ARAB ACADEMY FOR SCIENCE, TECHNOLOGY
AND MARITIME TRANSPORT

COLLEGE OF ENGINEERING
AND TECHNOLOGY

(GRADUATE STUDIES)

Master of Science Programs

STATUS REPORT

ALEXANDRIA

2012

CONSTRUCTION AND BUILDING ENGINEERING

M.SC. PROGRAMS

M.Sc. in Construction and Building Engineering

OVERVIEW

Construction is one of the largest nation's industries, encompassing an incredibly wide range of activities, from high-rise buildings construction to homes, from highways to power plants. Indeed modern construction projects have become so large, complex, expensive and time-consuming that special educational programs now are being offered to prepare students for entry into this important and challenging industry.

The mission of the Construction and Building Engineering Department at the AASTMT is to provide the educational, research, and training programs that serve both the needs of our students and those of the construction industry. The curriculum objective is to prepare individuals for a professional career in construction engineering and management and for continued learning through post-graduate education or self study.

The department offers a B.Sc., a diploma, and a Master's degree in Construction Engineering. As a student in construction engineering, you will learn to identify the best methods and techniques of construction, to determine construction costs and set schedules, to apply methods of quality control and to supervise construction projects.

The program is designed to prepare our students to become outstanding construction engineers, whose job is to devise and design construction facilities, coordinate and direct the efforts of labor and equipment, and control the time and cost demands of field operations.

As they gain experience, construction engineers become construction managers who combine engineering, management, and field construction skills in the administration and management of field construction.

Graduates of the Construction and Building Engineering degree program design and manage construction processes that create living and working environments such as office buildings, industrial buildings, airports, housing, roads, bridges, utilities, and dams. Graduates fill positions in construction companies, engineering consulting firms, government agencies, and large construction corporations. The positions usually involve either the planning, design, and management of the construction process for a general, specialty, or mechanical contractor, or the coordination, inspection, and management of design, contracts, or facilities for a business, industry or government owner.

When you ask top managers in construction and engineering firms why they selected this career, you can hear the excitement of the construction industry in their responses. Some say they like to conceive an idea and then engineer and manage it through to reality. Others say that they like the combination of computerized planning, process design, cost engineering, and scheduling with the gratification of seeing a job well done.

Graduates of this degree program enjoy a wide range of opportunities to apply their technical knowledge with tremendous variety in the day-to-day work. Some choose design, planning, or financial management positions working in an office environment, while others prefer to direct field operations or some combination of the above.

Program Detailed Structure

M.Sc. Program

(F) Irrigation and Hydraulic Engineering

M.Sc. in Construction and Building Engineering
(F) Irrigation and Hydraulic Engineering

CORE COURSES:

Course Code	Course Title	Credit Hours
CB 760	Surface and Subsurface Hydrology	3
CB 761	River Engineering	3
CB 762	Irrigation and Drainage System	3
CB 763	Advanced Hydraulics and Modeling	3
CB 764	Advanced Numerical Methods	3
CB 765	Advanced Fluid Mechanics for Civil Engineers	3
CB 766	Ocean and Coastal Hydrodynamics	3
CB 767	Coastal Processes and Design	3
CB 768	Integrated Water Resources Management	3
CB 769	Design Of Potable And Sewage Water Networks	3
CB 760-I	Coastal Projects Planning and Development	3
CB 761-I	Interaction of Coastal Structures and Shorelines	3
Subtotal	**8 Courses * 3 Credit Hours**	**24**

RESEARCH THESIS:

Course Code	Course Title	Credit Hours
CB 701	Master's Research Thesis (Part 1)	6
CB 702	Master's Research Thesis (Part 2)	6
Subtotal	**2 Parts * 6 Credit Hours**	**12**

Total	**36**

Courses

Course Code : **CB 760**

Course Title : **Surface and Subsurface Hydrology**

Credit Hours : **3**

Course Description

The hydrologic cycle, water budget, Rainfall, local rainfall, Rainfall abstractions, Runoff Models and Routing Models, reservoir management and dams, GIS, Remote Sensing and Climatic changes. Ground water, Movement of ground water, radial flow in all kinds of aquifers, Filed determination of aquifer characteristics , Aquifer boundaries ,surface investigation of ground water, Multi well interaction.

Course Objectives

To enable the student to understand different elements of hydrology, Establish rainfall-runoff relationship, and understand channel routing methods.

Course Topics

- The hydrologic cycle,
- Application of the hydrologic budget'
- Evaporation, transpiration, and evapotranspiration
- Stream flow and stream flow estimation,
- Morphological and hydrological studies of water sheds or basins
- Introduction to ground water
- One dimensional flow equation
- Analytical solution and simplified solution for flow equations
- Pumping tests
- Evaluation of ground water resources.

References

- Barndorff-Nielsen, Ole E; "Stoch*astic Methods in Hydrology: Rain, Landforms and Flood Guanajuato*"; 1996; World Scientific Publishing Co Ptc. Ltd.
- Serrano, Sergio E.: Hydro*logy for Engineers, Geologists, and Environmental Professionals: Integrated Treatment of Surface, Subsurface, and Contaminant Hydrology*"; 1997; HydroScience Incorporated.
- Manning, John C.; "*Applied Principles of Hydrology*"; 1996; Prentice-Hall Regents.

Course Code : **CB 761**

Course Title : **River Engineering**

Credit Hours : **3**

Course Description

Phenomenology of rivers, River training, River bank protection, River navigation enhancement, local scour, river measurements, Field data collection and analysis. Sediment properties, Initiation of sediment motion, Bed load, Suspended load, and Total load. Erosion and deposition in river basin, Sediment budget and models. Einstein Bed-Load function, Transport of sediment mixtures.

Course Objectives

To enable the student to deal with river morphological problems, analyze local scour, align and plan river navigation, and collect river field data

Course Topics

- River morphology
- local scour
- Introduction to sediment transport theory
- River training and river bank protection
- River navigation enhancement
- Field data collection and analysis.

References

- Barndorff-Nielsen, Ole E; "*Stochastic Methods in Hydrology: Rain, Landforms and Floods Guanajuato*"; 1996; World Scientific Publishing Co Pte. Ltd.
- Serrano, Sergio E.; "Hydr*o1ogy for Engineers, Geologists, and Environmental Professionals: An Integrated Treatment of Surface, Subsurface, and Contaminant Hydrology*"; 1997; HydroScience, Incorporated.
- Carling, P. A.; "*Advances in Fluvial Dynamics and Stratigraphy*"; 1996; Wiley-Liss Inc., U. S.

Course Code : **CB 762**

Course Title : **Irrigation and Drainage System**

Credit Hours : **3**

Course Description

Types and characteristics of irrigation systems, System design fundamentals, Sprinkler and trickle irrigation systems, optimum design of pressurized systems, Automation and control, Importance of land drainage, drainage requirements, Field investigation and laboratory measurements, basic theories and design fundamentals, Methods of construction and maintenance.

Course Objectives

To enable the student to understand different types of irrigation systems, design sprinkler and trickle irrigation systems, design of drainage systems, and methods for constructing and maintaining irrigation and drainage systems.

Course Topics

- Types and characteristics of irrigation systems
- System design fundamentals
- Optimum design of pressurized systems
- Automation and control
- Importance of land drainage, drainage requirements
- Field investigation and laboratory measurements
- Basic theories and design fundamentals
- Methods of construction and maintenance

References

- Melby, Pete; "*Simplified Irrigation Design Professional Designer and Installer Version*"; 1997; Wiley, John and Sons, Incorporated.
- Burt, M.; "*Drip and Microirrigation: For Trees, Vines and Row Crops*"; 1994; Irrigation Training and Research Center.
- "*Drainage Manual: A Guide to integrating Plant, Soil and Water Relationships for Drainage of Irrigated Lands* "; 1994; Gordon Press Publishers.

Course Code : CB 763

Course Title : Advanced Hydraulics and Modeling

Credit Hours : 3

Course Description

Flow in open channels, uniform flow, non-uniform flow, bed shear stress, Hydraulic structures; (Weirs, Gates, Flumes, Spillways, Culverts, Stilling basins), scour around bridge piers, sediment in front of dams.

