Examine the concept of customer lifetime value, how to calculate it and the different factors that influence it
- LO2 Evaluate the different segments in a customer base and the appropriate opportunities for customer value creation
- LO3 Apply appropriate techniques and methods in order to increase customer lifetime value.

BUS 348

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 49: BUS349 Sales Management

## Introduction

Changing dynamics between buyers and sellers, driven by the fast-paced evolution of e-commerce and globalisation, has led organisations to review and adapt their sales management approach in response to a customer-driven culture. This unit introduces students to the discipline of sales management for the 21st century. Students will learn about the key principles of sales management, the techniques of selling and how to manage portfolios for an organisation effectively. Students will have the opportunity to develop key skills in developing and coordinating sales, implementing sales techniques and management of sales operations. This unit gives a comprehensive overview of sales management and gives students the tools and knowledge they need to succeed in today's increasingly complex and fast-paced sales environment.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Demonstrate the key principles of sales management for both public and private organisations
- LO2 Evaluate the relative merits of how sales structures are organised and recognise the importance of 'selling through others'
- LO3 Apply successful selling techniques for building and managing effective customer relationships
- LO4 Create a portfolio management process to maximise revenue for an organisation.

BUS 349

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 50: BUS350 International Marketing

## Introduction

Marketing on a global scale can be challenging as marketers need to be able to reconcile operational differences, opportunities and similarities to meet global market objectives. In today's globalised economy, it is essential that marketing efforts are able to transcend international borders. To do this, marketers must gain an appreciation of the various cultural, regulatory and political issues that exist in transferring marketing strategies into different countries and the impact this can have on both consumers and the organisation. The aim of this unit is to introduce students to a variety of methods that organisations use to coordinate their international marketing efforts, students will critically evaluate the various challenges that organisations face when doing so. Through the analysis of different marketing approaches in different international contexts students will learn about the international marketing environment. This unit will give students the knowledge they need and the ability to work effectively with marketing teams internationally and to study marketing at a higher level.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Analyse how effective marketing contributes to business strategies in an international context
- LO2 Evaluate entry to a selection of international markets and define the key success factors
- LO3 Debate how the elements of the marketing plan can be adapted or standardised across international markets
- LO4 Present different international marketing approaches for multinational, global, transnational or meta-national contexts.

BUS 350

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 51: BUS351 Brand Management

## Introduction

Branding is the first thing that customers recall, so it is important to perfect it. Having a memorable and distinctive brand design really can achieve new relationships with consumers. Brand designers are experts in crafting a bespoke image to suit the company and convey the right message on every level. Brand managers manage the customer's brand association and purchasing process relationship. Brand management is an important aspect of marketing and boosts product value for any business. This unit gives students a comprehensive overview of brand management – starting with why brands are so important and how they are formed, through to measuring brand value and managing a portfolio of brands over time. The unit is designed and structured to give students an end-to-end understanding of brand management. Students will explore a range of tools and techniques that can be employed to maximise brand value. They will look at a number of case studies that contextualise information in real-world examples to aid understanding of how effective brand management can be achieved.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Analyse how a brand is built and managed over time
- LO2 Create a brand portfolio strategy to organise portfolios and manage brand hierarchies
- LO3 Evaluate how brands are leveraged/extended over time domestically and internationally
- LO4 Apply techniques for measuring and managing brand value over a period of time

BUS 351

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 52: BUS352 Product and Service Development

## Introduction

Almost every day we encounter new products and services through a variety of marketing promotions. But how do they get from a single idea to, in some cases, becoming a household item and brand? How did the mobile phone, e-books, 24/7 banking services and fast food become part of our lives? Why do some products enjoy a long and profitable lifespan, whilst others disappear almost overnight? What are the secrets to success? This unit explores the journey from ideas generation through to the launch of a new product or service. Students will examine the processes behind new product development (NPD) and consider the potential risks involved. Through the combination of theory and practice, students will develop knowledge and understanding and be able to apply it in either an organisational or entrepreneurial context. They will be given the opportunity to design and pitch their new or renovated product or service of their choice and evaluate their performance. On completion of the unit, students will have developed confidence and competency in pitching and presenting an idea, teamworking and creative thinking skills. These are all vital skills, required in a dynamic and forever changing work environment.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Examine the processes involved in new product or service development

