

**Group Award Specification for:**  
**Professional Development Award**  
**in**  
**Software Development at SCQF levels 7, 8 and 9**

**Group Award codes:**

**GT22 47**

**GT23 48**

**GT24 49**

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# 1 Introduction

This is the group award specification for the Professional Development Awards (PDAs) in Software Development at SCQF levels 7, 8 and 9. The purpose of this document is to:

- ◆ assist centres to implement, deliver and manage the qualification
- ◆ provide a guide for new staff involved in offering the qualification
- ◆ inform course managers, teaching staff, assessors, learners, employers and HEIs of the aims and purpose of the qualification
- ◆ provide details of the range of learners the qualification is suitable for and progression opportunities

The title of the qualification makes it clear that it focuses on software development and closely-related topics, rather than providing more general coverage of computer science.

Level 7 will be suitable for learners with no previous background in computing. Level 8 will be suitable for learners with some previous knowledge of computing or a graduate-level qualification in a non-STEM area, and level 9 will be suitable for learners with a graduate-level qualification in a STEM area who wish to retrain as computer programmers.

Learners completing level 9 should be prepared for employment as entry-level programmers. Those completing lower levels are likely to require further training before being ready to enter employment.

The Scottish Government's Skills Development Plan includes the proposal to establish a number of Digital Skills Academies, to provide short and highly-focused courses in software development. The PDA in Software Development can provide a suitable curriculum for such academies.

## 2 Qualification structure

### 2.1 Structure

The qualification is available at **SCQF levels 7, 8 and 9**.

Each of the levels consist of **three** mandatory units and the total credit value is **6 SQA credits** (48 SCQF credit points) for each level. There are **no** optional units.

The following tables define the award at each level.

#### PDA Software Development at SCQF level 7

4 code	2 code	Unit title	SCQF level	SCQF credit points	SQA credits
J5RB	47	Software Development: Analysis and Design	7	16	2
J5RE	47	Software Development: Implementation and Testing	7	16	2
J5RH	47	Software Development: Project	7	16	2

#### PDA Software Development at SCQF level 8

4 code	2 code	Unit title	SCQF level	SCQF credit points	SQA Credits
J5RC	48	Software Development: Analysis and Design	8	16	2
J5RF	48	Software Development: Implementation and Testing	8	16	2
J5RJ	48	Software Development: Project	8	16	2

#### PDA Software Development at SCQF level 9

4 code	2 code	Unit title	SCQF level	SCQF credit points	SQA Credits
J5RD	49	Software Development: Analysis and Design	9	16	2
J5RG	49	Software Development: Implementation and Testing	9	16	2
J5RL	49	Software Development: Project	9	16	2

The qualification is hierarchical in nature. To achieve the group award, learners are required to complete all three units:

*Software Development: Analysis and Design*

*Software Development: Implementation and Testing*

*Software Development: Project*

It is not necessary for all units to be completed at the same level. The level of the group award will be determined by the levels of the units completed, for example, all three units would need to be completed at level 8 to obtain the level 8 group award.

The SCQF level descriptors describe in broad terms what learners should be able to do or demonstrate at a particular level. Each level descriptor has five characteristics which provide a reference point for determining the level of a qualification. The five characteristics are:

- ◆ Knowledge and understanding
- ◆ Practice: applied knowledge, skills and understanding
- ◆ Generic cognitive skills
- ◆ Communication, numeracy and ICT skills
- ◆ Autonomy, accountability and working with others

The qualifications demonstrate a clear progression through the SCQF levels from 7 to 9 for each of the five characteristics.

### 3 Aims of the qualification

The principal aim of the qualification is to prepare learners to obtain employment as entry-level computer programmers.

#### 3.1 General aims of the qualification

- 1 To develop an understanding of the software development life cycle.
- 2 To develop skills in computer programming.
- 3 To develop computational thinking skills.
- 4 To prepare learners for employment.
- 5 To develop team-working skills.
- 6 To develop project management and time management skills.
- 7 To develop an appreciation of the contemporary IT industry.
- 8 To facilitate retraining of learners with no background in software development.
- 9 To facilitate the up-skilling of learners with a background in computing.
- 10 To contribute to the reduction of skills shortages in the software development area.

