SEMESTER III: STREAM 2 – PORT, HARBOUR AND COASTAL STRUCTURES

OE5560: DREDGING AND RECLAMATION

Course content:

Introduction to Dredging and dredging equipment; Need for reclamation; Introduction to Engineering aspects of Dredging and Reclamation. Marine investigations for Dredging and Reclamation – Standards, Requirements and Methods: Hydrographic survey; Geophysical – sidescan, sub-bottom, seabed refraction investigations; Geotechnical investigations; Sea bed and water sample analysis. Use of Marine investigations in Capital and Maintenance Dredging, and reclamation. Characterization of Soils and Rocks; PIANC guidelines (Report No. WG 144) and other international practices; Interpretation of marine investigation data in the context of characterization of soils for dredging. Methods of estimation of Dredging Production; Estimation cutter power. Dredging equipment selection; cutting tools and power estimation; pumps and capacity; dredging tolerances and dredging methods in river, open sea and inland water bodies; dredging near existing structures; Dredge spoil disposal; spoil dumping ground selection; methods of transportation of dredged spoil. Reclamation schemes; Burrow pit materials from land; dyke formation and peripheral shore protection; near shore and island reclamation; use of dredged materials for reclamation; direct dumping methods; rainbow discharge; pumping via pipelines; booster stations; layered soil dumping; suitability of materials for reclamation; Methods of ground improvement in reclamation; vibro-compaction etc. Estimation of cost; rate analysis for dredging; Cost standards (CIRIA C684); Dredging management to protect the environment; risks and cost escalation in dredging; siltation issues; dispersion of silt; silt curtains and containment booms.

Text Books:

1. **Vlasblom, WJ.** 2007. Dredging equipment and technology, University lecture notes, Delft University of Technology, Delft, The Netherlands.
2. **Sape A Miedema.** 2019. The Delft Sand, Clay and Rock, Cutting Model, TU Delft Open, ISBN: 978-946-3661-324
3. **Bray, N and COHEN, M (Ed.).** 2010. Dredging for development, Sixth Ed., Int. Association of Dredging Companies, The Netherlands and Int. Association of Ports and Harbors, Japan, ISBN: 978-9-07525-416-7
4. **Bray, RN., Bates, AD and Land, JM.** 1996. Dredging: A Handbook for Engineers, Butterworth Heinemann, London, UK, ISBN: 978-0-34054-524-9
5. **Vallam Sundar and Sannasiraj, SA.** 2019. Coastal Engineering: Theory and Practice, Adv series on Coastal engineering, Vol. 47, World Scientific, Singapore, ISBN: 978-981-3275-90-4

Reference Books:

1. **IADC.** 2018. Dredging for sustainable infrastructure, Int. Association of Dredging companies, The Netherlands.
2. **Offshore Shipping Online,** 2009. Dredgers of the world, 7th Ed., Offshore Energy Newsletter, The Netherlands.
3. **Bray, RN.** 2009. A guide to cost standards of dredging equipment C684, Construction Industry Research and Information Association (CIRIA), ISBN: 978-0-86017-684-8

Prerequisite: