

**Foundry - National Technical Certificate (NTC) and
Advanced National Technical Certificate (ANTC)**

Core Making

Programme: National certificate in foundry:

Module CFD12:Core making

Duration 168 hrs (14 hours per week)

Goal: This module is intended to provide the trainee with the competence and underpinning knowledge to operate and maintain different types of core making tools and equipment and be able to produce good cores for foundry work.

General objectives:

On completion of this module, the trainee will be able to

1. Understand the types of cores, methods of production and techniques of producing good cores.
2. Understand various processes of core making including bonding materials
3. Understand the essential features and working principles of core making machines (equipment) for mixing sand, drying and manipulation of cores.
4. Be able to use simple calculations involving core sand preparation and compaction.

Student outcome:

On completion of this module the student will demonstrate the following practical competencies:

To produce cores using

1. Core box process
2. Extrusion process
3. Core blowing process

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FOUNDRY			
MODULE: CORE MAKING		MODULE CODE: CFD 12	CONTACT HOURS: 14 HRS/WK PER WEEK, T6:P8
MODULE SPECIFICATION: Underpinning knowledge			
General Objective 1.0: Understand the types of cores, methods of production and the techniques of producing good cores.			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
1	1.1 Explain the types of cores a. Air-set b. Shell c. CO ₂ d. Oil sand (use of Linseed oil) 1.2 Recognise designs for core production.	<ul style="list-style-type: none"> • Ask students to define and explain different types of cores. • Ask students to recognise core designs. 	<ul style="list-style-type: none"> • Materials for core making.
General Objective 2.0: Understand various processes of core-making including bonding of materials.			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
2-3	2.1 Describe the types of core-making processes e.g.: a. Core box system b. Extrusion system c. Core blowing system d. Core shooting system e. Shell moulding core system etc.	<ul style="list-style-type: none"> • Ask the students to describe core-making processes. 	<ul style="list-style-type: none"> • Core boxes, • Core-making • Machines and • Core materials.
	2.2 Describe materials for core bonding: a. Sodium silicate b. CO ₂ c. Linseed oil d. Cereal e. Resin f. Clay g. Molasses h. Cement i. Starch 2.3 Take precautions against Linseed oil and the fast drying agent. 2.4 Explain the basic chemistry of core making: a. CO ₂ process b. Air-set processes.	<ul style="list-style-type: none"> • Ask students to differentiate the various core binders. • Emphasize curing temperature range. • Demonstrate the basic reactions arising from these processes. 	<ul style="list-style-type: none"> • Core binders. • Core materials and equipment.

MODULE: CORE MAKING		MODULE CODE: CFD 12	CONTACT HOURS: 14 HRS/WK PER WEEK, T6:P8
MODULE SPECIFICATION: Underpinning knowledge			
General Objective. 3.0: Understand the essential features and working principles of core-making machines (equipment) for mixing sand, drying and manipulation of cores.			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
4	3.1 Explain the essential features and working principles of: a. Mixing machines b. Extrusion machines c. Core blowing machines d. Shell core machines e. Continuous mixer machine dispenser.	• Ask students to explain the working principles of core making machines.	• Core making machines.
	3.2 Explain general properties of sand used in core-making: a. Porosity b. Adhesiveness or bonding c. Refractoriness d. Moisture contents e. Fineness etc.	• Ask students to describe various properties of core sand.	-Ditto-
General Objective 4.0: Understand simple calculations involving core sand preparation.			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
	4.1 Carry out simple calculations involving ingredients for mixing volumes used for moulding, test results, losses etc.	• Ask students to perform simple calculations involving sand composition e.g. base sand, additions, binders etc.	-Ditto-

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MODULE: CORE MAKING		MODULE CODE: CFD 12	CONTACT HOURS: 14hrs/wk PER WEEK: T6, P8
MODULE SPECIFICATION: Practice			
General Objective 1.0: Understand the types of cores, methods of production and the techniques of producing good cores.			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
6-7	1.1 Carry out tests such as: a. Moisture content, b. Silica and clay content c. Shatter index d. Dry strength e. Permeability f. Green strength g. Sieve tests for build up of fineness.	<ul style="list-style-type: none"> Teacher to demonstrate and students to perform various tests using relevant equipment. 	<ul style="list-style-type: none"> Sand testing equipment.
8-9	1.2 Explain various types of cores e.g. a. Cover cores b. Blind cores c. Wing cores d. Hanging cores e. Self cores f. Core assembly 1.3 Carry out core-making using any of the processes in above.	<ul style="list-style-type: none"> Demonstrate the use of corebox equipment. Ask students to identify various types of cores. Ask students to produce cores of any of the type above. 	<ul style="list-style-type: none"> Corebox. Materials for core making and coreboxes. As above.
10-11	1.4 Carry out tests on finished cores: a. Permeability b. Green and Dry compressive strength c. Green and Dry hot deformation d. Shatter index.	<ul style="list-style-type: none"> Teacher to demonstrate the procedures/ students to perform the tests using the relevant equipment. 	<ul style="list-style-type: none"> Permeability tester, green and dry compression equipment, shatter index machine.
12	1.5 Operate core making machines mentioned in 3.1 above and observe safety precautions.	<ul style="list-style-type: none"> Demonstrate the operation of these machines. Emphasize on maintenance and safety precautions. 	<ul style="list-style-type: none"> Relevant core making machines see 3.1