LO2 Assess the lifecycle stage of the products or services in a company's portfolio and evaluate whether innovation, adaptation or renovation are needed for the individual products or services

LO3 Pitch the design for a new or renovated product or service

LO4 Critically reflect on the skills of teamworking, creative development and presentation.

BUS 352

15 UK  
Credits

UK Level 5

School of  
Business



# Unit 53: BUS353 Planning for Growth

## Introduction

This unit focuses on small and medium enterprises (SMEs) and how they can broaden their knowledge of business growth. SMEs need to know where they sit in the marketplace and which approaches to take in order to grow business and develop relevant industries and sectors accordingly. This aim of the unit is to give students an awareness of how SMEs develop and grow. They will understand the options for SMEs in terms of exiting successful or unsuccessful businesses and will be able to appreciate the importance of making informed choices when choosing routes to growth. They will also understand the potential risks vs rewards involved with growth. Students will learn about and apply techniques for identifying opportunities for growth and appraise options for achieving growth. Students will also learn about the sources of investment finance and consider how an SME attracts investors and the appropriate approaches to gain stakeholder interest.

## Learning Outcomes

By the end of this unit a student will be able to:

LO1 Analyse the key factors that SMEs should consider when evaluating growth opportunities

LO2 Assess the various methods through which organisations access funding and when to use different types of funding

LO3 Develop a business plan to communicate a growth strategy in a business to the relevant stakeholders

LO4 Assess the various ways that a small business owner can exit the business and the implications of each option.

BUS 353

15 UK  
Credits

UK Level 5

School of  
Business

# BUS354 E-Commerce & Strategy

## Introduction

Electronic commerce, or e-commerce, refers to any type of commercial/business transaction where information, data, products and services are exchanged across the internet. These transactions can cover a wide diversity of business types, including: consumer-based retail sites (for example Amazon), sites that provide facilities such as auctions (for example eBay) and business exchanges between different organisations. E-commerce allows consumers to electronically exchange goods and services 24/7 with no barriers in terms of time or geography. In this unit, students will gain an understanding of how and why businesses and organisations develop e-commerce strategies to remain competitive in the global market. Students will develop an appreciation of the elements and resources required to set up an e-commerce site and will be engaged in the design and implementation of their own strategies that would, in reality, form part of a secure e-commerce site. Students will examine the impact that e-commerce has on society and the global market for consumers, buyers and sellers in terms of the benefits and drawbacks of online purchasing. Students will research and investigate the technologies involved in setting up a secure e-commerce site in preparation for their own e-commerce strategy. Students will devise a strategy based on an element of e-commerce, for example designing a shopping cart, an ordering system, payment system or an online marketing system. Their design should be fully implemented and evaluated in terms of its success or failure. On successful completion of this unit, students will have gained a technical and a practical insight into e-commerce strategy, design and development. As a result, they will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

## Learning Outcomes

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

LO1 Examine the strategies employed by and the impact of e-commerce on business organisations

LO2 Analyse the hardware, software, web-based and database technologies involved in setting up a secure e-commerce site

LO3 Design an e-commerce strategy based on a given end-user requirement for a target audience.

LO4 Implement an e-commerce strategy based on a given end-user requirement for a target audience.

