

Unit 21: Project in Construction and the Built Environment

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| Unit code: | M/600/0444 |
| QCF Level 3: | BTEC Nationals |
| Credit value: | 10 |
| Guided learning hours: | 60 |

● Aim and purpose

This unit aims to enable learners to develop the skills needed to specify, plan and implement a project relating to construction and the built environment, and then present the project outcomes to an audience.

● Unit introduction

This unit will enable learners to complete a realistic project relating to construction and the built environment. Learners will have the opportunity to develop skills relating to the processes and procedures that are required to take a project from inception to completion, using appropriate technology. Learners will be encouraged to bring together their knowledge, learning and understanding from other areas of study in order to develop solutions for a project that has been negotiated and agreed with the tutor.

Projects may take into consideration recent ideas, developments and reports affecting the construction industry. Learners who are employed may carry out a project that is directly related to their workplace, in which case the project outcomes may be designed to be of direct use to the employer.

A presentation of the project to a selected audience will be prepared and delivered by learners.

The scale of the agreed project should be achievable and yet challenging, and in keeping with learner ability level. After completing this unit, learners should feel confident in carrying out project work within the construction industry.

● Learning outcomes

On completion of this unit a learner should:

- 1 Be able to create a specification for a construction project
- 2 Be able to plan a construction project
- 3 Be able to implement a construction project
- 4 Be able to present the outcome of the construction project.

Unit content

1 Be able to create a specification for a construction project

Techniques for identifying best solution: comparison methods eg statistical, graphical, quality and resource requirements/limitations, process capability, fitness for purpose; analysis eg cost benefit, feasibility

Specification: type of project; objectives; technical information eg functionality, reliability, operational conditions, process capability, scale of operation, size, capacity, cost, style, ergonomics, present and future trends; health and safety issues; environmental and sustainability issues; quality standards and legislation; timescales; resource implications (physical, human)

2 Be able to plan a construction project

Plan: long-term planning techniques eg flow charts, Gantt charts, critical path methods, software packages, use of RIBA Architect's Plan of Works; setting priorities; resources eg labour, plant, materials, technology; funding, budgeting

3 Be able to implement a construction project

Implement: effective and efficient use of resources and relevant techniques (eg equipment, tools, materials) within agreed timescale; adapting project plan where appropriate; maintaining appropriate records

Maintenance of project file: key project information eg project title, address, location, nature of project, work involved, names of key personnel, client, specialists, design and construction teams; project programme; schedule dates for completion of project phases; project meetings; communications; design work; calculations; financial costing; evolution of organised file format; updates eg design, cost information, decisions

Monitor progress: regular assessment of targets, milestones, budget and performance of individuals; modifying/updating charts/planners

4 Be able to present the outcome of the construction project

Preparation: consideration of audience; venue; environment; documentation; resources eg overhead transparencies, software packages and projectors, charts, models, video/DVD clips; planning; practice

Skills: clarity; concision; voice

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | | |
|---|---|---|
| To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
| P1 identify a construction project and possible solutions [IE1, IE6] | M1 construct the project development process | D1 evaluate the whole project development process, making recommendations for improvements. |
| P2 use appropriate techniques to identify the best solution for the construction project [IE1, IE6, CT1] | | |
| P3 produce a specification for the construction project [IE2, IE4, TW1, EP4] | | |
| P4 produce a plan for the construction project [IE1, IE6, RL2] | | |
| P5 carry out the construction project [IE1, IE4, IE6, CT2, CT3, CT4, RL1, RL2, SM2, SM3] | | |
| P6 maintain a project file [IE1, IE4, IE6, CT2, CT3, CT4, RL1, RL2, SM2, SM3] | M2 maintain detailed records throughout the project that clearly show progress made, difficulties experienced and solutions to any problems encountered. | |
| P7 monitor progress and suggest solutions of problems that arise [IE1, IE4, IE6, CT2, CT3, CT4, RL1, RL2, SM2, SM3] | | |

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| P8 prepare a presentation for the construction project [IE1, IE4, IE6, CT2, CT3, CT4, RL1, RL2, SM2, SM3] | | |
| P9 carry out a presentation of the construction project using the appropriate skills. [IE1, IE4, IE6, CT2, CT3, SM2, SM3] | | |

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

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| Key | IE – independent enquirers CT – creative thinkers | RL – reflective learners TW – team workers | SM – self-managers EP – effective participators |
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Essential guidance for tutors

Delivery

This unit provides flexibility for learners, tutors, and where relevant, employers. A project can be selected that not only suits the learner, and the role that they play in the construction and built environment sector, but which will also benefit their employer (where appropriate) by designing project outcomes that may be of use to the company. The time available for this unit ensures that there is the opportunity to implement a substantial project.

