

## Higher National Unit Specification

### General information for centres

**Unit title:** Building Services Engineering Project Management

**Unit code:** DP10 34

**Unit purpose:** This unit is intended to provide a broad knowledge and understanding of management principles and their applications. This unit is designed to provide an understanding of the application of management techniques to building services business and project management.

The unit has been designed to enable candidates studying higher national programmes to demonstrate both knowledge and understanding of project/contract management. Candidates will have the opportunity to apply, analyse and evaluate processes of management and to identify opportunities for improvement.

On completion of the Unit the candidate should be able to:

- ◆ Develop an understanding of the objectives of project/contract management in terms of cost, quality, performance and continuous improvement.
- ◆ Demonstrate an understanding of procedures and processes involved in procuring projects, producing tenders and estimates, and the factors that affect profitability.
- ◆ Demonstrate an understanding of management structures and relationships involved in project delivery.
- ◆ Determine and understand what constitutes a contract, standard contracts, rights and obligations, commercial and financial risks.
- ◆ Demonstrate an understanding of project management systems and procedures for forecasting, planning, allocation and control of human, material and financial resources.

**Credit points and level:** 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7\*)

*\*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

**Recommended prior knowledge and skills:** It would be an advantage for candidates to have a basic understanding and knowledge of building services engineering science and technology.

Such understanding and knowledge may be evidenced by the possession of a National Certificate in Building Services Engineering or a related subject.

The unit includes all the basic principles necessary to allow candidates possessing other qualifications or experience to succeed in this unit.

## General information for centres (cont)

**Core skills:** There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

**Context for delivery:** This unit was developed for the HNC in Building Services Engineering. If this Unit is delivered as part of another group award(s), it is recommended that it should be taught and assessed within the context of the group award(s) to which it contributes.

**Assessment:** It is possible to assess candidates either on an individual Outcome basis, combinations of Outcomes or by a single holistic assessment combining all Outcomes. The assessment paper/s should be composed of an appropriate balance of short answer, restricted response and structured questions. Assessment should be conducted under supervised, controlled conditions. A single assessment covering all outcomes should not exceed 2 hours in duration. It should be noted that candidates must achieve all the minimum evidence specified for each Outcome in order to pass this Unit.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

An exemplar instrument of assessment and marking guidelines has been produced to provide examples of evidence required to demonstrate achievement of the aims of this unit.

## Higher National Unit specification: statement of standards

**Unit title:** Building Services Engineering Project Management

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

(If you think holistic assessment is the best assessment strategy for the Unit and you wish to state *Knowledge and/or Skills* and *Evidence requirements* for the Unit as a whole, please add the following statement here: ‘Please refer to *Knowledge and/or skills for the Unit* and *Evidence requirements for the Unit* after the Outcomes.’)

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

### Outcome 1

Develop an understanding of the objectives of project/contract management in terms of cost, quality, performance and continuous improvement.

#### Knowledge and/or skills

- ◆ Objectives and processes.
- ◆ Project cycles.
- ◆ Resource management processes.
- ◆ Improvement strategies.

#### Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ define the objectives of a project and their significance in meeting the client’s needs
- ◆ explain the standard project phrases/terminology
- ◆ explain the need for forecasting, planning, organising, motivating, controlling, coordinating and communication
- ◆ define quality criteria and explain the need for a continuous quality improvement strategy

Evidence for the knowledge and /or skills for this Outcome will be provided on a sample basis. In any assessment of this Outcome a minimum of **three out of four** knowledge and/or skills items should be sampled. In order to ensure that candidates will not be able to foresee what items they will be questioned on, a different sample of knowledge/skill items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to all three items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

## Higher National Unit specification: statement of standards (cont)

**Unit title:** Building Services Engineering Project Management

### Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this outcome might be combined with that for Outcomes 2,3,4,5 to form a single assessment paper.

### Outcome 2

Demonstrate an understanding of procedures and processes involved in procuring projects, producing tenders and estimates, and the factors that affect profitability.

### Knowledge and/or skills

- ◆ Project procurement and delivery:
- ◆ Estimating and Tendering:
- ◆ Profitability:

### Evidence requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ describe methods of funding/delivering projects
- ◆ analyse the construction of estimates and tenders
- ◆ determine cost factors within a contract
- ◆ identify and explain the 'sensitivity' of profitability to variation in cost factors

Evidence for the knowledge and /or skills for this Outcome will be provided on a sample basis. In any assessment of this Outcome a minimum of **two out of three** knowledge and/or skills items should be sampled. In order to ensure that candidates will not be able to foresee what items they will be questioned on, a different sample of knowledge/skill items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to both items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

### Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this outcome might be combined with that for Outcomes 1,3,4, 5 to form a single assessment paper.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Building Services Engineering Project Management

### **Outcome 3**

Demonstrate an understanding of management structures and relationships involved in project delivery.