BUS 354

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 55: BUS355 Planning Social Media Campaigns

## Introduction

Facebook, Twitter, LinkedIn, blogs on countless themes, the ability to leave comments about news, online stores, file-sharing platforms and wikis have become essential elements of daily life. They are also valuable tools in the way that businesses communicate with their existing and potential audiences. Social media has transformed the way that people and businesses communicate, by allowing engagement across multiple channels with greater personalisation and targeted dissemination. While we are experiencing a time of transformation that generates interesting opportunities, we are also faced with new challenges for organisations and individuals. The rapid growth in social media raises questions about authorship, authenticity and privacy, to name but a few. In this unit, students will explore this new cultural ecosystem, where we use new practices of communication and social interaction through social media. On successful completion of this unit, students will be able to analyse a market to plan and develop strategic communication campaigns through social media.

## Learning Outcomes

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

LO1 Examine the key concepts and features of social media for different business activities

LO2 Discuss the uses of social media and their impact on market and audience

LO3 Plan a social media campaign for an organisation, based on client need, market and user research

LO4 Implement a social media campaign plan for an organisation to meet business objectives.

BUS 355

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 56: BUS356 Tapping into New and International Markets

## Introduction

In today's global environment, organisations are constantly looking at new ways to expand internationally. With the rise of digital technology and the relaxation of barriers to entry this is easier than ever before, but all organisations must consider a range of options when making the decision to expand internationally. In this unit, students will explore how organisations are able to move into international markets, assessing the opportunities and threats of them doing so. They will investigate international trade theories and approaches to expanding internationally by importing and exporting. The unit aims to give students key tools and techniques to aid organisations in evaluating whether they should tap into international markets and assess the various implications of doing so. On completion of this unit, students will have a clear understanding of the international environment and considerations that need to be made by business if they are seeking to expand on an international scale. This is invaluable knowledge and understanding for students who aspire to work in the global business arena.

## Learning Outcomes

By the end of this unit a student will be able to:

- LO1 Analyse the opportunities and threats for firms exposed to an increasingly globalised environment
- LO2 Evaluate the membership of trading blocs as a vehicle for expanding internationally
- LO3 Determine the importing and exporting process, and the practicalities involved
- LO4 Devise ways in which an SME organisation can tap into international markets.

BUS 356

15 UK  
Credits

UK Level 5

School of  
Business

# Unit 57: BUS357 Business Intelligence

## Introduction

Data and information are core to any organisation and business process. The necessity of having meaningful information is the key driver for effective decision making and problem solving. Business intelligence has evolved from technologies such as decision support systems (DSS) to include tools and methods associated with data mining, data integration, data quality and data warehousing, in conjunction with other information management systems and applications. In this unit, students will examine the concept of business processing in terms of data capture, conversion and information output and they will define the tools and technologies associated with business intelligence functionality. Students will use business intelligence tools and techniques to demonstrate an understanding of a given problem. Finally, students will evaluate the impact of business intelligence on effective decision making. On successful completion of this unit, students will appreciate the importance of business intelligence in terms of optimising decision making and performance. By exploring the tools, techniques and systems that support business intelligence, students will be aware of their role and contribution, and their importance to organisations. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence

## Learning Outcomes

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

LO1 Discuss business processes and the mechanisms used to support business decision making

LO2 Compare the tools and technologies associated with business intelligence functionality

LO3 Demonstrate the use of business intelligence tools and technologies

LO4 Discuss the impact of business intelligence tools and technologies for effective decision-making purposes and the legal/regulatory context in which they are used.

BUS 357

15 UK  
Credits

UK Level 5

School of  
Business

# School of Business (BUS)

## YEAR 4 – UK LEVEL 6 (Top-Up) – With Teeside University , UK

### 3 Mandatory Specialist Units + 2 Optional Units + General Education Subjects

#### Accounting & Finance

##### 3 x Mandatory Specialist Units

1. Unit 1: [BUS 401/ACC3023-N](#) Advanced Financial Accounting and Reporting (20 UK Credits)
2. Unit 2: [BUS 402/ACC3026-N](#) Audit and Assurance (20 UK Credits)
3. Unit 3: [BUS 403/ACC3025-N](#) Global Enterprise and Strategy (20 UK Credits)

