

Unit 3: Planning and Management of Computing Projects

Level: **3**

Unit type: **External**

Guided learning hours: **120**

Unit in brief

Learners study how project planning and management concepts are applied to computing projects.

Unit introduction

A project is created for the purpose of delivering one or more business products according to an agreed business case. Good planning and management skills are essential to ensure that an end product can be delivered on time, within budget and to the required specification.

This unit explores the business case needed for the initial approval of a computing solution to meet organisational needs. It will provide you with the skills associated with project planning and management: task scheduling, budgeting, risk management, time management, quality management, and communication with all stakeholders throughout the life cycle of the project. To complete the assessment task within this unit, you will need to draw on your learning from across your programme.

In this unit, you will apply project planning and management techniques to a computing project scenario. This will develop your knowledge and understanding of the role of a computing project management professional, and support your progression to higher education studies.

Summary of assessment

This unit is assessed through a task set and marked by Pearson.

The set task will be completed under supervised conditions in two sessions during the assessment period timetabled by Pearson. Part A will last three hours and Part B will last two hours.

The set task will assess learners' ability to plan and manage a computing project. Information about the project is released to learners at the start of each session.

The number of marks for the unit is 66.

The assessment availability is December/January and May/June each year. The first assessment availability is December 2017/January 2018.

Sample assessment materials will be available to help centres prepare learners for assessment.

Assessment outcomes

A01 Demonstrate knowledge and understanding of the project planning and management concepts, processes and life cycle

A02 Apply knowledge and understanding of computing management tools, techniques and procedures to explore outcomes and find solutions to problems

A03 Analyse data and information; recognise patterns, correlations and connections in order to solve problems and predict outcomes

A04 Evaluate project planning and management tools, techniques, procedures, outcomes and solutions to make reasoned judgements and decisions

A05 Be able to plan a computing project and manage it throughout its life cycle, with appropriate justification

Essential content

The essential content is set out under content areas. Learners must cover all specified content before the assessment.

A Project management concepts

The key factors, processes and stages that make up a typical computing project.

A1 Costs and timescales

How key factors can be used to determine project viability and measure progress and success:

- project budget
- setting milestones and deadlines
- interim reviews.

A2 Quality and deliverables

- Application of current quality standards and subsequent iterations:
 - ISO/IEC 25010:2011 as a benchmark for software development
 - World Wide Web Consortium (W3C®) for website design and functionality standards.
- Defining success criteria and using SMART (specific, measurable, achievable, realistic, timebound) objectives to define project outcomes.
- Customer requirements in terms of functional requirements and non-functional requirements.
- Product description or product breakdown structure, to describe the product to be delivered.

A3 Risk

- Identifying typical project risks:
 - external risks
 - internal risks.
- The risk management cycle:
 - identification of risks
 - assessing the severity of risks:
 - 3-point scale for impact and probability
 - impact multiplied by probability formula
 - planning – accept the risk, plan contingency or avoid the risk
 - monitor and control the risks through the project.
- Handling issues: when a risk occurs and is dealt with using the plan.

A4 Benefits

The key benefits of a project for the organisation and stakeholders and establishing a measurement of success.

- Business benefits:
 - saving money
 - maintaining or increasing profits
 - improving services
 - growing the business
 - increasing market share
 - improving productivity.
- Expected return on investment as:
 - justification for the project
 - a forecast of project success.

A5 The project life cycle

Following the life cycle to start, plan, manage and deliver a project.

- Conception and start up:
 - project mandate
 - client requirements
 - project feasibility.
- Definition of the project:
 - set up project team
 - create the Project Initiation Document (PID).
- Planning:
 - timescales
 - costs
 - quality management
 - risk management and controls.
- Launch and execution:
 - carrying out the plan
 - monitoring activity
 - checking progress.
- Closure:
 - handover of the product
 - user acceptance testing
 - disbanding project team.
- Post-project evaluation:
 - reviewing the project against success criteria.

A6 Professionalism

- The codes of conduct developed by professional bodies and their impact on how a project is planned and managed in an ethical way:
 - Association for Project Management (APM)
 - British Computer Society (BCS)
 - Project Management Institute (PMI).
- Communication and presentation for project planning and management activities:
 - appropriate for target audience
 - conveys intended meaning
 - effective use of graphics to support meaning
 - use of fluent English and appropriate technical language
 - appropriate tone for project documentation.

B Starting up a computing project

Gathering the key information needed to run a successful project, production of the PID and obtaining authorisation for the project kick-off.

