Unit BR10: Project Management for Engineering

Unit code: T/503/7221

QCF level: 6

Credit value: 15

Aim

The aim of this unit is to give learners an understanding of the techniques and skills required for effective project management.

Unit abstract

Over the last decade companies and organisations have taken a much more strategic interest in project management as they seek to address pressures to reduce costs and manage projects effectively. Although projects are undertaken in all areas and sectors, it is the failure of engineering projects to deliver on time and on cost that provide unwanted headlines. Knowledge and expertise in effective project management is an important employability skill which enables engineers to combine academic subject expertise with project management to contribute to profitability.

Learning outcome 1 raises learners' awareness of the status of project management and enables understanding of project-management processes. Learning outcome 2 examines the characteristics and attributes of project managers together with human resources issues, including planning and risk assessment for project personnel. Project organisation and costing are covered in learning outcome 3. Here the concept of earned value is extended to encompass value and risk management as a technique for optimising project benefits and costs. Learning outcome 4 allows learners to demonstrate their project-management expertise by applying the knowledge and skills gained from learning outcomes 1 to 3 to a real project in their workplace.

Learning outcomes

On successful completion of this unit a learner will:

1 understand project-management processes

2 understand personnel issues in project management

3 understand project execution

4 be able to undertake project-management activities.

Unit content

1 **Understand project-management processes**

Emerging standards in project management: standards and professional recognition, eg Project Management Body of Knowledge (PMBOK), PRojects IN Controlled Environments (PRINCE2), Association for Project Management (APM)

Project lifecycle: lifecycle models, eg spiral development, Concept Assessment Development Manufacturing In-Service Disposal (CADMID); project phasing, eg milestones, phases, stage gates; front end loading

Project-management processes: project process groups (initiating, planning, executing, monitoring and controlling, closing)

2 **Understand personnel issues in project management**

Project manager: roles; responsibilities; training; decision making; ethics; professional practice; communication skills, eg IT, written, verbal, meetings; liaison skills, eg with project sponsor, with contractors, with consultants; managerial skills, eg people management, time management, change management, information management, negotiation, delegation

Project team: staffing management plan; recruitment (processes, timetable, release); organisational charts (roles; responsibilities); skills matrix; motivation; training; teamwork; performance assessment; health and safety; equal opportunities

Risk management – personnel: risk assessment, eg recruitment gaps, skills gaps, absenteeism, ill health, injury; personnel risk analysis; risk-mitigation; risk management plan

3 **Understand project execution**

Project organisation: project breakdown structure (PBS); work breakdown structure (WBS); scheduling techniques (relationship between schedules WBS and PBS); project integration management; Gantt charts; milestones; deliverables; critical path analysis; execution strategy

Project costing: procurement plan; estimating; budget allocation; cost breakdown structure; cost performance analysis; cost control; cash flow analysis (committed costs, actual costs, contingency); optimisation of benefits and costs; concept of earned value; value management (value drivers, key performance indicators)

Risk management – project execution: project organisation (risk analysis, risk mitigation); project costing (risk analysis, risk mitigation); time-cost-quality triangle; value and risk-management plans

4 **Be able to undertake project-management activities**

Planning and programming: techniques; for scheduling and programming material (diagrams and charts), equipment, financial and human resources

Project progress and control: techniques and procedures (control, monitor and report progress); progress management information, eg completed work, work in progress, costs, claims for variations, delays, disruption, cash flow; post-project appraisal

Learning outcomes and assessment criteria

Learning outcomes On successful completion of this unit a learner will:	Assessment criteria for pass The learner can:
LO1 Understand project-management processes	1.1 Describe the role of professional bodies in setting standards for project management 1.2 Describe in detail the concept of the project lifecycle 1.3 Describe in detail the important features of the five project-management processes 1.4 Compare and contrast project lifecycle and project-management processes
LO2 Understand personnel issues in project management	2.1 Critically evaluate the role of the project manager 2.2 Devise the staffing management plan for a project involving more than ten personnel 2.3 Devise the personnel risk-management plan for a project involving more than ten personnel
LO3 Understand project execution	3.1 Describe in detail how project breakdown structure and work breakdown structure are used for project scheduling 3.2 Compare and contrast cost control techniques used in project management 3.3 Critically evaluate the role of value and risk-management plans in project management
LO4 Be able to undertake project-management activities	4.1 Apply techniques and procedures to monitor and report project progress 4.2 Plan actions arising from project progress measurement information 4.3 Critically evaluate project outcomes

Guidance

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

The learning outcomes associated with this unit are closely linked with:

Level 4	Level 5	Level 6
Unit 37: Management of Projects	*Unit 31: Value Management*	*Unit BR19: Strategic Management*
	Unit 38: Managing People in Engineering	*Unit BR21: Supply Chain Management*
		Unit BR22: Management and Leadership
		Unit BR24: Change Management
		Unit BR26: Contemporary Issues in Business

The content of this unit has been designed and mapped against the Engineering Council's current Learning Outcomes for IEng Accreditation. The completion of the learning outcomes for this unit will contribute knowledge, understanding and skills towards the evidence requirements for IEng Registration.

See *Annexe B* for summary of mapping information for IEng Accreditation.

Essential requirements

There are no special requirements for this unit.

Delivery and Assessment

Learning outcomes 1 to 3 are likely to require learners to read the recommended textbooks and undertake internet searches in order to fully appreciate and understand the importance and status of project management. Learning outcome 4 should, if possible, be based on a project or projects in the learner's workplace. If this is not possible, case study materials will need to be made available.

The project management unit covers project management in its widest sense for middle management and above, personnel involved in large projects, ie more than ten personnel. Although aspects of project management are included in *Unit 1 Major Project* (learning outcome 2), the breadth and depth envisaged in this project management unit is such that it is unlikely that the work undertaken for the major project unit will be suitable for contributing to the learning outcomes and assessment criteria of the project-management unit.

Care must be taken in assessing learner work to ensure that the level of discussion, analysis, evaluation and reflection meets expectations for professional project managers and academic work at final year degree level, ie level 6.

Resources

Books

Nokes S and Kelley S – *The Definitive Guide to Project Management* (Prentice Hall, 2007) ISBN 978-0273710974

Duncan W R – *A Guide to the Project Management Body of Knowledge* (Project Management Institute, 2009) ISBN 978-1933890517

Lock D – *Project Management* (Gower Publishing Ltd, 2007), ISBN 978-0566087721

Dallas M F – *Value and Risk Management: A Guide to Best Practice* (Wiley-Blackwell, 2006) ISBN 978-1405120692

Websites

www.apm.org.uk	The Association for Project Management
www.prince2.com	Information about PRINCE 2 courses and certification for project management