##### + 2 x Optional Units

1. Unit 4: [BUS 404/ ACC3027-N](#) Consultancy Project (20 UK Credits)
2. Unit 5: [BUS 405/ BIN3023-N](#) Undergraduate Business Project (20 UK Credits)

#### Business Management (General)

##### 3 x Mandatory Specialist Units

1. Unit 6: [BUS 406/BIN3038-N](#) Contemporary Issues in Business Management (20 UK Credits)
2. Unit 7: [BUS 407/BIN3050-N](#) Sustainability, Strategy & Society (20 UK Credits)
3. Unit 8: [BUS 408/BIN3039-N](#) Dissertation (40 UK Credits)

+ any 2 x Optional Units from the list of Optional Level 5 Subjects/Units

#### Human Resource Management

##### 5 x Mandatory Specialist Units

1. Unit 6: [BUS 406/BIN3038-N](#) Contemporary Issues in Business Management (20 UK Credits)
2. Unit 8: [BUS 408/BIN3039-N](#) Dissertation (40 UK Credits)
3. Unit 10: [BUS 410/ BIN3050-N](#) Sustainability, Strategy & Society (20 UK Credits)
4. Unit 11: [BUS 411/CSE3005-N](#) Concepts and Principles of International Management (20 UK Credits)
5. Unit 12: [BUS 412/HRM3046-N](#) Current Issues in Business Ethics & CSR (20 UK Credits)

#### Marketing (Business with Marketing)

##### 5 x Mandatory Specialist Units

1. Unit 6: [BUS 406/BIN3038-N](#) Contemporary Issues in Business Management (20 UK Credits)
2. Unit 7: [BUS 407/BIN3050-N](#) Sustainability, Strategy & Society (20 UK Credits)
3. Unit 8: [BUS 408/BIN3039-N](#) Dissertation (40 UK Credits)
4. Unit 9: [BUS 409/ MAR3017-N](#) Marketing Planning Application (20 UK Credits)
5. Unit 10: [BUS 410/ MAR3020-N](#) Sales Management (20 UK Credits)



**British Applied College**  
الكلية البريطانية التطبيقية

# Unit 1: BUS401 (ACC3023-N) Advanced Financial Accounting and Reporting

This module builds on financial accounting knowledge and develops understanding of the theoretical frameworks within which financial reporting takes place. The content and application of complex reporting standards are explored in the context of the preparation and interpretation of key financial statements for both single entity and consolidated financial statements.

By the end of the module students will be able to apply key International Financial Reporting Standards (IFRS) to transactions and prepare a set of consolidated financial statements incorporating Statement of Profit and Loss, Statement of Financial Position, Statement of changes in Equity and Other Comprehensive Income.

Assessment is one ECA (100%) 3 hour closed book examination

## Module Learning Outcomes

1. Adopt independent learning and apply knowledge in unfamiliar contexts.
2. Engage in debate and discussion concerning relevant complex accounting areas.
3. Identify and apply relevant accounting technical knowledge and skills to analyse specific problems.
4. Demonstrate ability to identify International Financial Reporting Standards and other requirements applicable to consolidated financial statements.
5. Apply knowledge of international financial reporting standards through explanation, calculation and demonstrate ability to prepare consolidated financial statements for companies in conformity with IFRS.
6. Apply analytical and numerical skills to the preparation of group financial statements.
7. Analyse and interpret financial statements, making assessments on the performance of a company using professional judgement and scepticism.
8. Gain an awareness of International differences in accounting.
9. Evaluate and categorise financial information, reporting appropriately using contemporary accounting theory and International Financial Reporting Standards.
10. Choose and apply appropriate principles and techniques in practical situations.
11. Apply professional judgement and scepticism in applying techniques.