Course Objectives

The course aims at understanding different hydraulic aspects of flow in rivers and open channels. In addition, student will be able to analyze different hydraulic structures. The course also aims at understanding the concept of hydraulic models and developing hydraulically based model.

Course Topics

- Flow in open channels
- Uniform flow and non-uniform flow
- Bed shear stress
- Hydraulic structures; (Weirs, Gates, Flumes, Spillways, Culverts, Stilling basins)
- Theoretical base for hydraulic models
- Theory of dimensional analysis
- Practical aspects of construction and operation of Froude and Reynolds models
- Modeling of hydraulic machinery
- Rivers and Tidal flows
- Modern instrumentation and data handling techniques

References

- *Chadwick, Andrew and Morfett, John; "Hydraulics in Civil and Environmental Engineering"; Paperback: U.K.*
- *Chadwick, A. and Morfett, J.; "Hydraulics in Civil and Environmental Engineering"; Publisher: E&FN SPON London and New York, Latest Edition.*
- *Davis, CV. and Sorensen (EDS); "Handbook of Applied Hydraulics"; 1978; McGraw-Hill Co; N.Y.*
- *Munson, B., Young, D. and Okiishi, T.; "Fundamentals of Fluid Mechanics"; Publisher: John Wiley & Sons, Inc.; New Jersey, Latest Edition.*
- *Nalluri, C. and Featherstone R; "Civil Engineering Hydraulics"; Publisher: Blackwell Science; MA, USA, Latest Edition.*
- *Roberson, J A.; Cassidy, J.J.; and Chaudhry, M. H.; "Hydraulic Engineering", Houghton Mif.*
- *Walski, M.T. (Ed); "Computer Applications in Hydraulic Engineering-connecting theory to practice"; Publisher: Haestad Press, Waterbury*
- *Hwang, N.H.C. and Houghtalen, R.J.; "Fundamentals of Hydraulics Engineering Systems"; Printice Hall, New Jersey, Latest Edition.*

Course Code : CB 764

Course Title : Advanced Numerical methods

Credit Hours : 3

Course Description

General review of numerical methods and finite element method, One dimensional unsteady flow, Quasi two dimensional unsteady flow, Unsteady dispersion in rivers, Water and sediment routing in rivers, Model calibration, Model verification.

Course Objectives

The course aims at enabling the student to develop advanced models for hydraulic problem such as open channel water surface profile calculation problems, pipe network problems, and groundwater problems. In addition, river sediment calculation problems should also be solved by developing advanced models. The student should also be able to calibrate and verify the developed model with suitable data, apply the developed model for future prediction of river status.

Course Topics

- General review of numerical methods and finite element method for solving algebraic ordinary and partial differential equations
- One dimensional unsteady flow
- Quasi two dimensional unsteady flow
- Water and sediment routing in rivers
- Fundamentals and general techniques Basic elements of numerical modeling, Generation of numerical mode ling
- Relation between physical and numerical modeling
- Numerical models in different fields (Pipe networks - Open channels - Ground water – Hydrology….)
- Application of geographic information systems in numerical modeling
- Analysis of results of application of numerical modeling

References

- Chadwick, Andrew and Morfett, John; “Hydraulics in Civil and Environmental Engineering”; Paperback: U.K.
- Chadwick, A. and Morfett, J.; “Hydraulics in Civil and Environmental Engineering”; Publisher: E&FN SPON London and New York, Latest Edition.
- Davis, CV. and Sorensen (EDS); “Handbook of Applied Hydraulics”; 1978; McGraw-Hill Co; N.Y.
- Munson, B., Young, D. and Okiishi, T.; “Fundamentals of Fluid Mechanics”; Publisher: John Wiley & Sons, Inc.; New Jersey, Latest Edition.
- Nalluri, C. and Featherstone R; “Civil Engineering Hydraulics”; Publisher: Blackwell Science; MA, USA, Latest Edition.
- Roberson, J A.; Cassidy, J.J.; and Chaudhry, M. H.; “Hydraulic Engineering”, Houghton Mif.
- Walski, M.T. (Ed); “Computer Applications in Hydraulic Engineering-connecting theory to practice”; Publisher: Haestad Press, Waterbury

- Hwang, N.H.C. and Houghtalen, R.J.; "Fundamentals of Hydraulics Engineering Systems"; Printice Hall, New Jersey, Latest Edition.

