The specification for:

Level 2 Certificate in Software Development Fundamentals

The assessment model for the qualifications presented in this publication was designed by TLM in consultation with employers and academic institutions in order to offer the most up to date set of skills and experiences available at the time of delivery. The core units are based software development systems and services, which has a recognised skills shortage. Learners study some optional units in areas of interest or ones that compliment other academic subjects they are studying. The overall assessment is based on coursework completion and an external examination.

Contents

1. For those in a hurry!

Please read the rest of the book later as the details are important!

1.1	TLM's assessment model is common to most of its qualifications. It is based on competence-based assessment of coursework using a portfolio of evidence and supported by a free optional cloud-based evidence management system.
1.2	Learners must demonstrate competence against the assessment criteria from their day-to-day work and the tutor/assessor must verify that they are competent in relation to the general level descriptor using indicative assessment criteria. TLM's external moderator will check the judgements and the quality of the evidence and provide feedback. This process is not graded, the intention is that it is a flexible way of checking basic practical competence in the subject at the qualification's framework level.

Procedures

1.3	The first thing to do is to arrange assessor training with TLM. TLM trains at least one assessor as Principal Assessor who must accept responsibility for standards within the Centre. The Principal Assessor can train and appoint assessors within the Centre as long as they are competent to take on the work and are willing to sign an agreement on the web site to uphold standards.
1.4	TLM will provide initial training in the pedagogical model and using the supporting technologies to provide the evidence needed. The purpose is to get you started and then we provide on-going support to ensure you are confident and we can work as a professional partnership. We advise new Centres to do some coursework assessment early so that they can receive feedback and quickly become confident in doing routine coursework assessment. Our aim is to make this no more onerous than normal routine assessment that anyone would do as a normal part of the teaching job. This gives more time to focus on teaching and therefore to support raising attainment.

2. Introduction

The Level 2 Certificate in Software Development Fundamentals qualification is designed for a wide range of abilities and for people who require skills and competence in developing software and applications There is a wide range of units available for all skill levels and interests.

2.1 **Level 2 Certificate in Software Development Fundamentals.**
The Level 2 Certificate is a qualification designed for people who require skills and competence in software development. The qualification consists of optional units to make up the 16 credits required:

Mandatory
None

Optional
Centres can choose a range of set optional units for their cohort or can work on a wider set of options so that learners can specialise in something that interests them.

There are currently 4 optional units to choose from.

3. Summary of Qualification Specification

3.1   Level 2 Award (Annexe A)

The Level 2 certificate is a qualification designed for people who require a wide range of skills in IT and specifically in software development. The qualification consists of a number of optional units. The qualification consists of 16 credits so learners can make up the credits with optional units.

Qualification Title: Level 2 Certificate in Software Development Fundamentals
Qualification Number: 610/1125/3
Qualification Level: Level 2
Total Credits: 16
Guided Learning Hours: 120
Total Qualification Time: 150
Assessment Methods: Coursework, E-assessment, Portfolio of Evidence

Assessment

Learners must demonstrate competence against the assessment criteria from their day to day work and the teacher assessor must verify that they are competent in relation to the general level descriptor using indicative assessment criteria. TLM's external moderator will check the judgements and the quality of the evidence and provide feedback. This process is not graded, the intention is that it is a flexible way of checking basic practical competence in the subject at the qualification's framework level.

3.5   Assessment

The internally assessed, externally moderated coursework for all qualifications is pass/fail but by submitting the evidence for external moderation, feedback can be given to the teacher on areas to improve for resubmission.

Evidence must be provided against the unit assessment criteria from practical tasks related to the learners' everyday work supported by IT.

The way evidence is gathered is up to the assessor, the only requirement is that it clearly supports the judgements against the assessment criteria and the relevant learning outcomes.

If on moderation the account manager finds gaps in evidence relating to a particular candidate, they will request more evidence before approving the award or the unit certificate. Assessors must then adjust their work to ensure all their learners are providing the appropriate level and breadth of evidence.

We encourage early submission of at least some evidence so that assessors are confident from the feedback that what they are providing is sufficient. In this way we can maintain standards while supporting improved efficiency.

4. Qualification Content

Mandatory	Optional (for reference)
NONE	**9 CREDITS**
	Unit 1: Improving Productivity Using software development tools (4 credits)
	Unit 2: Developing Websites (4 credits)
	Unit 3: Using collaborative technologies in a software development project (4 credits)
	Unit 2: Using project management methods in software development (4 credits)

5. Transferable Skills

5.1	**Key Subject Aims**

The over-arching aim is to enable learners to support their learning in all subjects using Open System and industry standard IT tools that are freely and legally available from the internet. Subordinate aims include:

- Developing the skills needed for employment in an area with a large skills gap.
- Gaining practical experience and competence with contemporary technologies including programming where appropriate.
- Increasing the capacity to transfer knowledge and skills between contexts.
- Developing practical skills in creativity and problem solving.
- Developing an understanding of the social and commercial impact of software development.
- Developing an understanding of the legal, social, economic, ethical and environmental issues raised by software development.
- Developing safe, secure and responsible practice when using development tools and systems including reducing risk.
- Developing the skills to work collaboratively with software development.
- Developing skills in critical evaluation and feedback.

5.2	**Knowledge and Understanding**

The following knowledge and understanding will be required to support learning for the qualification.

- Demonstrate knowledge and understanding of audiences at which work is targeted.
- Understand the purpose in common applications and/or applications they have used.
- Demonstrate knowledge and understanding of strengths and weaknesses in the way information is presented.
- Understand information flow starting with input of information, to processing and output.
- Understand the costs associated with different applications including direct and indirect costs.
- Have the confidence to deal with the unfamiliar such as the code in a computer program and work out what to do.
- Understand the principles of ordered lists of instructions underpinning algorithms.
- Understand abstraction as picking out common features of objects in order to simplify. e.g. A common structure for a template to input information into different systems.
- Understand the benefits of target setting for software development projects.
- Know specific characteristics of software in order to make choices of tools.
- Demonstrate a practical understanding and respect for acceptable use policies.

5.3	**Skills**

Opportunities are provided to support the following skills, the great majority of which will be assessed directly.

- Select, use and integrate software development tools and techniques to meet needs.
- Find, select and evaluate information for its relevance, value, accuracy and plausibility.
- Manipulate and process data and other information, sequence instructions, model situations and explore ideas.
- Transfer competence in a familiar context to an unfamiliar context.
- Communicate data and information in a form fit for purpose and audience.
- Adopt safe, secure and responsible practice when using software development tools and systems.
- Develop appropriate and effective software development solutions in a range of contexts including computer programming solutions.
- Think creatively, logically and critically evaluate their own and others' use of digital technologies.

6. Support

6.1 There is further guidance for coursework assessment on the TLM web site. All centres have an assigned Account Manager who will be pleased to help at any time. Our aim is to give professional assessors, most of whom are qualified teachers, the confidence to make judgements with a minimum of bureaucracy so that they can focus their time on maintaining their professional knowledge, skills and supporting learning through effective teaching rather than "chasing paper". There is often a confusion between bureaucracy and rigour, since unnecessarily complex bureaucracy can actually detract from rigour by obscuring the importance of the outcomes.

6.2 **Web sites** - TLM provides support through cloud-based systems. Providing assessment grades and the management of certification through the Markbook Site is mandatory and all assessors are provided with training in its use. It is simply a matter of recording learner competence against the unit criteria as the evidence is collected and claiming a certificate on behalf of the learner when a unit has been fully assessed.

6.3 The **community learning site** provides free optional facilities for learners to submit their evidence on-line, linking it to the assessment criteria across single or multiple units. The assessor can accept or reject this evidence and comment on it providing a full audit trail for evidence. Moderator/verifiers can get immediate access to this evidence and so it is potentially a lot more efficient than alternative methods. No paper, no e-mails with file attachments necessary. There are facilities for progress tracking that can be based on criteria and/or units. The system can be linked as an extension to any standards compliant VLE/e-portfolio system for centres that are already committed to a specific VLE product. Training can be provided, and free support is available from your Account Manager. The aim is to eliminate all paper-based bureaucracy, all screen-shots and referencing that draws time away from teaching.

