

CIVIL ENGINEERING PROJECT MANAGEMENT

UNIT CODE: CON/CU/CET/CR/13/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Manage civil engineering projects

Duration of Unit: 120 hours

Unit Description

This unit describes the competencies required to manage civil engineering projects. It involves managing project time, managing construction project quality, managing project site safety, health and security, managing construction project cost, managing project labour, managing project contracts and managing construction materials, plant, tools and equipment.

Summary of Learning Outcomes

- 1 Manage project time
- 2 Manage construction project quality
- 3 Manage project site, safety, health and security
- 4 Manage construction project cost
- 5 Manage project labour
- 6 Manage project contracts
- 7 Manage construction materials, plant, tools and equipment

Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
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| 1. Manage project time | <ul style="list-style-type: none">• Project definition• Meaning of statutory bodies• Types of statutory bodies and their legal requirements• Types of project approvals• Project approvals procedures• Functions of statutory approval documents• Statutory approvals | <ul style="list-style-type: none">• Written Test• Interview• Oral Question• Assignments• Supervised Exercises• Practical Tests |

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| | <ul style="list-style-type: none"> • Definition of project work schedule • Benefits of a work schedule in a project • Documents necessary in the preparation of a work schedule • Classification of project activities • Inter-relationship of project activities • Definition of a time project time programme • Project work programming tools • Process of allocating activity timelines • Importance of reviewing previous similar jobs • Primary sources of information • Secondary sources of information • Characteristics of the best practices • Project plans definition • Types of project plans • Definition of Bills of Quantity (BQs) • Roles of plans and BQs in a project • Procedure of developing project plans and BQs • Definition and importance of monitoring • Monitoring tools • Analysis and evaluation methodologies • Identification and implementation of control | |
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| | <p>measures Identification of project time risk</p> <ul style="list-style-type: none"> • analysis of project time risk (categories and ranking) • Mitigation of time risk (transfer, avoidance, delegation) • Monitoring project time risk • Definition of client's team • Definition of time variation • Time variation approval process • Identification and implementation of control measures • Time variation documentation • Time variation report writing • Identification of project stakeholders • Identification of project expectations • Importance of communicating with project stakeholders • Process of communicating with project stakeholders' feedback | |
| 2. Manage construction project quality | <ul style="list-style-type: none"> • Definition of quality • Code of professional conduct and ethics • Importance of quality in a project • Contract documents • Project activities • Site dynamics • Development of quality checklists • Elements of a project quality plan • Characteristics of an effective project quality plan | <ul style="list-style-type: none"> • Written Test • Interview • Oral Question • Assignments • Supervised Exercises • Practical Tests |

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| | <ul style="list-style-type: none"> • Implementation methodologies of a project quality plan • Evaluation of project quality plan • Definition of methodology in a project • Identification of project activities • Identification of relationships among the activities • Types of project methodologies • Factors determining the choice of a methodology • Development of a project works methodology plan • Processes of implementing project methodologies • Evaluation of a project methodology • Definition of project resource schedule • Types of project resources • Identification of project activities • Identification of the activities' resources requirements • Project resource sources • Development of a procurement plan • Implementation and review of a procurement plan • Warehousing and storage of the project resources • Definition and importance of a project quality control plan • Importance and methods of project material testing • Project plant and equipment maintenance | |
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| | <ul style="list-style-type: none"> • Project quality inspection tools and methodology • Work quality inspection • Principles of work quality control • Contract documents analysis • Site information documentation methods • Features of a project quality report • Report writing | |
| 3. Manage project site, safety, health and security | <ul style="list-style-type: none"> • Code of professional conduct and ethics • Definition of Occupational Safety and Health • Legal frameworks (OSHA, County authority regulations, NEMA, WARMA, NCA) • Environmental Management Policies • Identification of other sources of health and safety policy • Project risk analysis and documentation • Characteristics of a good health and safety policy • Formulation of occupational safety and health guidelines • Communication of health and safety policy • Regular review of the policy • Definition of site safety and health audits • Importance of conducting site health and safety inspections • Site health and safety inspection tools and methodologies | <ul style="list-style-type: none"> • Written Test • Interview • Oral Question • Assignments • Supervised Exercises • Practical Tests |