BUS 401  
(ACC3023-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 2: BUS402 (ACC3026-N) Audit and Assurance

BUS 402  
(ACC3026-N)

20 UK Credits

UK Level 6

School of  
Business



# Unit 3: BUS403 (ACC3025-N) Global Enterprise and Strategy

BUS 403  
(ACC3025-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 4: BUS404 (ACC3027-N) Consultancy Project

BUS 404  
(ACC3027-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 5: BUS405 (BIN3023-N) Undergraduate Business Project

BUS 405  
(BIN3023-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 6: BUS406 (BIN3038-N) Contemporary Issues in Business Management

The purpose of this module is to develop an understanding of the challenges faced by organisations in a complex and dynamic environment and it explores the controversies and dilemmas of contemporary management thinking and practice.

The module is structured around three key interrelated contemporary issues facing businesses: internationalisation; technological innovation; and sustainability. The module is designed to synthesise contemporary conceptual discussion and to further develop students' diagnostic, analytical and communication skills for effective human interaction and decision making and therefore a variety of teaching approaches are used.

The assessment for the module is a 100% end course assessment related to the key themes explored during the module. Students will develop an individual 15 minute presentation in a media format of their choice e.g. video, audio cast, narrated PowerPoint. The assessment covers all learning outcomes.

## Module Learning Outcomes

1. Evaluate ethical dilemmas and make appropriate ethical decisions based on the evidence base.
2. Question orthodoxy using balanced, logical and supported argument.
3. Demonstrate a comprehensive understanding of the dynamic and changing nature of the business environment at a strategic, local, national and international level.
4. Demonstrate a comprehensive understanding of organisations: their nature, structure, governance and internal processes and the associated individual and organisational behaviours that exist within and between organisations.
5. Be reflective: evaluate own learning through applying own practice to current thinking around business issues.
6. Engage effectively in academic debate and present arguments through answering examination questions around current business issues.

BUS 406  
(BIN3038-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 7: BUS407 (BIN3050-N) Sustainability, Strategy & Society

This module is designed to equip students with the necessary knowledge and skills in effective strategic and responsible leadership in the wider context of business and society. The current context of the macro environment will be explored, and contemporary issues will be considered by students specifically relating to sustainability and the United Nations (UN) Sustainable Development Goals (SDGs). The SDGs are evaluated to enable students to present a range of solutions to implement strategic or tactical change with an organisation. Students will reflect upon leadership capability to promote organisational development in such a way that it contributes social as well as economic value.

Assessment consists of 1 x 10 minute group presentation of a group project (ECA 30%) and 1 x 2,500 word thought leadership report dedicated to 1 on the UN SDG's linked to the topics covered in the group work (ECA 70%)

## Module Learning Outcomes

1. Select from a wide range of technology appropriate to delivering a quality presentation.
2. Set criteria for, and be effective in professional and interpersonal communication in a wide range of situations.
3. Work effectively within a team, support or be proactive in leadership.
4. Synthesise, appraise and evaluate the SDG's utilising leadership, strategy and change theory and practice.
5. Demonstrate intellectual flexibility and openness to new ideas.
6. Act with minimal supervision in complex and unpredictable contexts.

BUS 407  
(BIN3050-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 8: BUS408 (BIN3039-N) Dissertation

Undergraduate Dissertation is a 40 credit module featuring across undergraduate programmes within the Department of Business Management, which fulfils the need for each student to produce a substantive submission founded on extended self-guided study into a subject area which is associated with their degree programme. The topic focus of the submission will be informed by the personal interest of the student as guided by academic advice received from their dissertation supervisor who will support the student formally during the module.

The module comprises of one summative end assessment:

The submission of a completed Dissertation of between 8,000 and 10,000 words.

In accordance with University regulations, and where appropriate, students will need to ensure ethical clearance is in place before they undertake any primary research into their topic area.