The delivery strategy should, therefore, include clear and continual tutor reinforcement of all learning outcomes together with adequate levels of support. The learning outcomes must inform a progressive and structured approach for the project and lead to achievement of the project outcomes. Project outcomes should be closely monitored by both the tutor and the learner to facilitate project development and structured assessment.

The initial focus of unit delivery will be the agreement of appropriate project outcomes by the tutor, learner and, where relevant, the employer. The size, scale and form of the project must be suitable for the number of learning hours allowed for the unit. It is essential that as much detail as possible concerning the actual project outcomes is discussed at this stage and collectively agreed in writing by all parties. The selected project should also allow knowledge, understanding and skills from other relevant units to be incorporated.

The tutor should make sure that learners understand the constraints of the learning outcomes and guide them on the type of work that they need to produce for their project in order to achieve all the pass level criteria. This advice and guidance can be incorporated into regular timetabled sessions during the initial stage of the project.

The tutor, learner and, where relevant, their workplace supervisor should meet, discuss and monitor project progress at regular monthly tutorials. The tutor should encourage learners to create a schedule of agreed meetings and to set agendas to support project planning and self-learning. The tutor should arrange for some tutorials to be carried out in the workplace (if appropriate) so that learners can demonstrate the relevance of their project to the organisation. Learners can also explain how the processes and procedures used to progress their work meet the required learning outcomes.

Once the project has been agreed there will be no formal requirement for further technical input from the tutor. The unit requires learners to take a considerable amount of responsibility for their own work. It is important that learners are aware of the need to organise and plan their work from the beginning. However, the tutor should be prepared to provide general advice and guidance on the project, as and when requested, and should confirm that learners are being adequately supported to meet the demands of the project. Appropriate resources should also be made available to learners at the study centre.

There is an assumption that learners will have the appropriate levels of mathematical, literacy and ICT skills to undertake this unit, and that each can be applied to completion of the particular project.

Group activities are permissible, but tutors will need to ensure that individual learners have equal experiential and assessment opportunities.

Health, safety and welfare issues are paramount and should be reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken before practical activities are taken. Centres are advised to read the *Delivery approach* section in the specification, and *Annexe H: Provision and Use of Work Equipment Regulations 1998 (PUWER)*.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

| Topic and suggested assignments/activities and/assessment |
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| Introduction to the unit – class discussion |
| Identify a construction project and producing a specification Consider possible projects – class discussion on previous successful project reports Identifying best solution – tutor explanation and exercises Specification – tutor explanation and class discussion Identification of project – individual work in consultation with tutor |
| Plan a construction project The process of project planning – tutor explanation/class discussion/software demonstrations Exploring planning techniques – learner exercises eg Gantt charts, use of software |
| Assignment 1: Specifying and planning a Construction Project |
| Implement a construction project Maintaining a project file – tutor explanation/class discussion Researching project, interviewing relevant people, researching data, compiling surveys, analysing data |
| Assignment 2: Implementing a Construction Project |
| Present the construction project Preparation for presentation – individual work Compilation of presentation using a variety of tools and media |
| Assignment 3: Presentation of a Construction Project |
| Review of unit and assignment feedback |

Assessment

Some criteria can be assessed directly by the tutor during practical activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on their use is provided on the Edexcel website.

It is important that the tutor fully understands the unit content, and refers to it throughout the assessment process, as the type of evidence that is to be presented is stated clearly under each learning outcome. The tutor should formulate an appropriate assessment tool for cross-mapping the evidence to the unit content. This is to ensure that the evidence learners present meets the relevant learning outcomes. The assessment process should be well managed, standardised and agreed across the different programmes to which the unit may contribute. This is to ensure that every learner is given the same opportunity when their evidence is being assessed.

The tutor should ensure that the evidence that learners presents is their own work, although some guidance will almost certainly have been provided by the tutor and, if appropriate, the employer. Representatives of the

employer or organisation could be encouraged to attend learner tutorial sessions. This will help substantiate the evidence presented by the learner and provide guidance if the project forms part of a larger company undertaking.

Assessment should be coordinated with regular progress reviews and tutorials that support the learner's project development. Learners should also be encouraged to continually self-assess their progress in order to produce clear, structured evidence at project reviews and be able to indicate what evidence they are presenting for assessment against the relevant grading criteria.

Learners should be assessed on their ability to carry out and present the project in line with the standards expected within the construction and built environment sector. This should include using numeracy, literacy and ICT skills in terms of relevant modern technology such as software packages for project planning, designing, performing calculations, AutoCad and wordprocessing.

The grading criteria for pass, merit and distinction determine what learners must do in order to meet each one. However, the criteria encourage flexible assessment and allow the tutor to use their judgement. It is expected that the merit level will build on work already performed at pass level and distinction level to build further on achievements at merit level.

To achieve a pass grade learners must meet the nine pass criteria listed in the grading grid.

For P1, learners must identify a construction project and possible solutions. The project chosen will draw on what they have learned while studying other parts of the programme. Whatever project is undertaken it is important that it is feasible within the allocated time, and that enough time is available for the project to be completed and assessed.

For P2, learners must identify the best solution for the construction project. The chosen solution must be realistic and be achievable in the time available.

For P3, learners must produce a specification for the construction project. Learners could prepare and submit a written project specification, for scrutiny, to show that they have produced a specification to an acceptable standard. Particular emphasis should be placed on ensuring that learners consider budgetary constraints and resource/time limitations.

For P4, learners must produce a plan for the construction project to demonstrate their organisational, planning and presentation skills. This is the document that will drive all the others and it should be clear and comprehensive.

For P5, learners must carry out the project. Regular progress reviews are essential and a record must be kept of what was said or agreed.

For P6, learners must maintain a project file. Learners should update the project file continually with details of meetings, problems that arise and how they were solved, decision made and so on.

For P7, learners must monitor their progress. Problems that arise during the execution of the project should be discussed and solutions suggested by the learner. This too should be recorded.

For P8, learners must prepare a project presentation. Evidence should be obtained from a combination of hard copies of the presentation, including handouts, slides and witness statements.

For P9, learners must present their project to an audience. This could be tutors, employers or awarding body representatives. Evidence should take the form of witness testimonies and observation records completed by those present.

To achieve a merit grade learners must meet all the pass grade criteria and both merit grade criteria.

For M1, learners must construct the project development process. Each stage of the process must be included.

For M2, learners must maintain detailed records throughout the project that clearly show progress made, difficulties experienced and solutions to problems encountered. Records should be professional and maintained to a high standard. Learner should use records to present ongoing reports to the tutor/employer detailing the planning and progress of the project. There should be clear evidence of self-assessment being carried out in order to inform regular, planned project reviews. Solutions to problems encountered should be presented in detail and implemented.

To achieve a distinction grade learners must meet all the pass and merit grade criteria and the distinction grade criterion.

For D1, learners must evaluate the whole project development process, making recommendations for improvements. This should refer to how and why the project was structured, planned and actioned and whether this worked as intended. It should highlight where improvements have been made or could be made to existing processes and procedures.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading criteria. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

| Criteria covered | Assignment title | Scenario | Assessment method |
|--------------------|--|--|--|
| P1, P2, P3, P4, M1 | Specifying and Planning a Construction Project | An employer engages you to do a specific construction project and requires to see the project plan before you commence work. | Written specification with diagrams, flow charts or pictures as appropriate. Written plans with charts and diagrams as appropriate. |
| P5, P6, P7, M2, D1 | Implementing a Construction Project | Implement the project and maintain the supporting paperwork during the progression of the project. | Written records in a project file with notes, charts, presentations and diagrams as appropriate. |
| P8, P9 | Presentation of a Construction Project | Present the project to the employer who has engaged you. | Presentation, using tools and media as appropriate. |

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and the Built Environment sector suite. This unit has particular links with the following unit titles in the Construction and the Built Environment suite:

| Level 1 | Level 2 | Level 3 |
|---------|--|--|
| | Construction Processes and Operations for Low-rise Buildings | Health, Safety and Welfare in Construction and the Built Environment |
| | Construction Methods and Techniques for Low-rise Buildings | Construction and the Environment |
| | | Science and Materials in Construction and the Built Environment |

| Level 1 | Level 2 | Level 3 |
|---------|---------|---|
| | | Construction Technology and Design in Construction and Civil Engineering |
| | | Graphical Detailing in Construction and the Built Environment |
| | | Measuring, Estimating and Tendering Processes in Construction and the Built Environment |
| | | Building Regulations and Control for Construction |

This unit links to the Edexcel Level 3 Level 3 NVQ in Technical Design (Construction Environment), the Edexcel Level 4 NVQ in Site Inspection and the Edexcel Level 4 NVQ in Construction, Plant and Equipment Management.