Course Code : CB 765

Course Title : Advanced Fluid Mechanics for Civil Engineers

Credit Hours : 3

Course Description

Fundamental concepts of Newtonian and non-Newtonian fluids, mathematical representation for fluid motions for laminar and turbulent, methods of analysis for governing conservation equations, dimensional analysis and similitude, sedimentation and erosion mechanics, modeling of water quality in natural streams.

Course Objectives

The objective of this course is to provide graduates with a solid basis in fundamentals and strong capability to use methods of analysis and mathematical tools to solve fluid flow problems, sedimentation & erosion problems in natural streams, lakes, and coastal lagoons.

Course Topics

- Characteristics (physical, chemical, biological) of fresh water, seawater, and sediment-laden fluids
- Fundamental concepts; fluid as continuum, velocity field, stress field, Newtonian and non-Newtonian fluids, description and classification of fluid motions (laminar, turbulent)
- Basic flow governing equations and methods of analysis: system control volume; differential versus integral approach, methods of description: Eulerian vs. Lagrangian.
- Governing equations in integral form
- Governing equations in differential form
- Dimensional analysis and similitude
- Sedimentation and erosion in natural streams; steady and unsteady flow
- Hydraulics of sustainability
- Fluid dynamics for water quality in the environment; movement of contaminants in rivers, estuaries, lakes, groundwater, and coastal waters
- Overview of commercial computer models for hydrologic and water quality applications

References

- *Hydraulics in Civil and Environmental Engineering by Chadwick, A. and Morfett, J. Publisher: E&FN SPON, London and New York, 2004.*
- *Fundamentals of Fluid Mechanics by Munson, B., Young, D. and Okiishi, T. Publisher: John Wiley & Sons, Inc., New Jersy, Latest Edition.*
- *Civil Engineering Hydraulics by Nalluri, C. and Featherstone, R. Publisher: Blackwell Science, MA, USA, Latest Edition.*
- *Computer Applications in Hydraulic Engineering-connecting theory to practice by Walski, M.T. (Ed) Publisher: Haestad Press, Waterbury, CT, U.S.A, Latest Edition.*

Course Code : CB 766

Course Title : Ocean and Coastal Hydrodynamics

Credit Hours : 3

Course Description

Defining variables with associated time-length scales affecting the behavior of shoreline and beach changes. Review of water waves theories and effects of ocean currents for estimate of fluid forces. Wave and current transformation and associated coastal processes. Development of design basis criteria for risk based design in the coastal zone. Oceanographic measurements and introduction to modeling.

Course Objectives

The course aims at providing the graduate students with the knowledge of developing design criteria and methods of designing coastal protection structures. Further the course introduces the students to the principles of coastal zone management; including field measurements and modeling.

Course Topics

- Coastal environment and oceanographic parameters.
- Coastal zone behavior due to climate and climatic changes.
- Higher order water waves theories; wind and impulsively generated waves.
- Coastal water level variations due to: waves, currents, tides and climatic changes.
- Wave transformation.
- Wave current interaction.
- Design wave specifications and risk levels.
- Short term wave analysis-Long term wave analysis.
- Wave-current induced circulation and transport of sediments.
- Surf zone processes.
- Hydrographic measurements and introduction to modeling.

References

- Reeve, D., Chadwick, A., Fleming, C. “Coastal: Engineering-processes, theory and design practice”. Spon Publisher: Press, London and New York, 2004.
- British Institute of Civil Engineering. Coastal Defense-ICE design and practice guide by Brampton Publisher: Thomas-Telford, London, Latest Edition.
- Chadwick, A., Morfett, A.J. “Hydraulics in Civil and Environmental Engineering”. London, New York, 2004.
- Kamphuis, J.W. “Introduction to Coastal Engineering and Management”. World Scientific Publishing Co., NJ, USA, 2011.
- Per Bruun: “Port Engineering”. Gulf Publishing Co. Houston, USA,1984
- Simm, J., Cruickshank, I. “Construction Risk in Coastal Engineering”. Thomas Telford, U.K., 1998.
- Wiegel, R.L. “Oceanographical Engineering”. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, USA, 2006.

