

VTCT Certificate in Computing for Teachers (QCF) Level 3

FREE



Cardiff
Metropolitan
University

Prifysgol
Metropolitan
Caerdydd



University of
South Wales
Prifysgol
De Cymru

Qualification Summary

The VTCT programme offers the opportunity for teachers and school support workers in Wales to gain an accredited certification in Computing for Teachers (QCF Level 3). The qualification is completely FREE and applications are open to Primary and Secondary school teachers, as well as those working in support roles such as Technicians and Teaching Assistants.

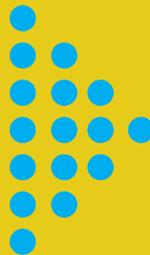
The qualification begins in September, the start of the academic year, and requires a commitment from both the participant and their school. It is delivered by Technocamps Delivery Officers who are able to pass on their

knowledge and experience to participants in a friendly, supportive environment. Learners on the course obtain a wealth of content and pedagogical knowledge, enabling them to integrate Computer Science into their own classroom, in line with the key recommendations within the Digital Competence Framework and the new Curriculum for Wales.

Previous graduates have found that they are able to disseminate information in their schools, helping to improve the quality of Computer Science and boost teachers' competence and confidence in embedding it into their classroom practice.

Programme Outline and Assessment

The Certificate in Computing for Teachers comprises four modules. These cover a range of topics from programming to theory.



- Intro to Programming for Teachers
- Teaching Programming
- Teaching Number Systems and Machine Code
- Teaching Programming in Robotics

The recommended guided learning hours for each unit is 30 hours. Each unit will be timetabled through a combination of full day sessions over the duration of the academic year.

Each unit will be delivered through a combination of theory and hands-on practical activities. Assessment is through the production of an electronic scheme of work. This will include examples and ideas of learning resources to support the delivery of at least

four lessons, combining knowledge of the subject content with effective and engaging classroom techniques.

Sufficient time is allocated for discussion of best practices, learning outcomes, and suitable activities, all of which will help in unit assessments. Deadlines for each unit will be scheduled throughout the course and feedback, including suggested improvements to assessments, will be offered by the Technocamps Delivery Team.

Introduction to Programming for Teachers

4 Credits J/615/1712 (30 GLH)

This unit provides practical insight into real-world examples and creating purposeful systems by incorporating techniques and methods of problem solving through coding. It helps teachers to understand the basics of programming which include the use of variables, calculations, testing, loop structures, and iteration. It examines assemblers, compilers, interpreters and practical programming using both high and low level language.

This unit is delivered within a hands-on, practical environment focusing on a variety of programming languages (LOGO, Scratch, Python at Primary Level. Python and Greenfoot at Secondary) to ensure teachers have a strong and confident understanding of programming. Whenever possible, examples relating directly to the current Computer Science curriculum will be used and cross-curricular links will be identified as appropriate.

Learning Outcomes

The learner will:

Assessment Criteria

The learner can:

1. Understand the nature and purpose of programming languages

- 1.1. Explain the differences between high level and low level languages and machine code
- 1.2. Describe the nature and purpose of assemblers, compilers and interpreters
- 1.3. Contrast the uses of assemblers, compilers and interpreters

2. Be able to use a high level programming language

- 2.1. Use a range of basic statements
- 2.2. Use variables when performing calculations and testing conditions
- 2.3. Create loop structures
- 2.4. Use iteration

3. Be able to code a solution to a complex problem

- 3.1. Identify the key components of a problem and order them
- 3.2. Use flow charts and/or pseudo code to structure a solution to a given problem
- 3.3. Produce a decision making solution that incorporates the use of variables, iterations and selection

Teaching Programming

4 Credits R/615/1714 (30 GLH)

This unit builds on the knowledge of programming language and looks at the pedagogy of teaching programming. We investigate potential misconceptions and work through a number of strategies to develop understanding. The concepts covered in this unit are key to the effective teaching of computing.

Within this unit, we explore many different approaches to teaching programming, each with its own merits and pitfalls. A great deal of time is given to reviewing different techniques providing an insight into when they are best suited to be used.

Learning Outcomes

The learner will:

1. Understand problems which may be encountered by learners when programming

2. Be able to design learning activities for teaching programming

3. Be able to create a scheme of work for the delivery of programming

Assessment Criteria

The learner can:

1.1. Diagnose potential areas of misunderstanding or confusion by learners

1.2. Evaluate possible strategies to address learners' identified problems

1.3. Research and evaluate a range of resources to support learners' specific needs

2.1. Develop an appropriate programming problem for learners

2.2. Formulate appropriate success criteria for the programming problem

2.3. Research and evaluate a range of pedagogies for teaching programming with and without a computer

3.1. Plan an appropriate scheme of work to support and engage learners as they develop their own programming solutions

3.2. Design appropriate forms of assessment for the scheme of work

3.3. Justify the approach used within the scheme of work and forms of assessment

Teaching Number Systems and Machine Code

4 Credits K/615/1704 (30 GLH)

This unit encourages computational thinking by manipulating data, understanding how systems are designed, and gaining insight into the use of machine code. It further aids teachers in creating a Scheme of Work and learning materials to support the delivery of Computer Science in schools.

