1. Course number and title
   ORE 661- Coastal and Harbor Engineering

2. Credits and contact hours
   3 credits, two 1.25-hour sessions per week

3. Instructor
   Kwok Fai Cheung

4. Textbooks
   Textbooks: None
   Reference books:
   a. Coastal Engineering Manual – Part II, US Army Corps of Engineers, 2006 (PDF version on http://chl.erdc.usace.army.mil).
   b. NAVFAC DM 26.1, 26.2, and 26.3
   c. *Handbook of Coastal and Ocean Engineering*, Vol. I, II, and III, Edited by John Herbich, Gulf Publishing Company, 1990.
   d. *Port Engineering*, Vol. I and II, Edited by Per Bruun, Gulf Publishing Company, 1990.
   e. Design of Marine Facilities for the Berthing, Mooring, and Repair of Vessels, J.W. Gaythwaite, ASCE Press, 2004.

5. Specific course information
   a. Course context: Planning and design of seawalls, groins, jetties, breakwaters, and layout of ports. Design requirements for harbor entrances and channels. Littoral drift and sedimentation problems. Navigation and mooring requirements. Pre. 607 or consent.
   b. Prerequisites by Topics:
      i. Applied mechanics
      ii. Engineering economics
      iii. Fluid mechanics
      iv. Hydraulics
      v. Probability and Statistics
      vi. Soil Mechanics
      vii. Wave mechanics
   c. Designation: ORE required course

6. Specific goals for the course
   a. Learning Outcomes:
      The course familiarizes students with the planning, design, and maintenance of coastal and harbor structures. Specific learning outcomes include:
      i. Ability to identify, formulate, and solve coastal and harbor engineering problems
      ii. Ability to provide optimal designs of coastal structures and harbor facilities
      iii. Appreciation of professional and non-technical issues
   a. Student Outcomes: (1) Fundamentals. (2) Core program. (3) Option area. (4) Problem formulation. (5) Multi-fact design. (6) Communication. (9) Research and experimentation. (10) Constant learning.

7. Brief list of topics to be covered
   a. Planning and Design. Problem definition, site characterization and data, alternative evaluation.

b. Breakwaters. Rubble mound structures (conventional and berm design), caissons, scour protection, and geotechnical consideration.
c. Revetments and Seawalls. Rubble mound structures, caissons, lateral earth pressure, seismic consideration.
d. Harbor. Navigational requirements, channels and turning basins, sedimentation and maintenance dredging.
e. Engineering practice issues. Design process, economics, construction, and risk.