6.4 **Telephone** and e-mail support are available to all Centres. There is a general convention of firstname.secondname@tlm.org.uk for e-mail addresses. It is usually best to e-mail your account manager in the first instance. Google hangouts can be arranged for video conferencing support.

7. Registration & Procedures

Registration

7.1 TLM's subscription model can enables centres to enter learners at times convenient to them. There are no late entry fees and no additional fees should a learner fail to produce evidence at a level but can meet the criteria at a lower level.

There are no fees for replacement certificates or verification of certificates because all certificates can be directly authenticated against TLM's secure database. For details of current subscription costs please contact us or refer to the web site.

Internal standardisation

7.2 The Principal Assessor has the ultimate responsibility for consistency in assessment standards within a centre. All assessors have signed a contract agreeing to uphold standards and should therefore co-operate with the Principal Assessor and Account Manager at TLM to ensure that standards across the centre are consistent.

It is advisable to send work samples to TLM early to check that evidence is at the right standard so that there is time to make any adjustments necessary to the course and learner expectations.
TLM will generally check a higher quantity of work from new assessors and feedback to ensure that they are confident to make appropriate judgements over time. This reduces risk and improves efficiency in the longer term.

Authentication

7.3 All assessors must take reasonable steps to ensure that any coursework evidence submitted by candidates is a true reflection of the candidates' competence. This is in keeping with the assessor undertaking to uphold and maintain standards in the contract with TLM.

7.4 Certificates can be authenticated directly on-line using the certificate number or by scanning the QR code on the certificate. There is no charge and it makes it more likely that certificates will be checked and that in turn improves security. Certificate forgeries are a significant problem when authentication is not simple and straightforward because convincing forgeries are easy to achieve with recent technologies and will get easier as time goes on.

8. Other Considerations

Access arrangements and special requirements	
8.1	All TLM's qualifications are intended to be accessible, as widely as possible. There is an extensive policy documented on the web site at https://tlm.org.uk/policy-download-centre/ Centres should contact TLM if they have any questions related to accessibility issues.
Language	
8.2	The language for provision of this qualification is English only. This will only change if we have a significant demand in another language that is sufficient to cover the additional costs involved.
Malpractice	
8.3	TLM has comprehensive policies and procedures for dealing with malpractice. These are documented with links on the web site at https://tlm.org.uk/policy-download-centre/ Assessors should be familiar with these policies and make them clear to candidates. Assessors should inform their account manager if they suspect any instance of malpractice that could have a material effect on the outcome of any assessments, either for themselves or colleagues. This is part of the upholding of standards that is part of the contract with TLM.
Equality of opportunity	
8.4	TLM promotes equality of opportunity through policies and procedures. These are again documented in detail on the web site at https://tlm.org.uk/policy-download-centre/
Resources, Support and Training	
8.5	A clear goal is to enable learners to support all their IT user needs using resources freely and legally available from the internet. This is related directly to national policies for inclusion and equality of opportunity. The reality is that there is so much user dependence on proprietary applications that we can only support the transition to free and open resources through education and common sense.
8.6	TLM does not require centres to use Free and Open-Source applications but it certainly encourages them to do so. Most of the key software applications needed to support any of the assessed units are available freely from the web including office suites, graphics and sound editing. As a nation we could save hundreds of millions if not billions of pounds in software licensing fees by providing users with the skills, knowledge and confidence to migrate to free and open-source applications. You Tube, OpenClipart.org, Wikipedia and many other sites provide free content that supports learning and the number and range of such sites is increasing.

Annexe A

Level 2 Certificate - Unit assessment - coursework guidance

The **Level 2 learner** has knowledge and understanding of facts, procedures and ideas in an area of study or field of work to complete well-defined tasks and address straightforward problems. Holder can interpret relevant information and ideas. Holder is aware of a range of information that is relevant to the area of study or work.

AND/OR

Holder can select and use relevant cognitive and practical skills to complete well-defined, generally routine tasks and address straightforward problems. Holder can identify how effective actions have been. Holder can identify, gather and use relevant information to inform actions.