## Module Learning Outcomes

1. Act autonomously with limited supervision or direction within agreed guidelines to allow for effective self-management.
2. Demonstrate competency in the selection and application of appropriate data analysis/interpretation and understanding of their limitations.
3. Communicate complex written information to an academic audience.
4. Demonstrate the ability to plan, undertake and evaluate a self-managed research submission in an area of direct relevance to the chosen degree programme.
5. Exhibit a comprehensive and critical understanding of the chosen subject specific topic, research design and implementation.
6. Show an awareness of the ethical issues relevant to the chosen topic area and methodology.
7. Demonstrate the ability to synthesise, appraise and evaluate data/evidence from appropriate sources relevant to the chosen topic area and make reasoned, coherent and balanced arguments to support or refute research findings.
8. Exhibit the ability to apply academic and professional codes of conduct in the design and management of the research process.
9. Demonstrate research skills relevant to the chosen topic area, including research design, evaluation and data analysis/interpretation.

BUS 408  
(BIN3039-N)

40 UK Credits

UK Level 6

School of  
Business

# Unit 9: BUS409 (MAR3017-N) Marketing Planning Application

This module aims to give final year students the scope to consolidate their understanding of marketing as a managerial activity of corporate relevance. A live project is a crucial component of this module and will be used by students to carry out the process of modelling a Strategic Marketing Plan. The project is connected to a real-time situation, giving valuable experience without concern of a negative outcome. The live project method encourages the student to be an active decision-maker in marketing strategy, to analyse relevant data and apply the theories, concepts and analytical techniques discussed in class and readings. The module will also require students to draw on knowledge and techniques previously gained throughout their degree course, including finance and accounting, economics, management science and organisational behaviour.

This module is assessed via an ICA 30% and End 70%.

ICA - 30% of the overall mark. Students are required to do a 20 Minute group presentation (PowerPoint).

End - 70% of the overall mark. Students are required to submit a 3,000 word individual written report.

## Module Learning Outcomes

1. Demonstrate a comprehensive and detailed knowledge of analytical and strategic decision making frameworks relative to a range of marketing problems.
2. Critically appraise the marketing activities of an organisation.
3. Synthesise, appraise and evaluate marketing issues and conditions provided via the live project.
4. Demonstrate intellectual flexibility and openness to new ideas in the process of marketing planning application and decision-making.
5. Question the orthodoxy of the marketing planning application process in the development of marketing strategy.
6. Undertake and evaluate marketing planning application as a dynamic process and be able to prepare and use marketing plans.
7. Demonstrate employment potential in analysing, evaluating and problem solving real-time issues.
8. Communicate fluently, both orally and in writing.
9. Work effectively in a group situation inclusive of negotiation, listening and interpersonal skills.

BUS 409  
(MAR3017-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 10: BUS410 (MAR3020-N) Sales Management

The roles of buyers, sellers, and technology have changed, and collaboration is now the key to success on all sides. Indeed the buyer seller relationship has shifted from subservient to sales collaboration. This module focuses on the consultative approach of understanding the buyers needs and providing adapted solutions by helping them overcome their problems, challenges, and creating value. Students will learn how to build partnership with buyers, through detailing the foundations, personae, and reality of the new marketplace.

Salesmanship is an essential skill that carries over into many industries, through studying this module, students will gain insights into the new buyer thought processes, the new sales personae required for dealing with the new buyers, and how to establish and implement a dynamic sales process. The module will provide students with a balanced view of sales management and contextualise it for future employability through its integration with the marketing function and the other operation business functions.

This module is assessed via an ICA 75%, an ECA 25%.

The ICA (75%) - students will produce a portfolio made up of various activities carried out during the course of the module.

The ECA (25%) - students will carry out an individual sales presentation based on a brief (provided by the academic tutor). The presentation will last 20 minutes. This assessment will account for 25% of the module mark.

## Module Learning Outcomes

1. Demonstrate a comprehensive and detailed understanding of the business organisations, the environment which they operate in and their management, specifically in regard to the sales function and discipline and the way in which these areas interlink and integrate.
2. Analyse and critically evaluate established personal selling models and business theories.
3. Analyse and evaluate the impact of ethical and legal issues in the buyer seller relationship.
4. Synthesise, appraise and evaluate various data in order to present a structured, balanced and independent argument.
5. Identify and define complex problems and applying relevant methods to produce appropriate solutions.
6. Operate ethically in complex and unpredictable contexts, recognising the basis for professional competence in personal selling.
7. Evaluate personal leadership, professional skills and personal qualities necessary for a career in sales.
8. Plan, manage, review and evaluate the acquisition of new knowledge and skills as part of a lifelong learning strategy and future employability.
9. Communicate clearly, fluently and effectively in a range of styles appropriate to the context.