Course Code : CB 767

Course Title : Coastal Processes and Design

Credit Hours : 3

Course Description

Review of model predictions of wave & current induced fluid motion in coastal waters. Geological and geotechnical properties of seafloor. Coastal sediment transport. Coastal morphology changes in the cross-shore and longshore directions. Design steps for hard structures; groins, detached & submerged breakwater, seawalls. Review of natural coastal defense systems, and beach nourishment. Management of tidal flats, and wetlands and coastal lagoons.

Course Objectives

This course aims to provide graduate students with the knowledge and design equations/models to estimate sediment transport rates and beach morphology under the combined action of waves and currents in coastal waters. Further the course lays the criterion for selection and design steps of sustainable coastal defense systems; hard structure versus natural systems.

Course Topics

- Overview of water waves theories and wave-current models
- Geological and geotechnical properties of sea floor sediments in the surf zone and offshore waters.
- Coastal transport processes; sediment transport mechanics and rates.
- Coastal morphology; beach profiles and long shore configurations.
- Modeling and prediction of coastal morphology.
- Principles of coastal zone management.
- Selection and detailed design of coastal structures.
- Design of hard coastal structures.
- Design of soft coastal structures.
- Design codes and computer models.

References

- *Reeve, D., Chadwick, A., Fleming, C. "Coastal: Engineering-processes, theory and design practice". Spon Publisher: Spon Press, London and New York, 2004*
- *Branyoton, A., British Institute of Civil Engineering. "Coastal Defense-ICE design and practice guide" Publisher: Thomas-Telford, London, 2002.*
- *Chadwick, A., Morfett, A.J. "Hydraulics in Civil and Environmental Engineering". Spon Press, London, New York, 2004.*
- *Kamphuis, J.W. "Introduction to Coastal Engineering and Management". World Scientific Publishing Co., NJ, USA, 2011.*
- *Simm, J., Cruickshank, I. "Construction Risk in Coastal Engineering". Thomas Telford, U.K., 1998.*
- *Wiegel, R.L. "Oceanographical Engineering". Prentice-Hall, Inc., Englewood Cliffs, New Jersey, USA, 2006.*

- *U.S. Army; "Coastal Engineering Manual (http://chl.erdc.usace.army.mil/, formerly: "Shore Protection Manual", Corps of Engineering, Coastal Engineering Research Center, Vicksburg, USA, 2001.*
- *Journal of Waterway, Port, coastal and Ocean Engineering, (Quarterly), American Society of Civil Engineers, NY, USA*

Course Code : CB 768

Course Title : Integrated Water Resources Management

Credit Hours : 3

Course Description

Definition of water sustainability and challenges to meet today's associated environmental, climate, economic and water demands considerations in the region including coastal zones. Application of hydrology, hydraulics, principles and system analysis, in the selection of an integrated water resources system. Water resources management systems include types of water supply components for urban and agricultural usage, structures for flood and storm water management, drainage disposal or reuse of wastewater and agricultural drainage. Such systems would involve use of new practices as water conservation and new technologies as rainfall harvest. Discussion of technical papers and computer models related to case studies on sustainable development of water resources surface and groundwater, system selection, construction and operation, maintenance and other topics. Evaluating alternatives for sustainability of water resources systems.

Course Objectives

To introduce the students to the general water availability/demand problem, design methods for water resources development, optimization methods for the operation of water resource systems, the general practices of regional water resource management. The role of a proper assessment of uncertainty in water resources and a systems approach to the design and operational problems will be emphasized.

Course Topics

- Water resources sustainability; quantity, quality, demand, and climatic changes.
- Watershed hydrology; surface water, ground water, water management
- Challenges to water resources sustainability and planning process
- Water sources of water resources and withdrawals; energy production, agriculture, domestic, industrial water demand and price
- Flood and storm control, drought management and risk based analysis.
- Integrated water resources management for sustainability.
- Water law and environmental pollution control
- Sustainable water supply, methodologies for arid and semi arid regions.
- Water resources economics.
- Water resources system analysis.
- Case studies of water resources management in arid, semi-arid regions and coastal zone.

References

- *Mays, L.W. "Water Resources Engineering"; Jon Wiley & Sons, Inc.; N.J., USA, 2011*
- *"Hydraulic Engineering", Roberson, J.A., Cassidy J.J. and Chaudhury M.H., John Wiley & Sons, Inc., New York, 1995*
- *"Flood Risk Management", G. Fleming, ed., ICE, Thomas Telford, London, U.K., 2000*

- *"Integrated Watershed Management in the Global Ecosystem", Lal, R., ed., CRC Press, Boca Raton, USA, 2000*
- *"Computer Applications in Hydraulic Engineering-connecting theory to practice"; Walski, M.T. (Ed), Haestad Press, Waterbury, CT, USA, 2002*
- *"Water Resources Engineering", R.Linsley, J.Franzini, J.Freyberg and G.Tchobanogolous, McGrawHill, Inc., New York, 1992*
- *Goodman, A.S., "Principles of Water Resources Planning," Prentice-Hall, Inc., N.J., U.S.A., 1984.*
- *Wurbs, R.A., and James, W.P., "Water Resources Engineering", Prentice-Hall, Inc., N.J., U.S.A., 2002.*
- *Journal of Water Resources Management, (Quarterly), American Society of Civil Engineers,NY,USA*

Course Code : CB 769

Course Title : Design Of Potable And Sewage Water Networks

Credit Hours : 3

Course Description

Mechanism of liquid flow in pipes and pipes networks, controlling water transmission, types of flow, fluid storage, pumping stations, design of pipeline, computer application, planning of sewage network, types sewage pumping station, design of sewage pipeline, computer application.

Course Objectives

The course aims at enabling the student to understand different aspects regarding water transmission and control through either water distribution networks or sewage networks. These aspects include planning and design aspects of different elements of both networks such as pipelines (gravity and pressurized), pumping stations, elevated and rested on ground tanks, control and measurements devices.

Course Topics

- Mechanics of liquid flow in pipes and pipe networks.
- Water transmission and control - including flow control and flow measurements.
- Steady and unsteady flow, Surge and water hammer problems.
- Storage capacity. Elevated and rested on ground tanks.
- Pumping stations, Components of pumping stations, Types of pumps, Pump selection, Design and efficiency, Cavitation in pumps and pipelines.
- Design of pipeline.
- Computer applications
- Planning of sewage network, Different elements of sewage network, Design of gravity pipelines.
- Sewage pumping stations, Types of sewage pumps, Pump selection.
- Design of pressurized sewage pipeline
- Computer application

References

- *Valiron, F.; Affholder, M.; "A Guide for the Design and Management of Combined Sewerage Networks : State of the Art"; Taylor and Francis, Latest Edition.*
- *Sharma, A.K. and Swamee, P.K.; "Design of water supply pipe network"; John Wiley & Sons, Inc.; New Jersey, Latest Edition.*
- *Boldy, Adrian P.; "Hydraulic Design of Hydraulic Machinery"; Avebury Technical, Latest Edition.*
- *Parker Hannifin Corporation Staff; "Hydraulic Pumps and Controls"; Parker Hannifin Corporation, Latest Edition.*
- *Krivchenko, G. I.; "Hydraulic Machines: Turbines and Pumps"; Lewis Publishers, U. S. , Latest Edition.*
- *Chadwick, Andrew and Morfett, John; "Hydraulics in Civil and Environmental Engineering"; Paperback: U.K.*

