

## Construction & Building Engineering Courses (CB)

Water Resources & Coastal Engineering Courses Group

### CB 585 – Design and Construction of Coastal Structures

#### COURSE INFORMATION

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Course Title: Design and Construction of Coastal Structures

Code: CB 585

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

Prerequisite: CB 281

#### GRADING

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Class Performance/Attendance: 10%

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

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

Final Exam: 40%

#### COURSE DESCRIPTION

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Ocean environment; wind, tides, wave mechanics; Coastal processes; surf-zone dynamics & coastal sediment transport; Wave & current forces on coastal structures; Port planning and technology; Functional design of coastal structures; Construction aspects of major coastal structures; breakwaters, seawalls, docking facilities, ocean outfalls and submarine pipelines. Field visits to local coastal protection projects.

#### TEXT BOOK

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Introduction to Coastal Engineering and Management by J.W. Kamphuis Publisher: World Scientific Publishing Co., NJ, USA, 2001.

#### REFERENCE BOOKS

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Coastal Defense-ICE design and practice guide by Brampton Publisher: Thomas-Telford, London, 2002.

Hydraulics in Civil and Environmental Engineering by A. Chadwick and A.J. Morfett, Spon Publisher: London, New York, 2002.

Coastal Engineering-processes, theory and design practice by D. Reeve, A. Chadwick and C. Fleming, Spon Publisher: Press, London and New York, 2004.

## APPENDIX A-191

Port Engineering by Per Bruun, Gulf Publishing Co. Publisher: Houston, USA, 1981.

Construction Risk in Coastal Engineering by ed. J. Simm and I. Cruickshank  
Publisher: Thomas Telford, U.K., 1998.

Oceanographical Engineering by R.L. Wiegel Publisher: Prentice-Hall, Inc.,  
Englewood Cliffs, New Jersey, USA, 1964; reprint, 2005.

### COURSE AIM

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The course aims at acquainting the student of construction engineering to the knowledge of fundamental and methods of designing coastal protection structures and shoreline facilities. Further the course introduces the students to the principles of coastal zone management and construction aspects of major structures.

### SPECIFIC OUTCOMES OF INSTRUCTION

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- The student should be aware with coastal waters hydrodynamics, coastal sediment transport; erosion and accretion as applied to the construction of coastal structures.
- The student should be aware with of sustainability and management of coastal projects during design, construction and operation stages.

### COURSE OUTLINE

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- Week Number 1:* Introduction to coastal engineering; environment and types of coastal structures.
- Week Number 2-3:* Wind, tide, currents and surface wave hydrodynamics; elementary and finite amplitude waves
- Week Number 4:* Wind generated waves; prediction and forecast.
- Week Number 5:* Modification of wave characteristics in shoaling waters and sea level changes.
- Week Number 6:* Coastal processes and sediment transport (erosion & accretion).
- Week Number 7:* Introduction to coastal zone management & sustainability of coastal projects.
- Week Number 8-9:* Wind and wave-current hydrodynamic forces.
- Week Number 10:* Introduction to port & harbor planning and offshore terminals.
- Week Number 11:* Port and Harbor facilities; breakwaters, piers and terminals etc.
- Week Number 12-13:* Design and construction of breakwaters, seawalls and groins (rigid/ flexible).
- Week Number 14:* Marine construction: methods, materials and equipment.
- Week Number 15:* Environmental effects on coastal zone management; e.g.:  
Effects of sea level rise

*Week Number 16:* Final Exam.

COURSE COORDINATOR AND DEMAND

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*Course Coordinator:* Dr. Wael Mohamed Hamdy Khadr.

*Course Demand:* *Required*