The relevance of the general aims will vary across different levels of the award. The following table shows how relevant they might be at each level. Entries are on a scale from 1–5, with the numbers representing the relative importance of each aim at the specified levels.

For example, the first aim ('Understanding of the software development life cycle') is rated as 5/4/3 (at levels 7/8/9), not because it's not important at level 9, but because it is relatively more important at level 7. At level 9, there are more important things to focus on, since it could be presumed that learners would know the development life cycle at this level.

	Level 7	Level 8	Level 9
To develop an understanding of the software development life cycle.	5	4	3
To develop skills in computer programming.	5	5	5
To develop computational thinking skills.	5	4	3
To prepare learners for employment.	3	4	5
To develop team-working skills.	1	3	5
To develop project management and time management skills.	1	3	5
To develop an appreciation of the contemporary IT industry.	3	3	3
To facilitate retraining of learners with no background in software development.	5	3	1

	Level 7	Level 8	Level 9
To facilitate the up-skilling of learners with a background in computing.	1	3	5
To contribute to the reduction of skills shortages in the software development area.	4	4	4

### 3.2 Specific aims of the qualifications

- 1 To focus on skills in computer programming in at least one contemporary programming language.
- 2 To develop skills in software maintenance.
- 3 To develop skills in program testing.
- 4 To develop a wide range of underpinning knowledge and skills relevant to computer programming.
- 5 To prepare learners for employment as entry-level computer programmers.
- 6 To appreciate the roles within a programming project team and work within one.
- 7 To apply project management techniques to the software development process.
- 8 To appreciate the importance of data security and its implications for software development.

The relevance of the specific aims will vary across different levels of the award. The following table shows how relevant they might be at each level. Entries are on a scale from 1–5, with the numbers representing the relative importance of each aim at each level.

	Level 7	Level 8	Level 9
To focus on skills in computer programming in at least one contemporary programming language.	5	5	5
To develop skills in software maintenance.	1	4	5
To develop skills in program testing.	3	5	5
To develop a wide range of underpinning knowledge and skills relevant to computer programming.	5	5	5
To prepare learners for employment as entry-level computer programmers.	1	3	5
To appreciate the roles within a programming project team and work within one.	1	3	5
To apply project management techniques to the software development process.	1	3	5
To appreciate the importance of data security and its implications for software development.	1	3	5

## 4 Recommended entry to the qualifications

Entry to this qualification is at the discretion of the centre. The following information on prior knowledge, skills, experience or qualifications that provide suitable preparation for this qualification has been provided by the Qualification Design Team as guidance only.

All learners will be expected to possess basic IT skills before admission to the qualifications. Learners would benefit from having attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

**Level 7:** no previous knowledge of computer programming is required, but learners would benefit from having previous experience of using computers, for example, the use of office applications.

**Level 8:** learners would benefit from having a lower-level qualification in computing, eg an Advanced Higher, SQA Advanced Certificate, or a graduate-level qualification in a non-STEM subject.

**Level 9:** learners would benefit from having a graduate-level qualification in a STEM subject or another subject that promotes logical thinking.

Although computational thinking is not formally classed as a Core Skill, it will play a major role in the award, particularly at the lower levels where the development of computational thinking skills will be a crucial element.

## 5 Additional benefits of the qualification in meeting employer needs

This qualification was designed to meet a specific purpose and what follows are details on how that purpose has been met through mapping the units to the aims of the qualification. Through meeting the aims, additional value has been achieved by linking the unit standards with those defined in National Occupational Standards and/or trade/professional body requirements. In addition, significant opportunities exist for learners to develop the more generic skills, known as Core Skills through doing this qualification.



## 5.1 Mapping of qualification aims to units

Code	Unit title	Aims									
		1	2	3	4	5	6	7	8	9	10
J5RB 47	Software Development: Analysis and Design (SCQF level 7)	X		X				X	X		X
J5RE 47	Software Development: Implementation and Testing (SCQF level 7)	X	X	X				X	X		X
J5RH 47	Software Development: Project (SCQF level 7)	X	X	X				X	X		X
J5RC 48	Software Development: Analysis and Design (SCQF level 8)	X		X	X			X		X	X
J5RF 48	Software Development: Implementation and Testing (SCQF level 8)	X	X	X	X			X		X	X
J5RJ 48	Software Development: Project (SCQF level 8)	X	X	X	X	X		X		X	X
J5RD 49	Software Development: Analysis and Design (SCQF level 9)	X		X	X			X		X	X
J5RG 49	Software Development: Implementation and Testing (SCQF level 9)	X	X	X	X			X		X	X
J5RL 49	Software Development: Project (SCQF level 9)	X	X	X	X	X	X	X		X	X