#### **Knowledge and/or skills**

- ◆ Structures and relationships
- ◆ Relationships
- ◆ Communication

#### **Evidence requirements**

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ evaluate appropriate project structures and explain the roles of the participants
- ◆ contribute effectively to a team project and understand the roles and needs within a team
- ◆ demonstrate appropriate written, verbal and pictorial communication skills

Evidence for the knowledge and /or skills for this Outcome will be provided on a sample basis. In any assessment of this Outcome a minimum of **two out of three** knowledge and/or skills items should be sampled. In order to ensure that candidates will not be able to foresee what items they will be questioned on, a different sample of knowledge/skill items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to both items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

#### **Assessment guidelines**

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this outcome might be combined with that for Outcomes 1,2,4,5 to form a single assessment paper.

### **Outcome 4**

Determine and understand what constitutes a contract, standard contracts, rights and obligations, commercial and financial risks.

#### **Knowledge and/or skills**

- ◆ Definition of a Contract
- ◆ Rights & Obligations

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Building Services Engineering Project Management

### **Evidence requirements**

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ evaluate the differences between various ‘standard contracts’
- ◆ describe rights, obligations and legal responsibilities
- ◆ explain the implications of non standard and onerous contract conditions
- ◆ demonstrate an understanding of contract politics and effect on relationships, teamwork and project objectives.

In any assessment of this Outcome **all** knowledge and/or skills items should be included. Candidates must provide a satisfactory response to all items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

### **Assessment guidelines**

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this outcome might be combined with that for Outcomes 1,2, 3,5 to form a single assessment paper.

## **Outcome 5**

Demonstrate an understanding of project management systems and procedures for forecasting, planning, allocation and control of human, material and financial resources.

### **Knowledge and/or skills**

- Forecasting
- Management Structures
- Planning and programming
- Progress and control

### **Evidence requirements**

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ apply appropriate techniques and procedures for forecasting and planning the deployment of human, material and financial resources
- ◆ develop and apply techniques and procedures for control of resource acquisition and deployment and evaluate their effectiveness.
- ◆ develop and apply progress monitoring techniques
- ◆ evaluate actions arising from progress measurement information

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Building Services Engineering Project Management

Evidence for the knowledge and /or skills for this Outcome will be provided on a sample basis. In any assessment of this Outcome a minimum of **three out of four** knowledge and/or skills items should be sampled. In order to ensure that candidates will not be able to foresee what items they will be questioned on, a different sample of knowledge/skill items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to all three items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

### **Assessment guidelines**

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this outcome might be combined with that for Outcomes 1,2,3,4 to form a single assessment paper.

## **Administrative Information**

<b>Unit code:</b>	DP10 34
<b>Unit title:</b>	Building Services Engineering Project Management
<b>Superclass category:</b>	TF
<b>Date of publication:</b>	August 2005
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## **Higher National Unit specification: support notes**

### **Unit title: Building Services Engineering Project Management**

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

### **Guidance on the content and context for this Unit**

This unit requires a broad understanding of technology and practices used in the building services and construction industries. As such it is probably better delivered in the second year of the course.

Recommended time allocations to each outcome are given as guidance towards the depth of treatment which might be applied to each topic.

This guidance has been used in the design of the assessment exemplar material provided with the unit.

#### **1 Objectives of project/contract management (8 hours)**

*Objectives and processes:* Client objectives, project briefs. Project objectives in terms of prestige, profitability, expectations and quality

*Project cycles:* From project conception to post handover phase.

*Resource management processes:* Forecasting, planning, organising, motivating, controlling, coordinating and communicating.

*Improvement strategies:* Quality criteria. Performance and quality improvement objectives.

#### **2 Procuring projects, producing tenders and estimates (8 hours)**

*Project procurement and delivery:* Sequence and processes involved in procuring projects. Funding of projects. Alternative models for project delivery including PFI, Joint Venture & Partnering.

*Estimating and Tendering:* Cost predictions, cost/quality analysis. Techniques, processes and procedures required to produce estimates and tenders. Cost factors within contract bids.

