Civil Engineering Technology - National Diploma (ND)

ENGINEERING MEASUREMENT AND SPECIFICATION

Engineering Measurements and Evaluation ................................................................................. 2
# Engineering Measurements and Evaluation

**PROGRAMME: CIVIL ENGINEERING TECHNOLOGY**

**Course:** Engineering Measurements and Evaluation  **Course Code:** CEC 214  **Contact Hours:** 2 - 0 - 0

**Course Specification: Theoretical Content**

<table>
<thead>
<tr>
<th>General Objective 1.0: Understand the duties and relation of professional in connection with Civil Engineering Contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week</strong></td>
</tr>
</tbody>
</table>
| 1 | 1.1 List the functions of all professionals in a building industry.  
1.2 State the relationship between the quantity surveyor architect and civil engineer etc in the building industry  
1.3 List the functions of all professionals in the civil engineering works.  
1.4 State the relationship between the professionals in civil engineering works. | • Use questions and techniques  
• Give assignments | • Chalkboard  
• Charts and audio visual aid video. |

<table>
<thead>
<tr>
<th>General Objective 2.0: Know the main purposes of Civil Engineering Measurement And Evaluation.</th>
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</table>
| 2 - 3 | 2.1 Explain the meaning of Bill Engineering Measurement and Evaluation (BEME)  
2.2 Distinguish between BOQ and BEME.  
2.3 Discuss the various uses of BEME in executing engineering contracts.  
2.4 Use bill of engineering measurement and Evaluation (BEME) as a basis for tendering.  
2.5 Use the BEME as an itemized list of components of civil engineering works.  
2.6 Use BEME as a basis for the valuation of work for interim certificate and variations.  
2.7 Use BEME as a basis for cost analysis and planning. | Use question and answer  
Use examples  
Give assignments | Examples/specimen |
## PROGRAMME: CIVIL ENGINEERING TECHNOLOGY

### Course Specification: Theoretical Content

**Course: Engineering Measurements and Evaluation**  
**Course Code: CEC 214**  
**Contact Hours: 2 - 0 - 0**

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<th>Teachers Activities</th>
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</table>
| 4    | 3.1 Explain the traditional methods of preparing quantities.  
3.2 Describe the cut and shuffle method of preparing quantities.  
3.3 Distinguish between the traditional, cut and shuffle methods.  
3.4 Give the advantages and disadvantages of both methods. | Use question and answer | - do - |

**General Objective 3.0: Understand choice of the methods of preparing Civil Engineering Measurements and Evaluation**

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</table>
| 5 - 6| 4.1 State the objectives and use of Civil Engineering standard method of measurement (CE SMM).  
4.2 State the objectives and use of code for the measurement of Civil Engineering. Works.  
4.3 Explain the general rules to sections of the SMM of Building Works and Civil Engineering Methods of Measurements.  
4.4 List the units of measurement.  
4.5 Explain with example what is meant by Timing.  
4.6 Explain dotting on.  
4.7 Describe waste calculation.  
4.8 Use ampersand in taking-off.  
4.9 Use NIL in altering dimensions.  
4.10 Determine the need for adjustment of openings and voids. | Use question and answer  
Discuss 5mm for Building works and CE 8mm.  
Give assignment. | • CE 5mm  
• 5mm for Building works. |

**General Objective 4.0: Understand the general principles and rules to be followed in taking-off of Engineering Measurements and Evaluations.**
## PROGRAMME: CIVIL ENGINEERING TECHNOLOGY

### Course: Engineering Measurements and Evaluation

**Course Code:** CEC 214  
**Contact Hours:** 2 - 0 - 0

### Course Specification: Theoretical Content

**General Objective 5.0:** Know the methods of measuring quantities for sub-structure from drawings of a small dwelling and Civil Engineering structure using standard methods of measurements.

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</table>
| 7 - 8 | 5.1 Measure quantities for excavation and earth work in sub-structure of Civil Engineering works including building.  
5.2 Measure quantities for all concrete work in sub-structure of Civil Engineering works including building.  
5.3 Measure quantities for all block work in substructure of Civil Engineering works including building. | • Make student carry out site measurements  
• Use question and answer. | • Tapes, Linen  
• Levels, chain drainings. |

**General Objective 6.0:** Analyse and build up unit prices and rate for civil engineering works including pricing of preliminary items.

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| 9-10 | 6.1 Build up unit prices and analyse rates for all materials required for Civil Engineering works.  
6.2 Price preliminary items for Civil Engineering works.  
6.3 Price temporary works and services for Civil Engineering works.  
6.4 Explain break-even analysis.  
6.5 Prepare schedule of materials.  
6.6 Calculate pro-rata rates.  
6.7 Build up rates for:  
  a. Roof work  
  b. Finishes including Painting and Decoration  
  c. Drainage and External Works | • Make student carry out site measurements  
• Use question and answer. | • Tapes, Linen  
• Levels, chain drainings. |
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Course: Engineering Measurements and Evaluation  Course Code: CEC 214  Contact Hours: 2 - 0 - 0

Course Specification: Theoretical Content

| General Objective 6.0: Analyse and build up unit prices and rate for civil engineering works including pricing of preliminary items. |
|---|---|
| 6.8 Build up unit rates for: | |
| a. surface excavation, trenches and isolated holes, earthwork support to simple excavations, basement excavation, disposal of spoil hardcore. | |
| b. concrete to strip foundations, ground floor slab, including formwork and reinforcement. | |
| c. Walls in common and facing bricks and blockwork. | |

| 9-10 |  |

General Objective 7.0: Understand the principles of abstracting and billing.

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<tbody>
<tr>
<td>11 - 13</td>
<td>7.1 Abstract the squared dimensions from the taking-off sheets into an abstract sheet in recognized order.</td>
<td>• Use question and answers.</td>
<td>- do -</td>
</tr>
<tr>
<td></td>
<td>7.2 Prepare bill of engineering measurement from a given abstract sheet in a recognized order</td>
<td>• Give assignments.</td>
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General Objective 8.0: Understand the principles of specification writing.

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<td>14</td>
<td>8.1 Define specification. 8.2 Explain the different types of specifications. 8.3 State the importance of specification.</td>
<td>• Use question and answer. • Give assignments to students</td>
<td>• Chalkboard • Examples of specifications.</td>
</tr>
</tbody>
</table>

Revision: 3 weeks

Competency: This course is intended to acquaint the student with the basic knowledge of preparing Bill of Engineering Measurement and Evaluation (BEME) for structural engineering work with an introduction to specifications writing.

Assessment: Coursework 20%; Course test 20%; Practical 10%; Examination 50%.

Reference: