APPLY CONSTRUCTION MATERIAL SCIENCE

UNIT CODE: CON/OS/CET/CC/04/6/A

UNIT DESCRIPTION

This unit describes the competence in applying building materials science. It involves identifying essential construction materials, selecting quality construction materials, testing construction materials and demonstrating knowledge in use of construction materials.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT This describes the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are **assessable statements** which specify the required level of performance for each of the elements (to be stated in passive voice) ***Bold and italicized terms are elaborated in the Range***
1 Identify essential construction materials	1.1 Bills of quantities and working drawings are obtained and interpreted 1.2 Essential ***construction materials*** are identified based on construction requirements and project scope
2 Identify properties of construction materials	2.1 ***Physical properties*** of construction materials are identified based on the type of construction material and codes of practice 2.2 ***Chemical properties*** of construction materials are identified based on the type of construction material and codes of practice 2.3 ***Mechanical properties*** of construction materials are identified based on the type of construction material and codes of practice
3 Manufacture construction materials	3.1 Raw materials are identified based on construction materials to be produced 3.2 Construction materials are manufactured as per manufacturing procedures
4 Select quality construction materials	4.1 Cost implications of construction materials are evaluated and analyzed 4.2 Quality construction materials are selected based on their costs, availability and project requirements
5 Use construction materials appropriately	5.1 Construction materials, tools and equipment are assembled based on construction methods 5.2 Construction materials are used based on construction process
6 Test construction materials	6.1 Construction materials are sampled randomly as per SOPs 6.2 ***Test parameters*** are identified as per the construction requirements and engineer's instructions 6.3 Construction materials are tested as per the SOPs

7 Handle construction materials safely	7.1 Construction materials to be handled are identified according to their uses 7.2 Safety requirements are identified based on the construction materials 7.3 Construction materials are handled safely based on the safety requirements

RANGE

Variable	**Range** *May include but is not limited to:*
1. Construction materials may include but not limited to:	1.1 stones 1.2 bricks 1.3 clay and clay products 1.4 lime 1.5 cement 1.6 timber and timber products 1.7 metals and alloys 1.8 paints and varnishes 1.9 roofing materials 1.10 Aggregates
2. physical properties may include but not limited to:	2.1 porosity 2.2 surface texture 2.3 strength 2.4 density 2.5 thermal conductivity 2.6 wear and tear
3. chemical properties may include but not limited to:	3.1 corrosion resistance 3.2 chemical resistance
4. Mechanical properties may include but not limited to:	4.1 Toughness 4.2 Hardness 4.3 Fatigue 4.4 Stress and strain 4.5 Creep and stress rapture 4.6 Strength
5. Test parameters	5.1 Compression 5.2 Weathering 5.3 Durability 5.4 Water absorption 5.5 Impurity tests 5.6 Tensile tests 5.7 Workability

	5.8 Plasticity 5.9 Aggregates crushing value 5.10 Optimum moisture content

SKILLS

- Analytical
- Quality control analysis
- Complex problem solving
- Critical thinking
- Engineering drawings interpretation
- Monitoring
- Numeracy

REQUIRED KNOWLEDGE

- Applied science
- Construction materials
- Materials testing
- Quality assurance
- Management of material resources
- Engineering mathematics
- Bills of quantities
- Materials handling safety procedures

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified essential construction materials 1.2 Selected quality construction materials 1.3 Tested construction materials 1.4 Manufactured construction materials 1.5 Identified properties of construction materials 1.6 Appropriately used construction materials 1.7 Handled construction materials safely
2. Resource Implications	The following resources should be provided: 2.1 Samples of construction materials 2.2 Material Testing Laboratories 2.3 Safety equipment 2.4 Computers

		2.5 Calculators 2.6 Materials testing tools and equipment
3.	Methods of Assessment	Competency may be assessed through: 3.1 Written text 3.2 Interview 3.3 Observation
4.	Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5.	Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.