It also links to the following National Occupational Standards at Level 3:

- BE Design
- Construction Contracting Operations
- Surveying, Property and Maintenance
- Transportation.

Essential resources

Learners should have access to a wide variety of physical resources, depending on their project. Many of these resources are detailed within the units that act as pre-requisites and co-requisites, for this unit. There is also a need to provide some form of access to audio-visuals aids as well as free access to libraries and computer-aided learning centres. Learners may also require access to specialist catalogues and other documentation when implementing their project, and access to these facilities should be timetabled as required.

Employer engagement and vocational contexts

Employer led vocational projects need to be encouraged as they bring a sense of realism and purpose to the whole project process and tend to motivate learners to produce and evaluate worthwhile project solutions. Awareness evenings, or similar, could be arranged to encourage employer participation in setting suitable project subjects for learners. Additionally, the topic of allocating employer driven projects to learners (employed or otherwise) could be raised at the faculties industrial focus committee meetings, or at another appropriate centre forum with employers.

Support to enable centres to initiate and establish links to industry, and to networks arranging visits to industry and from property practitioners is below:

- Learning and Skills Network – www.vocationallearning.org.uk
- National Education and Business Partnership Network – www.nebpn.org
- The Royal Institution of Chartered Surveyors – www.rics.org
- Work Experience/Workplace learning frameworks – Centre for Education and Industry (CEI University of Warwick) – www.warwick.ac.uk/wie/cei/

Indicative reading for learners

Textbooks

Lock D – *Project Management* (Gower Publishing, 2003) ISBN 0566085518

Melton T – *Real Project Planning: Developing a Project Development Strategy* (Butterworth Heinemann, 2007) ISBN 9780750684729

Project Management Institute – *A Guide to the Project Management Body of Knowledge* (Project Management Institute, 2008) ISBN 9781933890517

Journals

BSE Journal – Datateam Publishing Ltd

Civil Engineer – The Association of Civil Engineers

Construction News – Emap

HVCA News – Heating and Ventilating Contractors' Association

Website

www.cbi.org.uk Confederation of British Industry

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

| Skill | When learners are ... |
|------------------------------|---|
| Independent enquirers | identifying project problems to resolve, planning, analysing information and supporting conclusions |
| Creative thinkers | generating ideas for a project, trying out solutions to problems and following these through |
| Reflective learners | setting goals, reviewing progress, dealing with feedback, evaluating progress to inform future performance, assessing themselves, identifying opportunities for a project, presenting to others and assessing achievements when completed |
| Team workers | collaborating, reaching agreements with others (for example, tutors for timelines and resources), and taking a leadership role |
| Self-managers | seeking out a new challenge, working towards project goals, organising time and resources and dealing with pressures to keep the project on target. |

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

| Skill | When learners are ... |
|--------------------------------|---|
| Effective participators | discussing areas of concern, presenting the resolutions to problems, breaking any practical way forward into manageable steps, delivering their presentation. |

● Functional Skills – Level 2

| Skill | When learners are ... |
|--|--|
| ICT – Use ICT systems | |
| Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used | producing Gantt charts |
| Manage information storage to enable efficient retrieval | maintaining the project file |
| ICT – Find and select information | |
| Select and use a variety of sources of information independently for a complex task | preparing their presentation |
| Access, search for, select and use ICT-based information and evaluate its fitness for purpose | preparing their presentation |
| ICT – Develop, present and communicate information | |
| Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records | preparing their presentation updating their project records |
| Bring together information to suit content and purpose | updating their project records |
| Present information in ways that are fit for purpose and audience | preparing their project presentation |
| Mathematics | |
| Select and apply a range of skills to find solutions | planning project requirements |
| Use appropriate checking procedures and evaluate their effectiveness at each stage | checking project requirements |
| English | |
| Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts | delivering a presentation on their project |
| Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions | preparing and planning their project |
| Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively | producing records, charts and assignments for their project. |