Traditionally, teaching number systems (binary, hexadecimal, etc) is seen as a mundane and repetitive task. Within this unit we focus on novel and engaging approaches, which promote a deeper and enriched understanding of number systems. We explore techniques to introduce numbers systems using machine code to further develop cognitive understanding.

Learning Outcomes

The learner will:

Assessment Criteria

The learner can:

<p>1. Know how computer systems represent and manipulate data</p>	<p>1.1. Convert numbers between the binary, denary and hexadecimal number systems</p> <p>1.2. Explain common data types</p> <p>1.3. Explain common file types</p>
<p>2. Be able to use machine code within a machine code simulator</p>	<p>2.1. Explain the nature and purpose of machine code</p> <p>2.2. Design an algorithm to solve a given problem</p> <p>2.3. Use machine code to program the solution to the given problem</p>
<p>3. Be able to create a scheme of work for the delivery of number systems and machine code</p>	<p>3.1. Produce an appropriate scheme of work to support and engage learners</p> <p>3.2. Design appropriate forms of assesment for the scheme of work</p> <p>3.3. Justify the approach used within the scheme of work and forms of assessment</p>

Teaching Programming in Robotics

4 Credits L/615/1727 (30 GLH)

This unit develops practical knowledge of programming robots and how it can be used to teach programming principles.

Learning Outcomes

The learner will:

Assessment Criteria

The learner can:

<p>1. Understand the rationale for using Robotics to teach aspects of computing</p>	<p>1.1. Explain the affordances Robotics offers when teaching computing</p> <p>1.2. Describe progression routes both within and from Robotics for further learning</p> <p>1.3. Describe the fundamental principles of computing that Robotics can be used to teach</p> <p>1.4. Produce success criteria to determine whether a Robotics solution meets the learning objectives</p>
<p>2. Be able to design and create a robotic solution for a specific audience and purpose</p>	<p>2.1. Select appropriate aspects of the robotic build</p> <p>2.2. Justify the selection of the robotic components</p> <p>2.3. Illustrate how collision detection to control robots requires the use of specific sensors</p>
<p>3. Be able to control a robot</p>	<p>3.1. Create mouse/keyboard/'onboard' control for a robot</p> <p>3.2. Manipulate robots using a range of commands/features to control the movement</p> <p>3.3. Manipulate robots to communicate</p> <p>3.4. Manipulate properties of robots</p>
<p>4. Be able to program Robots using algorithms</p>	<p>4.1. Control robots using algorithms</p> <p>4.2. Program robots that use variables</p> <p>4.3. Program robots that use logic operations</p>
<p>5. Be able to create a scheme of work for the delivery of programming a Robot</p>	<p>5.1. Plan appropriate scheme of work to support and engage learners</p> <p>5.2. Design appropriate forms of assessment for the schemes of work</p> <p>5.3. Justify the approach used within the scheme of work and form of assessment</p> <p>3.4. Manipulate properties of robots</p>

Qualification Details

Course Timetable

We make it our priority to deliver the sessions in the most central locations possible for all teachers who are accepted onto the training programme. Below is a table with a summary of the sessions.

Primary Timetable

Term	Full Day Session
Autumn	6
Spring	6
Summer	6

Secondary Timetable

Term	Full Day Session
Autumn	8
Spring	6
Summer	4*

*To account for May/June Exam period and National Tests

Cost

Technocamps provides this qualification absolutely FREE to teachers!

Schools are required to commit to this for one academic year and release teachers for all the unit sessions which consists of 18 days throughout the academic year. We must obtain Headteachers' agreement and a short statement of support as a requirement to be accepted onto this programme.

Once the applicant has been accepted onto the qualification, the school will be required to sign a contract assuring that the teacher will attend all the required activities and events. Whilst the qualification is free, schools may be held liable for reimbursing Technocamps for any unauthorised absences from the course (at £75 per session calculated at the market cost of delivery per participant).

Furthermore, teachers will also be required to spend additional time outside school hours, completing each assessment for all four units.

How to Apply

Application is on a first come, first served basis and candidates will need to apply for a place. You can find the registration form here:

tc1.me/VTCT

On the application form, we must obtain your Headteacher's agreement including a short statement of support to accept you on to this qualification. Once your place is confirmed, you will be provided with details of the course induction.

VTCT Certificate in Computing for Teachers (QCF) Level 3

Developing schemes of work
and learning resources



info@technocamps.com

www.technocamps.com

@technocamps



technocamps

institute of
CODING
in wales



Prifysgol
Metropolitan
Caerdydd



University of
South Wales
Prifysgol
De Cymru