BUS 410  
(MAR3020-N)

20 UK Credits

UK Level 6

School of  
Business



# Unit 11: BUS411 (CSE3005-N) Concepts and Principles of International Management

The purpose of this module is to develop an understanding of the challenges faced by organisations in a complex and dynamic environment and it explores the controversies and dilemmas of contemporary management thinking and practice.

The module is structured around three key interrelated contemporary issues facing businesses: internationalisation; technological innovation; and sustainability. The module is designed to synthesise contemporary conceptual discussion and to further develop students' diagnostic, analytical and communication skills for effective human interaction and decision making and therefore a variety of teaching approaches are used.

The assessment for the module is a 100% end course assessment related to the key themes explored during the module. Students will develop an individual 15 minute presentation in a media format of their choice e.g. video, audio cast, narrated PowerPoint. The assessment covers all learning outcomes. .

## Module Learning Outcomes

1. Evaluate ethical dilemmas and make appropriate ethical decisions based on the evidence base.
2. Question orthodoxy using balanced, logical and supported argument.
3. Demonstrate a comprehensive understanding of the dynamic and changing nature of the business environment at a strategic, local, national and international level.
4. Demonstrate a comprehensive understanding of organisations: their nature, structure, governance and internal processes and the associated individual and organisational behaviours that exist within and between organisations.
5. Be reflective: evaluate own learning through applying own practice to current thinking around business issues.
6. Engage effectively in academic debate and present arguments through answering examination questions around current business issues.

BUS 411  
(CSE3005-N)

20 UK Credits

UK Level 6

School of  
Business

# Unit 12: BUS412 (HRM3046-N) Current Issues in Business Ethics & CSR

Business operates today in a marketplace where increasingly companies are expected by consumers to not only do well but also to do good. "Doing the right thing" is seen as "the next big idea", a realisation by companies that embracing CSR can be a driver to success because other groups in society see you as acting correctly. In the light of recent banking scandals, and the BAe bribery case; the anti-globalisation protestors; endless "mandate" groups each with their own set of demands; and even demands from institutional and retail shareholders, companies of all sizes are increasingly aware of the new marketplace and seeing the growing importance of being (or at least appearing to be) seen embracing business ethics and corporate social responsibility.

Students will be assessed by two equally weighted 2,000 word essays: ICA (50%) and ECA (50%). The ECA will also include a one-page self-reflection on class contribution.

The ICA will look at business ethics/CSR in the Developed World, the ECA will look at business ethics/CSR in terms of business helping the Developing World.

## Module Learning Outcomes

1. Autonomously plan and manage own learning.
2. Communicate effectively through essay writing, reflecting and interpreting research findings using appropriate academic language.
3. Challenge the orthodox through a demonstration of critical informed thinking.
4. Demonstrate intellectual flexibility and openness to new ideas through wide reading and independent thinking in relation to business ethics/CSR in the Developed World.
5. Demonstrate intellectual flexibility and openness to new ideas through wide reading and independent thinking in relation to business helping the Developing World.
6. Employ a range of logical and supported arguments in discussing theory and research in the field of business ethics/CSR in the Developed World.
7. Employ a range of logical and supported arguments in discussing theory and research in the field of business ethics/CSR as it relates to business helping the Developing World.
8. Analyse and interpret evidence from a rich variety of sources attempting to explain issues around business ethics/CSR.
9. Think independently and be able to support a position using informed, logical, supported argument.
10. Be competent and confident in dealing with ethical/CSR situations.

BUS 412  
(HRM3046-N)

20 UK Credits

UK Level 6

School of  
Business

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