Moderation/verification: The assessor should keep a record of assessment judgements made for each candidate and make notes of any significant issues for any candidate. They must be prepared to enter into dialogue with their Account Manager and provide their assessment records to the Account Manager through the on-line mark book. They should be prepared to provide evidence as a basis for their judgements should it be required by the Principal Assessor or their Account Manager/external moderator. Before authorising certification, the Account Manager must be satisfied that the assessor's judgements are sound.

General Information

The Level 2 qualification has the following characteristics for learners:

- Achievement at RQF level 2 (EQF Level 3) reflects the ability to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward problems. It includes taking responsibility for completing tasks and procedures and exercising autonomy and judgement subject to overall direction or guidance.
- Use understanding of facts, procedures and ideas to complete well-defined tasks and address straightforward problems. Interpret relevant information and ideas. Be aware of the types of information that are relevant to the area of study or work.
- Complete well-defined, generally routine tasks and address straightforward problems. Select and use relevant skills and procedures. Identify, gather and use relevant information to inform actions. Identify how effective actions have been.
- Take responsibility for completing tasks and procedures subject to direction or guidance as needed.

- The specification for the Level 2 certificate provides an outcome framework for assessment and is not intended to dictate any particular context for learning and so can be used with adults and be applied to a wide range of software development skills.

Requirements

- Standards must be confirmed by a trained Level 3 Assessor
- Assessors must as a minimum record assessment judgement as entries in the on-line mark book on the TLM certification site.
- It is expected that there will be routine evidence of work used for judging assessment outcomes in the candidates' records of their day-to-day work. Samples, including related plans and schemes of work should be available at the annual visit and/or by video conference.
- Different approaches to learning will be required in order to match differing needs, for example, the needs of children will be different from the needs of adults with learning disabilities.
- When the candidate demonstrates secure capability against each of the criteria in the unit, they are entitled to a certificate for passing the unit and the overall award.
- We expect at least 120 hours of guided study to be under-taken for the certificate for complete beginners generally new to formal education, but discretion can be used to take account of prior learning where this is sensible in individual cases. In terms of making the certificate, what matters is outcomes. Can the candidate securely meet the criteria?

Unit 1 (4 credits) – Optional
Improving Productivity using software development tools (Programming languages typically - Python, JavaScript, Java, HTML, CSS, SQL, Swift, Kotlin, C++, SQL, and PHP)
CRITERIA
1. Plan, select and use appropriate systems and software to be able to write code
1.1 I can describe the purpose for using programs to write code.
1.2 I can describe the methods skills and resources required to complete coding tasks successfully.
1.3 I can plan how to carry out tasks using software development tools to achieve the required purpose and outcome.
1.4 I can describe factors that might affect the task.
1.5 I can select and use systems and software applications to complete planned tasks and produce effective results.
1.6 I can describe how the purpose and outcomes have been met by the chosen systems and software applications.
1.7 I can describe any legal or local guidelines or constraints that apply to the task or activity.
2. Review and adapt the ongoing use of software development tools and systems to make sure that activities are successful
2.1 I can review the on-going use of software development tools and techniques and change the approach as needed.
2.2 I can describe whether the software development tools selected were appropriate for the task and purpose.
2.3 I can assess the strengths and weaknesses in my final work.
2.4 I can describe ways to make further improvements to my work.
2.5 I can review outcomes to make sure they match requirements and are fit for purpose.
3. Develop and test solutions to improve the ongoing use of software development tools and systems
3.1 I can review the benefits and drawbacks of tools and systems used in terms of productivity and efficiency.
3.2 I can describe ways to improve productivity and efficiency.
3.3 I can develop solutions to improve my own productivity in using software development.
3.4 I can test solutions to check that they work as intended.