Code	Unit title	Specific aims							
		1	2	3	4	5	6	7	8
J5RB 47	Software Development: Analysis and Design (SCQF level 7)		X		X				X
J5RE 47	Software Development: Implementation and Testing (SCQF level 7)	X	X	X	X				X
J5RH 47	Software Development: Project (SCQF level 7)	X		X	X				X
J5RC 48	Software Development: Analysis and Design (SCQF level 8)		X		X	X			X
J5RF 48	Software Development: Implementation and Testing (SCQF level 8)	X	X	X	X	X			X
J5RJ 48	Software Development: Project (SCQF level 8)	X		X	X	X	X		X
J5RD 49	Software Development: Analysis and Design (SCQF level 9)		X		X	X			X
J5RG 49	Software Development: Implementation and Testing (SCQF level 9)	X	X	X	X	X			X
J5RL 49	Software Development: Project (SCQF level 9)	X		X	X	X	X	X	X

## 5.2 Mapping of National Occupational Standards (NOS) and/or trade body standards

Code	Unit title	National Occupational Standard												
J5RB 47	Software Development: Analysis and Design (SCQF level 7)	ESKITP5022	P1	K1	K3	K6	K8	K15	K16					
J5RE 47	Software Development: Implementation and Testing (SCQF level 7)	ESKITP5022	P3	P4	P5	P6	P7	K9	K10	K11	K12	K13	K14	K15
			K16	K17										
J5RH 47	Software Development: Project (SCQF level 7)	ESKITP5022	P1	P3	P4	P5	P6	P7	K2	K15	K16	K17	K18	
J5RC 48	Software Development: Analysis and Design (SCQF level 8)	ESKITP5023	P1	P2	P3	P5	K1	K2	K4	K6	K7	K10	K12	K13
			K32	K33	K34									
J5RF 48	Software Development: Implementation and Testing (SCQF level 8)	ESKITP5023	P1	P6	P7	P8	P9	P10	K6	K7	K13	K15	K16	K18
			K19	K20	K21	K22	K23	K24	K25	K26	K30	K31	K32	K33
			K34											
J5RJ 48	Software Development: Project (SCQF level 8)	ESKITP5023	P1	P4	P6	P7	P8	P9	P10	K3	K12	K13	K16	K32
			K33	K34										
J5RD 49	Software Development: Analysis and Design (SCQF level 9)	ESKITP5024	P6	P7	P8	P9	K2	K3	K4	K6	K7	K8	K9	K10
			K11	K12	K25	K27	K28	K29	K32	K39				
J5RG 49	Software Development: Implementation and Testing (SCQF level 9)	ESKITP5024	P10	P11	P15	P16	K8	K9	K10	K11	K12	K18	K19	K20
			K21	K22	K23	K26	K27	K28	K30	K31	K32	K49	K37	K38
J5RL 49	Software Development: Project (SCQF level 9)	ESKITP5024	P3	P4	P5	P6	P7	P8	P9	P11	P15	P16	P17	P18
			P19	P20	P21	P22	K15	K16	K18	K19	K20	K21	K22	K23
			K25	K26	K27	K28	K29	K30	K31	K32	K33	K34	K36	K37
			K38	K39	K40	K41	K42	K43	K44	K45	K46	K47	K48	K49
			K50	K51										

The relevant standards are listed below. These standards were originally produced by E-Skills, the former industry lead body for IT, and are now maintained by the Tech Partnership. They can be found at:

<https://www.thetechpartnership.com/standards-and-quality/it-professional-standards/solution-development-and-implementation/>

ESKITP5022 Software Development level 2 Role (L2)

ESKITP5023 Software Development level 3 Role (L3)

ESKITP5024 Software Development level 4 Role (L4)

There is extensive overlap between the contents of the units and the standards.

### 5.3 Mapping of Core Skills development opportunities across the qualifications

These qualifications will provide opportunities for learners to exercise their Core Skills and they are designed to promote the development of Computational Thinking skills.

Core Skills can be delivered within an award by **embedding** them (in which case the award will lead to additional certification for learners' Core Skills) or **signposting** them (which does not lead to certification).

Some Core Skills are embedded in the units ('E' denotes 'embedding'), and this is summarised in the table below.

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/ Creating information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
J5RB 47	Software Development: Analysis and Design							E6	E6	E6		
J5RE 47	Software Development: Implementation and Testing							E6	E6	E6		
J5RH 47	Software Development: Project						E5	E6	E6	E6		

## 5.4 Assessment strategy for the qualifications

Code	Unit title	Assessment			
		Outcome 1	Outcome 2	Outcome 3	Outcome 4
J5RB 47	Software Development: Analysis and Design (SCQF level 7)	Cognitive	Cognitive Practical	Cognitive Practical	Cognitive Practical
J5RE 47	Software Development: Implementation and Testing (SCQF level 7)	Cognitive	Cognitive Practical	Cognitive Practical	Cognitive Practical
J5RH 47	Software Development: Project (SCQF level 7)	Practical	Practical	Practical	Practical
J5RC 48	Software Development: Analysis and Design (SCQF level 8)	Cognitive	Cognitive Practical	Cognitive Practical	Cognitive Practical
J5RF 48	Software Development: Implementation and Testing (SCQF level 8)	Cognitive	Cognitive Practical	Cognitive Practical	Cognitive Practical
J5RJ 48	Software Development: Project (SCQF level 8)	Practical	Practical	Practical	Practical
J5RD 49	Software Development: Analysis and Design (SCQF level 9)	Cognitive	Cognitive Practical	Cognitive Practical	Cognitive Practical
J5RG 49	Software Development: Implementation and Testing (SCQF level 9)	Cognitive	Cognitive Practical	Cognitive Practical	Cognitive Practical
J5RL 49	Software Development: Project (SCQF level 9)	Practical	Practical	Practical	Practical

Assessment for the Project units is entirely practical. In each of the other units, Outcome 1 covers only cognitive competences while Outcomes 2, 3 and 4 cover both cognitive and practical competences.

Evidence may be wholly or partly produced under controlled conditions. When evidence is produced in uncontrolled or loosely controlled conditions it must be authenticated.

## 6 Guidance on approaches to delivery and assessment

### 6.1 Sequencing/integration of units

The units entitled *Software Development: Analysis and Design* and *Software Development: Implementation and Testing* should be delivered before *Software Development: Project* at each level. They can be delivered in sequence (Analysis and Design followed by Implementation and Testing) or simultaneously, according to the preferences of the centre.

### 6.2 Recognition of prior learning

SQA recognises that learners gain knowledge and skills acquired through formal, non-formal and informal learning contexts.

In some instances, a full group award may be achieved through the recognition of prior learning. However, it is unlikely that a learner would have the appropriate prior learning and experience to meet all the requirements of a full group award.

The recognition of prior learning may **not** be used as a method of assessing in the following types of units and assessments:

- ◆ Course and/or external assessments
- ◆ Other integrative assessment units (which may or not be graded)
- ◆ Certain types of assessment instruments where the standard may be compromised by not using the same assessment method outlined in the unit
- ◆ Where there is an existing requirement for a licence to practise
- ◆ Where there are specific health and safety requirements
- ◆ Where there are regulatory, professional or other statutory requirements
- ◆ Where otherwise specified in an assessment strategy

More information and guidance on recognition of prior learning (RPL) may be found on our website [www.sqa.org.uk](http://www.sqa.org.uk).

The following sub-sections outline how existing SQA unit(s) may contribute to this group award. Additionally, they also outline how this group award may be recognised for professional and articulation purposes.

#### 6.2.1 Articulation and/or progression

These qualifications are not expected to articulate to any specific degree programmes. Discussions with universities have suggested that these qualifications would only be considered in conjunction with the other qualifications held by the learner.

#### 6.2.2 Professional recognition

These qualifications are not intended to lead to any type of professional recognition.

### **6.3 Opportunities for e-assessment**

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by information and communication technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at: [www.sqa.org.uk/e-assessment](http://www.sqa.org.uk/e-assessment).