B1 Interpreting the business case

The business case as a driver of the project:

- reasons for the project
- options that should be considered
- expected business benefits
- timescale, including major milestones
- budget available
- major risks.

B2 Stakeholders

Identification of anyone with an interest in the project and allocation of their project responsibilities.

- Key stakeholder responsibilities:
 - project manager – responsible for defining, planning, controlling and leadership
 - technical teams – responsible for performing the project tasks
 - team managers – responsible for following company policies and providing resources
 - project sponsor – provides the authority and guidance, and maintains the priority of the project in the organisation
 - client – provides the product requirements and project finance.
- Other stakeholders:
 - suppliers – provide materials and equipment
 - contractors – contribute specialist work
 - general public – may be affected by the project.

B3 Identifying assumptions and constraints

- Dealing with assumptions as low-level risks documented at the outset.
- Constraints:
 - deadlines and the time available
 - funds for the project, including contingency
 - availability of staff when required
 - availability of required equipment
 - technical expertise in the project team
 - limitations of technology.

B4 The Project Initiation Document (PID)

- Production of a PID to contain the key management information:
 - document details
 - approvals
 - distribution
 - purpose of PID
 - project background, including how the project fits into the organisation
 - objectives, written as SMART targets
 - scope, a statement of what is and what is not included in the project
 - the business case
 - assumptions
 - constraints
 - risk management strategy
 - deliverables
 - project quality strategy
 - stakeholders
 - representation of the project management team structure as an organisation chart indicating roles
 - project plan
 - communication plan
 - document management.
- Communication and presentation requirements in the PID.

C Project planning

The process of creating and updating the plans to ensure that the project is completed on time, in budget and to specification.

C1 Scheduling and milestones

- Work breakdown structure.
- Task scheduling and precedence, including serial and parallel scheduling of tasks.
- Critical path analysis to identify spare capacity in time schedule.
- Gantt charts as a planning and progress tracking tool.
- Selection and use of project planning software tools.

C2 Resources and budgeting

- Resource requirements and allocation:
 - people and their work allocation
 - equipment and materials
 - allocation of work and material resources to tasks
 - pro rata costing.
- Application of estimation techniques to forecast project duration and cost:
 - bottom-up
 - parametric, using simplified function point analysis
 - top-down.
- Budget planning and cash flow to organise resource usage.
- Use of appropriate software tools: spreadsheets and project planning software.

C3 Risk management strategy

- Risk analysis process:
 - use of impact and probability to calculate severity
 - use of a risk matrix to classify risks as green, amber or red.
- Contingency planning for major risks.
- Documenting risks using a standard template.
- Recording issues:
 - use of an issues log
 - cross-referencing to the risk matrix.

C4 Quality management

Use and application of quality management project processes, techniques and procedures.

- Defect removal:
 - desk checking and proofreading
 - peer review
 - inspection and walkthrough.
- Testing strategy:
 - unit testing against unit specifications
 - integration testing against designs
 - systems testing against requirements
 - regression testing.
- Use of quality standards as an external benchmark.

C5 Communications

Identification of appropriate communication methods and frequency requirements.

- Methods for project team communication:
 - meetings and one-to-one discussions
 - memos and notices
 - telephone conversations and video conferences
 - emails and instant messaging
 - online forums, discussion groups and news groups
 - collaborative working tools.
- Devising a communication plan:
 - frequency of communication
 - target audience
 - agendas and minutes
 - communication and presentation requirements.

D Executing and monitoring a project

Running a live project, keeping track of progress and dealing with problems or changes to the project.

D1 The waterfall software development life cycle model

Use of the model to inform the stages of a project plan.

- Requirements analysis.
- Design.
- Construction and testing.
- Acceptance testing.
- Implementation and delivery.

D2 Monitoring and tracking progress

- Project baseline and variance.
- Monitoring and recording progress.
- Checkpoint reports as a way of recording milestones achieved.
- Monitoring risk and managing issues.
- Recording quality management activity.

D3 Managing issues

Categorisation of issues, taking action and recording activity as part of the risk management process.

- Categorising issues:
 - request for change
 - off-specification
 - problem or concern.
- Management by exception: reporting unforeseen issues to the project sponsor and the potential impact on the project.
- Recording lessons learned.

D4 Change management

The management of project changes triggered by the occurrence of an issue.

- Impact on the project:
 - entire project
 - stage(s) of project.
- Change of scope for:
 - requirements and effects on quality
 - costs
 - timescales.

- Development changes, handling modifications to designs.
- Dealing with faults:
 - defects in analysis and design documentation
 - software errors.
- The change management process:
 - change request submitted by project manager
 - review of the change request by management team
 - assessing feasibility of the change of scope
 - approval or rejection by management team
 - implementation of change by project team.

