

Course Name:

Construction Equipment and Methods

Course Number:

20311

Credit:

3

Prerequisite:

Soli Mechanics

Course Description (Objectives):

This course is designed to familiarize the student with management principles and methods involved in construction equipment selection, operation and safety. It will also provide the student with an overview of the different types of modern construction equipment and its main components, the equipment's economics, financial concerns, and usage. The course will promote skills necessary to select and manage an equipment mix that yields maximum productivity and the best value in the project.

The main themes of the course are the followings:

- 1) An overview of the different types of construction equipment, the equipment's usage, as well as the company's and the project's practical, economic, and financial aims and concerns.
- 2) Management principles and methods involving construction equipment.
- 3) Evaluation and selection methods of equipment combination that yields the maximum production at the best or most reasonable cost for a given project to successfully being executed.

Course Content (outline):

- **Construction Equipment**
Factors Affecting the Selection of Construction Equipment, Cost of Ownership and Operating Construction Equipment, Selection of Alternative, Cost Accounting for Equipment, Economic Life of Construction Equipment, Efficiency and Production of Construction Equipment, Overall Structure of Construction Equipment, Forces and Resistances, Speed vs. Horsepower, Fleet Balancing
- **Earthmoving Operations**
Managing Earthmoving Equipment Including Bulldozers, Loaders, Hauling Units and Dump Trucks, Scrapers, Rollers and Compactors

- **Excavation Operations**
Managing Excavating Equipment Including; Power Shovels, Trenchers, Backhoes, Draglines, Clamshells, TBM
- **Lifting Operations**
Managing Lifting Equipment and Cranes Including: Truck Mounted Cranes, Rough Terrain Cranes, Tower cranes
- **Production of Crushed Stones and Aggregates**
Managing Equipment such as Crushers and Screens
- **Portland Cement and Asphalt Concrete Production**
Managing Portland Cement and Asphalt Concrete Production and Placement Equipment Including: Batching Plants, Truck Mixers, Concrete Pumps, Asphalt Plants, Finishers
- **Welding and Air Compression**
Managing Compressed Air and Welding Equipment and Tools
- **Steel Structures and Reinforced Concrete**
Introduction to the Methods of Constructing Steel, Concrete and Prefabricated structures
- **Designing the Fleet Size and Type To Maximize Productivity of Construction Equipment**
Process of Selecting and Coordinating the Appropriate Equipment Fleet to Maximize Productivity of Construction Equipment
- **Health, Safety and Environment (HSE)**
Importance of Considering Health, Safety and Environmental Factors in Construction Operations

References:

- Construction Planning, Equipment and Methods (Peurifoy)
- Modern Construction Equipment and Methods (Harris)
- Equipment Manufacturers' Technical Data and Specifications such as:
 - Caterpillar Performance Handbook
 - Komatsu Performance Handbook