- *Chadwick, A. and Morfett, J.; "Hydraulics in Civil and Environmental Engineering"; Publisher: E&FN SPON London and New York, Latest Edition.*
- *Davis, CV. and Sorensen (EDS); "Handbook of Applied Hydraulics"; 1978; McGraw-Hill Co; N.Y.*
- *Munson, B., Young, D. and Okiishi, T.; "Fundamentals of Fluid Mechanics"; Publisher: John Wiley & Sons, Inc.; New Jersey, Latest Edition.*
- *Nalluri, C. and Featherstone R; "Civil Engineering Hydraulics"; Publisher: Blackwell Science; MA, USA, Latest Edition.*
- *Roberson, J A.; Cassidy, J.J.; and Chaudhry, M. H.; "Hydraulic Engineering", Houghton Mif.*
- *Walski, M.T. (Ed); "Computer Applications in Hydraulic Engineering-connecting theory to practice"; Publisher: Haestad Press, Waterbury*
- *Hwang, N.H.C. and Houghtalen, R.J.; "Fundamentals of Hydraulics Engineering Systems"; Printice Hall, New Jersey, Latest Edition.*

Course Code : CB 760-I

Course Title : Coastal projects planning and development

Credit Hours : 3

Course Description

Wave theory, definition of strategic planning, items of port planning, on shore terminals facilities, guide lines for ports developments, definition, types and design of break waters, dock structures, design of quay wall and sheet pile wall, different types of fenders.

Course Objectives

The course provides an overview for the keys aspects of coastal projects planning and development in the context of water theory, port planning and its items, on shore marine terminal facilities, dredging and reclamation and guidelines for ports developments. All major aspects of the design and maintenance of port facilities, including port planning, design loads for today's larger vessel size, seismic design guidelines, and breakwater design

Course Topics

- Wave theory, Wave diffraction inside Ports
- Port Planning; definition and strategic planning
- Items of port planning; breakwaters, navigation channel, port entrance, turning basin, Dock structures (Quays, Jetties and Dolphins), berths and on-shore facilities.
- On shore marine terminals facilities
- Guidelines for ports developments
- Ports mitigation measures and monitoring plans
- Breakwaters; definition and types (vertical, rubble mound, composite breakwater, reef breakwater, detached breakwater and floating breakwater).
- Breakwater failures types.
- Breakwater design methods.
- Dock structures (Quays, Jetties and Dolphins)
- Design of gravity quay wall.
- Design of sheet pile wall.
- Fender systems; wood fenders, rubber fenders and foam filled fenders
- Dredging and reclamation; definition and Equipments.
- Case study

References

- *Agerschou, H., Dand, I & Ernst, T., 2004. Planning and design of ports and marine terminals, Thomas Telford, ISBN: 0727732242, pp. 384.*
- *Dean, Robert G., & Dalrymple Robert A.; "Coastal Processes with Engineering Applications" ;Cambridge University Press; UK; 2002.*
- *Gaythwaite, John W.; "Design of Marine Facilities for the Berthing, Mooring, and Repair of Vessels"; ASCE Press; Virginia; USA; 2nd edition; 2004*

- *Gerwick, Ben C. Jr.; "Construction of Marine and Offshore Structures"; CRC Publisher Press; New York; USA; 2nd edition; 2002*
- *Goda, Y., 2000. Random Seas and Design of Maritime Structures, University of Tokyo Press, Tokyo*
- *Gregory P. Tsinker, 2004. Port Engineering: Planning, Construction, Maintenance, and Security, ISBN: 978-0-471-41274-8, 896 pages*
- *Reeve, D.E., Chadwick, A.J. & Fleming, C.A., 2004. Coastal Engineering: Processes, Theory and Design Practice, SPON Press.*
- *Sorensen, R. M., 1997. Basic Coastal Engineering, Chapman & Hall.*
- *Coastal Engineering, http://www.journals.elsevier.com/coastal-engineering/*

Course Code : CB 761-I

Course Title : Interaction of Coastal Structures and Shorelines

Credit Hours : 3

Course Description

Introducing the coastal zones, the dynamics of geophysical fluids, coastal evolution, evolution of coastal zone management practices, practice of the integrated coastal zone management and applying the ICZM in Egypt coastal zone.

Course Objectives

The course provides an overview for the marine environment and shoreline processes and their use and management, with special emphasis on the integrated management of ports and coastal zones and their mutual interaction.