Unit 2 (4 credits) - Optional
Website Development
CRITERIA
1. Create structures and styles for web sites (Types of website structures: - Hierarchical model. The hierarchical model is used in web applications that contain a large amount of data. - Sequential model. The sequential model can be used to develop flows for a process. - Matrix model. - Database model.)
1.1   I can describe what web site content and layout will be needed for each page.
1.2   I can plan and create web page templates to layout.
1.3   I can select and use web site features and structures to help the user navigate round web pages with the site.
1.4   I can create select and use styles to keep the appearance of web pages consistent and make them easy to understand.
1.5   I can describe how copyright and other constraints may affect the web site.
1.6   I can describe access issues that might need to be considered.
1.7   I can describe what filetypes to use for saving content.
1.8   I can store and retrieve files effectively, in line with local guidelines and conventions where available.
2. Use web site software tools to prepare content for websites (HTML (the Hypertext Markup Language) and CSS (Cascading Style Sheets) are two of the core technologies for building Web pages. HTML provides the structure of the page, CSS the (visual and aural) layout, for a variety of devices. Along with graphics and scripting, HTML and CSS are the basis of building Web pages and Web Applications.)
2.1   I can prepare content for my web pages so that it is ready for editing and formatting.
2.2   I can organise and combine information needed for web pages including across different platforms.
2.3   I can select and use appropriate editing and formatting techniques to aid both clarity and navigation.
2.4   I can select and use appropriate development techniques to link information across pages.
2.5   I can change the file formats of documents appropriately for content.
2.6   I can check that my web pages meet needs using software development tools and making corrections as necessary.
3. Publish web sites
3.1   I select and use appropriate testing methods to check that all the elements in my web site work as planned.
3.2   I can identify any quality problems with web sites and how to respond to them.

3.3	I can select and use an appropriate programme to upload and publish the web site.
3.4	I can respond appropriately to problems with multiple page web sites.

Unit 3 (4 credits) - Optional
Using Collaborative Technologies in a software development project
CRITERIA
1. Stay Safe and secure when using collaborative technology (Collaborative Technology typically: ClickUp, Wrike, Airtable, Front, PleaseReview, Slack, Studio Organiser, Jira, Confluence, Hiver)
1.1   I can take appropriate steps to avoid risks when working with collaborative technology, in line with relevant guidelines.
1.2   I can explain what risks there may be in using collaborative technology and how to keep them to a minimum.
2. Set up and access software development/project management tools and devices for collaborative work
2.1   I can describe the purposes for using collaborative technologies.
2.2   I can describe what outcomes are needed from collaborative working and whether or not archiving is required.
2.3   I can describe the roles, software development tools and facilities needed for collaborative tasks and communication media.
2.4   I can describe the features, benefits and limitations of different collaborative technology tools and devices.
2.5   I can describe the compatibility issues in different combinations of collaborative tools and devices.
2.6   I can select an appropriate combination of software development tools and devices to carry out collaborative tasks.
2.7   I can connect and configure the combination of software development tools and devices needed for a collaborative task.
3.   Contribute to tasks using collaborative technologies
3.1.   I can describe rules of engagement for using collaborative technologies.
3.2.   I can enable others to contribute responsibly to collaborative tasks.
3.3.   I can present relevant and valuable information.
3.4.   I can moderate the use of collaborative technologies.
3.5.   I can assess when there is a problem with collaborative technologies and when to get help.
3.6.   I respond to problems with collaborative technologies.

Unit 4 (4 Credits) - Optional
Software Development and Using Project Management Methods
CRITERIA
1. Understand development tools and environments (Programming languages typically - Python, JavaScript, Java, HTML, CSS, SQL, Swift, Kotlin, C++, SQL, and PHP)
1.1   I can investigate a range of development environments
1.2   I can assess the suitability of development environments for given projects
1.3   I can understand a range of tools and techniques and relate these to projects
1.4   I can appreciate (describe) the need for testing and project based development
1.5   I can follow instructions and act accordingly to requests
2. Apply knowledge and understanding of coding tools and techniques
2.1   I can plan how to write code to create a software development project
2.2   I can apply appropriate software development techniques by writing code
2.3   I can use a range of coding tools and techniques in the recommended way
2.4   I can use and apply industry standard testing regimes and (describe) project management and software development techniques
2.5   I can complete development tasks in a timely manner
3. Evaluate development tools and frameworks
3.1   I can assess the effectiveness of different project management techniques
3.2   I can reflect on the efficiency of project management techniques
3.3   I can work with a team using a range of tools and techniques
3.4   I can explain the effectiveness of tests and reflect on their purpose
3.5   I can demonstrate a working development project and describe the main features