Assessment support packs (ASPs) will be developed for each of the component units within this award. At this time there are no plans to support this award with SOLAR assessments. The ASPs will consist of the theoretical and practical assessments required by the evidence requirements for each of the units.

If evidence is produced by means of an e-portfolio, learners are required to collate a portfolio of evidence which may take a variety of digital forms, eg text, graphics, web pages, video clips, audio clips. This may be stored in an appropriate online platform.

### **6.4 Support materials**

Assessment support packs will be produced and published on the SQA secure site, one for each of the nine units in the award. The support packs will provide detailed assessment guidelines and advice as well as exemplars of valid evidence.

### **6.5 Resource requirements**

Staff delivering these qualifications should possess high-level qualifications in software development or a related area. They should ideally have significant experience of working in a software development environment.

Learners should have exclusive access to a modern PC with relevant software development tools installed.

Numerous online resources are available to help develop programming skills. These include:

- ◆ Codecademy
- ◆ Project Euler
- ◆ Reddit's DailyProgrammer

## 7 General information for centres

### Equality and inclusion

The unit specifications making up this group award have been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners will be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements).

### Internal and external verification

All instruments of assessment used within this/these qualification(s) should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

Further information on internal and external verification can be found in *SQA's Guide to Assessment* ([www.sqa.org.uk/GuideToAssessment](http://www.sqa.org.uk/GuideToAssessment)).



## 8 Glossary of terms

**Embedded Core Skills:** is where the assessment evidence for the unit also includes full evidence for a complete Core Skill or Core Skill components. A learner successfully completing the unit will be automatically certificated for the Core Skill. (This depends on the unit having been successfully audited and validated for Core Skills certification.)

**Finish date:** The end of a group award's lapsing period is known as the finish date. After the finish date, the group award will no longer be live and the following applies:

- ◆ candidates may not be entered for the group award
- ◆ the group award will continue to exist only as an archive record on the Awards Processing System (APS)

**Lapsing date:** When a group award is entered into its lapsing period, the following will apply:

- ◆ the group award will be deleted from the relevant catalogue
- ◆ the group award specification will remain until the qualification reaches its finish date at which point it will be removed from SQA's website and archived
- ◆ no new centres may be approved to offer the group award
- ◆ centres should only enter candidates whom they expect to complete the group award during the defined lapsing period

**SQA credit value:** The credit value allocated to a unit gives an indication of the contribution the unit makes to an SQA group award. An SQA credit value of 1 given to an SQA unit represents approximately 40 hours of programmed learning, teaching and assessment.

**SCQF:** The Scottish Credit and Qualification Framework (SCQF) provides the national common framework for describing all relevant programmes of learning and qualifications in Scotland. SCQF terminology is used throughout this guide to refer to credits and levels. For further information on the SCQF visit [www.scqf.org.uk](http://www.scqf.org.uk).

**SCQF credit points:** SCQF credit points provide a means of describing and comparing the amount of learning that is required to complete a qualification at a given level of the Framework. One National Unit credit is equivalent to 6 SCQF credit points. One National Unit credit at Advanced Higher and one SQA Advanced unit credit (irrespective of level) is equivalent to 8 SCQF credit points.

**SCQF levels:** The level a qualification is assigned within the framework is an indication of how hard it is to achieve. The SCQF covers 12 levels of learning. SQA Advanced Certificates and Diplomas are available at SCQF levels 7 and 8 respectively. SQA Advanced units will normally be at levels 6–9 and graded units will be at level 7 and 8. National Qualification group awards are available at SCQF levels 2–6 and will normally be made up of National Units which are available from SCQF levels 2–7.

**Subject unit:** Subject units contain vocational/subject content and are designed to test a specific set of knowledge and skills.

**Signposted Core Skills:** refers to opportunities to develop Core Skills in learning and teaching but which are not automatically certificated.

## 9 History of changes

It is anticipated that changes will take place during the life of the qualification and this section will record these changes. This document is the latest version and incorporates the changes summarised below. Centres are advised to check SQA's APS Navigator to confirm they are using the up-to-date qualification structure.

**NOTE:** Where a unit is revised by another unit:

- ◆ No new centres may be approved to offer the unit which has been revised.
- ◆ Centres should only enter candidates for the unit which has been revised where they are expected to complete the unit before its finish date.

Version Number	Description	Date

### Acknowledgement

SQA acknowledges the valuable contribution that Scotland's centres have made to the development of this qualification.