Course Topics

- An introduction to coastal zones.
- Dynamics of Geophysical Fluids.
- Littoral Processes and Coastal Evolution.
- General Planning and Management.
- Evolution of Coastal Zone Management practices.
- General overview of ICZM.
- Integrated Management of Coastal Zones and Port Areas.
- Approach of ICZM; integration and arrangements.
- Practice of ICZM; stages, initiation, planning, implementation, monitoring and evaluation.
- Methods, tools and techniques of ICZM.
- Case study: Applying ICZM in Egypt coastal zone.

References

- *Brampton A., "Coastal Defense – ICE design and practice guide", Thomas-Telford; London; 2002.*
- *Cicin-Sain, B. & Knecht, R., "Integrated Coastal and Ocean Management Concepts and Practices" Publisher: Island Press, pp 543, 1998.*
- *Kamphuis, J.W.; "Introduction to Coastal Engineering and Management", World Scientific; New Jersey; USA; 2006.*
- *Kay, R. & Alder, J., "Coastal Planning and Management" Publisher: Taylor & Francis Ltd, Edition 2, 2005.*
- *Roisin, Benoit C. & Beckers, Jean-M., "Introduction to Geophysical Fluid Dynamics: Physical and Numerical Aspects " Publisher: Elsevier Science Technology, Edition 2, pp 875, 2011.*
- *Coastal Engineering, http://www.journals.elsevier.com/coastal-engineering/*

Faculty Members

(in alphabetical order)

- **AHMED AWAD**
  Ph.D. (2006) Nottingham University, UK
  Construction Management

- **AHMED RAGHEB**
  Ph.D. (1994) Rensselaer Polytechnic Institute, USA
  Geotechnical Engineering

- **AKRAM SOLIMAN**
  Ph.D. (2003) Nottingham University, UK
  Coastal Engineering and Hydraulics

- **ALY I. ELDARWISH,** Head of Department
  Ph.D. (1994) Michigan State University, USA
  Construction Materials and Reinforced Concrete Structures

- **EHAB EL-KASSAS**
  Ph.D. (2001) Dundee University, UK.
  Structural Engineering

- **HESHAM BASSIONI**
  Ph.D. (2004) Loughborough University, UK
  Construction Management

- **KARIM M. HELMY**
  Ph.D. (2007) University of Manitoba, Canada
  Structural Engineering

- **KHALED SHAWKI**
  Ph.D. (2002) Alexandria University, Egypt
  Construction Engineering

- **MOHAMED FODA**
  Ph.D. (1988) McGill University, Canada
  Transportation and Highway Engineering

- **MOHAMED IHAB EL-MASRY**
  Ph.D. (2004) University of Southern California, USA
  Structural Engineering

- **MOHAMED RASLAN**
  Ph.D. (1987) Southampton University, UK
  Structural Engineering and Metallic Structures

- **MORSY Alaa**
  Ph.D. (2009) Alexandria University, Egypt
  Structural Engineering

- **NABIL EL-ASHKAR**
  Ph.D. (2002) Georgia Institute of Technology, USA
  Construction Materials

- **NABIL ISMAIL**
  Ph.D. (1981) University of California, Berkeley, USA
  Coastal Engineering and Water Resources

- **TAREK M. ABDEL-AZIZ**
  Ph.D. (2007) Alexandria University, Egypt
  Geotechnical Engineering

- **USAMA ELSHAMY**
  Ph.D. (2005) Rensselaer Polytechnic Institute, USA
  Geotechnical Engineering.

- **WAEL KAMEL**
  Ph.D. (1994) University of Paul Sabatier, France
  Environmental Engineering

General Rule for Graduation

For Graduation [M.Sc. in Construction & Building Engineering]

A student should complete (with satisfactory grades) a total of 8 courses (24 Credit Hours) and a thesis (12 Credit Hours) with a total of (36 Credit Hours).

A student can take into account a maximum of 7 courses (21 Credit Hours) from the same special division for the completion of the requirements of his graduation.

For Graduation [M.Sc. in Construction & Building Engineering (special division)]

A student should complete at least 5 courses (15 Credit Hours) at the special division and a thesis (12 Credit Hours) at the same special division.

Note:

- Each student must have a supervisor by the end of the first term.
- An advising committee, assigned by the department council, will be acting as the academic advisor for the student until he chooses a supervisor.
- The student after consulting with his supervisor chooses the courses.