# CONCRETE TECHNOLOGY

## Module Summary

This module will start from the first principle and lead to advanced studies in the field of concrete technology. It will cover the concrete design philosophy encompassing the performance and durability design criteria as well as the execution and construction techniques mandatory for professionals in the field. The module will address the role of concrete codes, standards and specifications in ensuring the achievement of the pertinent design criteria. Durability analysis, materials & modeling techniques will be addressed. Everyday problems encountered by concrete engineers in the field will be discussed. Strict quality control considerations will be elaborated. Finally, examples, exercises, and evaluation problems will be presented. Efficient concrete performance requires engineers to possess integrated knowledge of theory and practice. It is essential to understand the issues that can affect stability, safety, and serviceability of concrete structures. This course presents the principles of concrete technology in a systematic manner starting from the basics and concluding on state-of-the-art concrete technology. It discusses the essential concepts of quality control, durability, strength, stability, serviceability, safety and modernism.

## OBJECTIVES

## Terminal Objective

After attending this module the participant will be able to complete any concrete construction project in a most quality controlled, efficient, durable, sustainable and up-to-date manner.

## Enabling Objectives

In order to accomplish the terminal objective, the participants will:

* Learn concrete technology principles
* Explore concrete material quality criteria
* Determine fresh concrete quality assurance in large projects
* Develop awareness for the production of durable concrete
* Learn hot weather concreting
* Get familiarized with the future trends and modern concrete of 22nd century
* Get equipped with quality concrete production in the Kingdom

## Module Components

1. Introduction to Concrete:

Importance and reasons for success, constituents, components, properties, mix design, placement, execution, testing and code specifications.

2. Standard Specifications for Ready Mixed Concrete:

Concrete Plant Standards, batch plant, mixer truck, hauling of concrete, central mix plant, proportioning, conveyers, pumping, paving, concrete smoothers, placement, decks & form systems.

3. Durability Related Issues & Microstructure of Concrete:

Different forms of deterioration including corrosion of steel in concrete, cracking, alkali-silica reaction, sulfate attack, chloride attack, carbonation, calcium leaching, durability code provisions, microstructure.

4. Hot Weather Concreting:

Precautionary measures, effect of hot weather on fresh and hardened properties of concrete, effect of chemical admixtures, plastic shrinkage cracking, saudi building code provisions.

5. Quality Control:

Factors governing variability: materials, production and testing, measurement of variability & application to concrete, quality control requirements, acceptance criteria, quality control charts, code requirements for quality control, factor of safety (F.O.S).

6. State-Of-The-Art Developments in Concrete Technology:

Concrete-the material of choice, examples on significant developments, future of concrete technology developments, driving forces of the future, concrete technology of 22nd century, simulation authenticity, changing trends, sustainability issues, resources, eco-friendliness, significance for education in concrete technology, advanced concrete technology, new criteria.

7. Miscellaneous:

Examples, summary, exercises, design aids, glossary and evaluation.