ENGINEERING SURVEY

UNIT CODE: LSM/CU/LM/CR/02/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Conduct engineering survey

Duration of Unit: 140 hours

Unit Description

This unit describes the competencies required by a surveyor to conduct a reconnaissance, conduct control survey, set out engineering works, compute earthworks, conduct underground survey and prepare as built survey map.

Summary of Learning Outcomes

1. Conduct a reconnaissance
2. Conduct control survey
3. Set out engineering works
4. Compute earthworks
5. Conduct underground survey
6. Prepare as built survey map.

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Conduct a reconnaissance	❑ Meaning of reconnaissance ❑ Objectives of reconnaissance ❑ Importance of a reconnaissance ❑ Identification of existing control points ❑ Establishment of new control points ❑ Safety precautions	❑ Observation ❑ Oral questioning ❑ Practicals
2. Conduct control survey	❑ Meaning of control point ❑ Types of control points ❑ Importance of control points ❑ Types of monuments ○ Wooden pegs ○ Iron pins (IP)	❑ Observation ❑ Oral questioning ❑ Written tests ❑ Practical assessments

	○ Iron pin in concrete (IPC) ○ Iron pin in concrete underground (IPCU) ❑ Identification of existing control points ❑ Establishment of new control points ❑ Establishment of horizontal controls ○ Traversing ○ Triangulateration ○ GNSS ❑ Establishment of vertical controls; ○ Leveling ○ Trigonometric heighting ○ Global Navigation Satellite System (GNSS) ❑ Application of control points	
3. Set out engineering works	❑ Meaning of setting out ❑ Purpose and importance of setting out ❑ Methods of setting out ○ By coordinates ○ By theodolite and level ○ By off set ❑ Setting out vertical curves ❑ Setting out horizontal curves ❑ Setting out buildings & Structures ❑ Setting out trenches ❑ Setting out slope stakes	❑ Observation ❑ Oral questioning ❑ Written tests ❑ Practicals
4. Compute earthworks	❑ Meaning of earthworks ❑ Elements of a profile ○ Cross-section profiles ○ Longitudinal profiles ❑ Area computation ○ Regular boundaries ○ Irregular boundaries ❑ Volume computation ○ Cross-sections ○ Spot heights	❑ Observation ❑ Oral questioning ❑ Written tests ❑ Drawings ❑ Practicals

	○ Contours ❑ Mass haul diagrams	
5. Conduct underground survey	❑ Transfer of horizontal and vertical controls from surface to underground ❑ Underground survey procedures ❑ Applications of underground survey	❑ Observation ❑ Oral questioning ❑ Written tests ❑ Practicals
6. Prepare as built survey map	❑ Cartographic map elements ❑ Map scales and precision ❑ Map projections ❑ Coordinate transformations ❑ Map designs and layout	❑ Observation ❑ Oral questioning ❑ Written tests ❑ Practicals

Suggested Delivery Methods

- Teaching
- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group projects
- Industrial attachement
- Internship

Recommended Resources

- Survey equipments and tools
- Survey data and Plans
- CAD software
- Computers
- Stationery
- Online resources
- Storage media
- Transportation
- Store
- Reference Text Books