D5 Implementation strategy

Product delivery options as agreed with the client.

- Choice dependent on size and complexity of system:
 - direct changeover
 - parallel running
 - pilot changeover
 - user acceptance testing as part of the quality and review process.

E Project closure and post-project review

E1 Closing a live project

Completing a project in an organised and controlled way.

- Moving into operation and maintenance phase.
- Assessing the benefits delivered and plan to review again later.
- Closing down risk log, issue log, quality log.
- Summarising and reviewing the lessons learned.

E2 Review of project success

Determining a project's success in terms of key factors, SMART objectives and views of stakeholders.

- Review of lessons learned.
- Review project performance against the baseline and project objectives.
- Review of final cost, delivery date and quality of product delivered.
- Review feedback from key stakeholders:
 - sponsor
 - clients
 - end users
 - development team.
- Methods to obtain feedback and their advantages and disadvantages:
 - interviews
 - questionnaires
 - surveys
 - observation of resulting processes.
- Recommendations for future actions based on the outcome of the post-project review.
- Communication and presentation requirements for reviews.

Grade descriptors

To achieve a grade a learner is expected to demonstrate these attributes across the essential content of the unit. The principle of best fit will apply in awarding grades.

Level 3 Pass

Learners are able to use their knowledge of project planning, management concepts and processes and the application of problem-solving skills to show the documenting of project planning and management requirements. These are limited in scope and may be incomplete.

Learners are able to use planning and management documentation, and demonstrate an understanding of their completion and development to a minimal level of acceptability in order to support an organisation's project. Their evaluation of a given project planning and management scenario is limited in scope and may be incomplete.

Level 3 Distinction

Learners demonstrate that they can evaluate a given project planning and management problem, and develop a detailed and complex project planning and management documented solution to effectively meet all project scenario requirements. Learners demonstrate an in-depth understanding of project planning and management documentation requirements and are able to show that they fully understand how these are used to produce an effective project solution. They are able to evaluate their solution in order to make justified recommendations on project development and future actions.

Key terms typically used in assessment

The following table shows the key terms that will be used consistently by Pearson in our assessments to ensure students are rewarded for demonstrating the necessary skills.

Please note: the list below will not necessarily be used in every paper/session and is provided for guidance only.

Command or term	Definition
Function point	A way of measuring the amount of work taken to implement part of a software system, for example it might take 10 developer hours to implement a search function.
Gantt chart	A bar chart which provides a graphical illustration of a schedule that helps to plan, coordinate and track all the tasks in a project against a baseline.
Lessons learned	A summary report which brings together any insights gained during a project that can be usefully applied on future projects. This includes factors and actions that supported success, and learning from what did not go well.
Modules	Part of a large software system that carries out a specific business role; for example different departments will use different modules within a full system, i.e. Human Resources will use a payroll module to calculate staff wages. During development each module is likely to be built and tested independently, often by different groups of developers and testers.
Operating system	Software that manages computer hardware and software resources, and also provides common services for computer programs.
Project kick-off	The official launch of the project; the point at which details of the project are promoted. The kick-off will only happen after some initial investigation to establish that the project is viable, such as: Can the client afford it? Can it be done in the timescale? Is it technically possible?
Regression testing	A type of software testing that seeks to uncover new software bugs, or regressions in existing functional and non-functional areas of a system after changes, such as enhancements, patches or configuration changes have been made to them.
Resource list	A list of all the staff, equipment and raw materials required for a project, along with their associated costs. Staff will usually have an hourly rate or annual salary, while equipment and materials will usually be fixed costs.

Command or term	Definition
Server	Hardware and software that provides centrally managed services on a computer network, such as a database or email system.
Stakeholder	Anyone with an interest in the project. Can include those who have an interest in or can affect/are affected by the computing project. They can be internal or external, and at senior or junior levels.

Links to other units

This assessment for this unit should draw on knowledge, understanding and skills developed from:

- Unit 1: Principles of Computer Science
- Unit 2: Fundamentals of Computer Systems
- Unit 4: Software Design and Development Project
- Unit 5: Building Computer Systems
- Unit 6: IT Systems Security
- Unit 7: IT Systems Security and Encryption
- Unit 8: Business Applications of Social Media
- Unit 9: The Impact of Computing.

This unit would relate to teaching of:

- Unit 10: Human-computer Interaction
- Unit 16: Object-orientated Programming.

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers
- technical workshops hosted by staff from local organisations/businesses
- opportunities for observation of organisational/business application during work experience.