# 10 General information for learners

This qualification is available at three SCQF levels: 7, 8 and 9. Each level comprises three units:

*Software Development: Analysis and Design*

*Software Development: Implementation and Testing*

*Software Development: Project*

Level 7 is suitable for learners with no previous background in computing other than basic IT skills. Level 8 is suitable for learners with some previous knowledge of computing or a graduate-level qualification in a non-STEM area, and level 9 is suitable for learners with a graduate-level qualification in a STEM area who wish to retrain as computer programmers. Learners completing level 9 should be prepared for employment as entry-level programmers. Those completing lower levels are likely to require further training before being ready to enter employment.

## Level 7

### Analysis and Design

This unit introduces the Software Development Analysis and Design Process. It covers traditional and contemporary trends in software development methodologies including Waterfall, Prototyping, Incremental, Spiral, Rapid Application Development (RAD) and Agile. You will gain practical experience in using various analysis and design tools and be able to produce models and apply both the Waterfall and the Agile Development approaches.

### Implementation and Testing

This unit will introduce you to the principles and practices of computer programming including the stages in writing a computer program, the basic constructs of programming, algorithms, data types, data structures and testing techniques. You will develop your programming and computational thinking skills by implementing and testing practical solutions using an appropriate software development environment.

### Project

This unit is designed to give you the opportunity to apply skills and knowledge of software analysis, design, implementation and testing to produce the components of a software product composed of multiple sub-programs. It is aimed at learners wishing to begin preparing for a role as an entry-level software developer. You will analyse a problem, design the operation and interaction of program components, produce working code to meet requirements, and test a completed solution to prove functional operation.

## Level 8

### Analysis and Design

This unit introduces the use of object-oriented techniques in the Software Development: Analysis and Design Process. It reviews the analysis and design techniques used and covers the use of object-oriented analysis techniques to define user requirements, the use of object-oriented design techniques to design software solutions, and the use of object-oriented modelling techniques to model solutions. You will gain practical experience in the use of

object-oriented techniques to analyse user requirements and design and model software solutions.

### **Implementation and Testing**

This unit will introduce you to the use of object-oriented programming techniques, extend your skills in using algorithms and data structures in program development and let you apply a wider range of testing techniques. Object-oriented programming techniques include the use of objects and classes and algorithms, encapsulation, inheritance and polymorphism. Data structures will cover lists, queues, stacks tables and trees, and algorithms will include sorting and searching. Testing will cover Static Testing (verification), Dynamic Testing (validation), Unit Testing, Integration Testing and User Acceptance Testing. You will develop your programming skills by designing, implementing and testing practical solutions using an appropriate software development environment.

### **Project**

This unit allows you to apply skills and knowledge of software analysis, design, implementation and testing to produce a software product composed of multiple sub-programs. You will determine the scope and plan the development of a software project, design the operation and interaction of its components, produce working code to meet the requirements, and test a completed solution to prove functional operation. This will involve using an object-oriented programming approach and choosing appropriate data structures and algorithms to build a functional product. You will collaborate with others to deliver the completed project.

## **Level 9**

### **Analysis and Design**

This unit will introduce you to the use of architectural patterns and design patterns in the Software Development Analysis and Design Process. It reviews object-oriented analysis and design techniques and covers the use of templates for solving problems that occur in many different situations or applications. You will gain practical experience in the use of creational, structural and behavioural design patterns to show relationships and interactions between classes or objects without specifying the final application classes or objects involved.

### **Implementation and Testing**

This unit will introduce you to the planning of software development projects, the use of libraries and APIs in software development and the use of code repositories. Project planning will be carried out in line with the Agile Project Management Process. APIs will be used to interface with major platforms. Libraries covered will include standard and add-on libraries for the relevant platform. Version control will be accomplished by the use of code repositories.

### **Project**

This unit allows you to apply skills and knowledge of software analysis, design, implementation and testing to produce a software product composed of multiple sub-programs in a 'real world' teamwork scenario. You will work in a team to determine the scope and plan the development of a complex software project, design the operation and interaction of its components, produce working code to meet the requirements, and test a completed solution to prove functional operation, while following methodical project management practices and incorporating software design patterns. The project will include

interaction with third-party APIs and management of source code with version control software.