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| | <ul style="list-style-type: none"> • Site health and safety inspection stakeholders • Evaluation of site safety and health audits • Report writing • Sources and characteristics of site security threats • Process of project site security risk analysis • Elements of security provision • External and internal sources of security services • Security coordination meetings • Project site security reports | |
| 4. Manage construction project cost | <ul style="list-style-type: none"> • Code of professional conduct and ethics • Definition of a budget • Importance of a project budget • Analysis of contract documents • Identification of budget elements • Cost risk analysis • Identification of project activities • Preparation of resource schedules • Estimating and pricing project resources • Budget preparation • Project budget evaluation and reporting • Procurement laws and regulation • Law of contract and tort • Procurement methods (electronic or manual) • Material handling and wastage management • Warehousing and storage • Material sampling and testing | <ul style="list-style-type: none"> • Written Test • Interview • Oral Question • Assignments • Supervised Exercises • Practical Tests |

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| | <ul style="list-style-type: none"> • Material utilization plan development and implementation • Resource utilization monitoring tools • Project resource utilization report • definition of cost variation • sources of cost variations • cost variation approval procedures • project cost variation documentation • cost variation control methods • project cost variation report writing • Project budget and cash flow analysis • Resource utilization analysis • Variation and price fluctuations analysis • Features of a project financial report • Preparation of a project financial report | |
| 5. Manage project labour | <ul style="list-style-type: none"> • Code of professional conduct and ethics • Definition of project human resources • Identification of legislations affecting the management of human resources (labour laws) • Types of human resource policies • Sources of human resource policies • Characteristics of good human resource policies | <ul style="list-style-type: none"> • Written Test • Interview • Oral Question • Assignments • Supervised Exercises • Practical Tests |

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| | <ul style="list-style-type: none"> • Factors to consider when formulating human resource policies • Development and documentation of human resource policies • Communication of human resource policies • Implementation and regular review of human resource policies • Identification of Project activities human resource requirements • Human resource planning process • Regular review of the human resource plan • Principles of management and the associated theories • Process of job analysis • Implementation of the human resource plan • Placement and induction of human resources • Maintenance of human resources • Motivation of human resources (theories of motivation) • Meaning of staff welfare • Types of welfare facilities • Factors to consider when determining the welfare to offer employees • Group and individual welfare facilities • Implementation and review of staff welfare • Importance of keeping human resource records | |
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| | <ul style="list-style-type: none"> • Uses of human resource records • Filing systems and methods • Characteristics of a good filing system • Features of a human resource management system (manual or electronic) • Security of records • Confidentiality of information • Retention policy | |
| 6. Manage project contracts | <ul style="list-style-type: none"> • Code of professional ethics and conduct • Identification of contract documents and their functions • Laws and regulations governing construction industry (NEMA, building codes, County Statutes, NCA Act, WARMA Act, Labour laws, land laws, property laws, insurance laws) • Approving bodies and information centres • Process of approval • Development of a project documentation register • Updating project register • Confidentiality of the information in the register • Security of the register • Definition of project stakeholders • Identification and classification of stakeholders • Roles of each stakeholder during the life of the project • Types of stakeholders' contracts • Stakeholders engagement plan development and review | <ul style="list-style-type: none"> • Written Test • Interview • Oral Question • Assignments • Supervised Exercises • Practical Tests |

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| | <ul style="list-style-type: none"> • Definition of a construction work plan • Development and implementation of a construction work plan • Definition of project works inspection plan • Development and implementation of a project works plan • Development and implementation of project works inspection tools and methodologies • Documentation and projects work inspection report writing • Project works control measures • Identification of project contract elements • Importance of managing project information • Sources of information • Development of a project contract information management system • Confidentiality of information • Security of documents • Professional ethics in handling project information • Analysis and uses of project information • Project information review processes • Methods of communicating the information • Definition and importance of a project implementation report | |
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| | <ul style="list-style-type: none"> • Elements in a project implementation report • Types of information included in a project implementation report • Methodologies of gathering information and findings • Report writing and review | |
| 7. Manage construction materials, plant, tools and equipment | <ul style="list-style-type: none"> • Building materials, tools and equipment • clearing • Levelling • Erection of the facility • Types of building materials • Standard material schedule • Standard material rates • Types of equipment • Standard equipment schedule • Verification of documents • Catalogues • Price lists • Ordering • Verification of materials • Receiving • Recording • Issuing of materials • Recording of issued materials • Construction materials • Testing methods • Concrete technology | <ul style="list-style-type: none"> • Written Test • Interview • Oral Question • Assignments • Supervised Exercises • Practical Tests |

Suggested Methods of Instruction

- Group discussions
- Demonstration by trainer
- Online videos
- Power point presentation
- Exercises by trainee

Recommended Resources

- Scientific Calculators
- Relevant reference materials
- Stationeries
- GPS
- Design Software
- Computer lab
- Relevant practical materials
- Laboratories (chemical, biological & soils)
- Internet
- Manuals and guidelines
- Project management software
- Measuring and drawing tool
- Printer/plotting device
- Codes of practice
- Mechanical conventions

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