

Construction & Building Engineering Courses (CB)

Construction Engineering Courses Group

CB 523 – Methods and Equipment for Construction 1

COURSE INFORMATION

Course Title: Methods and Equipment for Construction 1

Code: CB 523

Hours: Lecture – 2 Hrs. Tutorial – 2 Hrs. Credit –3.

Prerequisite: CB 322

GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

COURSE DESCRIPTION

Design and construction of formwork systems; horizontal formwork, and vertical formwork. Concrete technology; mixing and batching concrete, transporting concrete, and placing and compacting concrete. Design and construction of dewatering systems; open sumps system, wellpoints system, and deep wells system. Design and construction of shoring systems; continuous piles system, secant piles system, and diaphragm walls system. Cranes; derrick cranes, mobile cranes, and tower cranes. Health and safety precautions.

TEXT BOOK

Construction Methods and Management by Nunnally, S.W., Publisher: Prentice Hall, New Jersey, 2005.

REFERENCE BOOKS

Principles and Practices of Commercial Construction by Cameron K. Andres, Ronald C. Smith Publisher: ISBN, 7th edition 2005.

Construction Methods and Planning by Illingworth, J.R., Publisher: Spon Press, UK, ISBN, 2005.

COURSE AIM

The course aims at introducing the student to the knowledge of construction engineering in the area of building construction.

SPECIFIC OUTCOMES OF INSTRUCTION

The student should be aware with:

- a- Horizontal and vertical formwork systems.
- b- Concrete production in field and batching plants.
- c- Available dewatering systems and shoring systems used in the building construction industry.
- d- Different crane types used in the construction industry and to acquaint students with health and safety precautions.

COURSE OUTLINE

- Week Number 1:* Loads on formwork:
- Calculation of the dead load on formwork, the construction live loads, and the lateral pressure of concrete on the vertical formwork.
- Week Number 2:* Properties of materials used in formwork:
- Behavior of wooden elements; the effect of moisture content on the lumber, the effect of number of using on the lumber, and the effect of finishing on the lumber.
 - Behavior of plywood; the relationship between grain direction and strength.
- Week Number 3:* Strength and rigidity of forming systems:
- Check for deflection, check for bending moment, check for shear force, and check for bearing stress.
- Week Number 4-5:* Design of horizontal formwork:
- Design and construction of the slab formwork system; sheathing, joists, stringers, and shores.
 - Calculate the quantity of material required to erect the formwork.
- Week Number 6:* Design of vertical formwork:
- Design and construction of the column formwork system; sheathing, studs, and clamps.
 - Calculate the quantity of material required to erect the formwork.
- Week Number 7:* Batching and mixing concrete:
- Batching and mixing concrete in site.

- Adjusting material proportioning according to the mixer capacity, the effect of moisture content of aggregate on the adding water, and the effect of mixing time on the concrete strength.

- Week Number 8:* Transporting concrete:
- Equipment used in transporting concrete to the site.
 - Factors affecting the selection of the method of transporting.
 - Factors affecting the quality of concrete during transportation phase.
 - Transporting concrete by pumps.
 - Comparison between alternatives of transporting concrete & 7th week exam
- Week Number 9:* Placing and compacting concrete:
- Equipment and tools used in placing of concrete.
 - Mechanism of vibration.
 - Precautions during Internal vibration.
 - Precautions during external vibration.
- Week Number 10:* Dewatering systems:
- Introduction to dewatering theory.
 - Relationship between soil type and dewatering system.
 - Design and construction of open sumps system.
- Week Number 11:* Wellpoint & deep wells system:
- Design and construction of well points system.
 - Design and construction of deep wells system.
- Week Number 12:* Cases of studies:
- Introducing cases of studies for projects used different dewatering systems.
- Week Number 13:* Diaphragm walls:
- Method of construction for diaphragm walls & 12th week exam.
- Week Number 14:* Cranes:
- Introduction to cranes. Derrick cranes. Mobile cranes; cranes mounted on crawler, cranes mounted on wheels, cranes mounted on lorry, and telescopic cranes.
 - Tower cranes.
 - Selection of the optimum location of tower crane.
 - Erecting and dismantling tower cranes.
 - Assessing the productivity of tower cranes.
- Week Number 15:* Health and safety
- Working at height: Hazards & control.

- Excavation work hazards.

Week Number 16: Final Exam.

COURSE COORDINATOR AND DEMAND

Course Coordinator: Dr. Mohamed Emam.

Course Demand: *Required*