*Profitability:* Cost factors that make up profit within a contract and their relative impact on profitability, cost benefit analysis techniques, cost allocation. Factors which affect profitability including materials procurement, contract terms, contract conditions, human resources, relationships, time and quality.

## **Higher National Unit specification: support notes**

**Unit title:** Building Services Engineering Project Management

### **3 Management structures and relationships (8 hours)**

*Structures and relationships:* Relationships and roles of client, project and contract teams, alternative structures for project teams.

*Relationships:* Team working. Relationships, leadership, decision making, team membership, stages of team formation.

*Communication:* Effective formal and informal communications structures, personal communication skills, management of information, meetings, reporting.

### **4 Standard Contracts, rights and obligations, commercial and financial (8 hours)**

*Definition of a Contract:* What constitutes a contract. Forms of contract. Implications and responsibilities of parties to a contract.

*Rights & Obligations:* Main and sub-contracts, standard contracts, requirements and obligations within standard contract clauses, the vocabulary of contracts, warranties and insurances, attendances. Commercial and financial risks.

### **5 Resource Management techniques and procedures (8 hours)**

*Forecasting:* Sources and management of current and historic information/data, forecasting techniques, analysis potential error/risk.

*Management Structures:* individual and collective roles and responsibilities of services project management and delivery teams.

*Planning and programming:* techniques, diagrams and charts for scheduling and programming material, equipment, financial and human resources.

*Progress and control:* techniques and procedures for controlling, monitoring and reporting progress including completed work, work in progress, costs, claims for variations, delays, disruption, and cash control procedures.

## **Guidance on the delivery and assessment of this Unit**

### ***Opportunities for developing Core Skills***

Since it is important that candidates have a sound understanding of the principles that underpin the planning and coordination of design of a construction project, study of this Unit should commence in the first year in parallel with the technology Units.

It is important that candidates have access to current information from industry regarding the use and development of project management in practice. Case studies should be used extensively together with a current working knowledge of business practices in the construction industry to identify best practices. The teaching of the unit would benefit from the involvement of project manager/practitioners to deal with aspects of the content. Where appropriate, role-play should be encouraged to develop an understanding of the application of management techniques and difficulties that are encountered.

## **Higher National Unit specification: support notes (cont)**

### **Unit title:** Building Services Engineering Project Management

Candidates will usually work individually and will be required to provide oral presentations from their own studies or experiences. During such role plays candidates would normally work together in groups.

It is recommended that evidence for learning outcomes is achieved through well-planned course work, assignments and projects. Assessment may be formative and summative and both may feature as part of the process. Although assessments must be focused on the individual achievement of each candidate, group work and role-play activities may contribute to the assessment. Integrative assignments and project work will help to link this unit with other related units.

The volume of evidence required for each assessment should take into account the overall number of assessments being contemplated within this unit and the design of the overall teaching programme.

In designing the assessment instrument/s, opportunities should be taken to generate appropriate evidence to contribute to the assessment of Core Skills units.

Appropriate evidence from the workplace may be used providing that such evidence can be accurately credited to the individual candidate.

### **Open learning**

Given that appropriate materials exist this unit could be delivered by distance learning, which may incorporate some degree of on-line support. However, with regard to assessment, planning would be required by the centre concerned to ensure the sufficiency and authenticity of candidate evidence. Arrangements would be required to be put in place to ensure that assessment/s were conducted under controlled, supervised conditions.

### **Candidates with additional support needs**

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on the SQA website [www.sqa.org.uk](http://www.sqa.org.uk)

## **General information for candidates**

### **Unit title:** Building Services Engineering Project Management

On completion of this unit you should be able to :

- ◆ Develop an understanding of the objectives of project/contract management in terms of cost, quality, performance and continuous improvement.
- ◆ Demonstrate an understanding of procedures and processes involved in procuring projects, producing tenders and estimates, and the factors that affect profitability.
- ◆ Demonstrate an understanding of management structures and relationships involved in project delivery.
- ◆ Determine and understand what constitutes a contract, standard contracts, rights and obligations, commercial and financial risks.
- ◆ Demonstrate an understanding of project management systems and procedures for forecasting, planning, allocation and control of human, material and financial resources.

Evidence that you can satisfy the knowledge and skill elements of this unit will be obtained by assessment in controlled, supervised conditions to which you will not be allowed to bring textbooks, handouts or notes to the assessment.