# GUJARAT TECHNOLOGICAL UNIVERSITY

**CIVIL (WATER RESOURCES ENGINEERING) (33)**
**Master of Engineering**
**Subject Code: 3733304**
**Semester – III**
**Subject Name: Coastal Engineering**

**Type of course: Program Elective-V**

**Prerequisite: Coastal hydraulics and coastal structures**

**Rationale:**
Students will be able to understand various forces exerted by waves on coastal structures. They will also be able to understand elementary design of groyne, sea wall, harbor and offshore structures.

**Teaching and Examination Scheme:**

| Teaching Scheme | | | Credits | Examination Marks | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | Practical Marks | | |
| L | T | P | C | ESE (E) | PA (M) | ESE (V) | PA (I) | |
| 2 | 0 | 2 | 3 | 70 | 30 | 30 | 20 | 150 |

**Content:**

| Sr. No. | Content | Total Hrs |
|---|---|---|
| 1 | Motion parameters – wind, tide, current and data collection and analysis. | 3 |
| 2 | Formulation of wave motion problem, assumption made in two dimensional cases, small amplitude wave theory, orbital motion and pressure, wave energy, finite amplitude wave theory, Stocke's wave theory (third order), mass transport, Gerstner theory, solitary wave theory, generation of waves, wave forecasting, decay of waves. | 6 |
| 3 | Reflection of waves, clapotis or standing waves, superposition of waves, refraction, refraction diagrams, wave fronts and orthogonal methods, diffraction of waves around semi infinite break waters, detached break water of finite length, diffraction through openings. | 6 |
| 4 | Forces on vertical walls due to non breaking waves, breaking waves and broken waves base on linear theory, forces on circular cylinders. | 3 |
| 5 | Long term and short term changes of shores, factors influencing beach characteristics , beach wave interaction, beach profile modification ,littoral drift, stability of shores, shore erosion due to sea level, on shore and off shore transport, long shore transport, interaction of shore structures, shore erosion in Kerala, mud banks. | 6 |
| 6 | Coastal structures, description and effects of break waters, sea walls, groynes of various types, beach nourishment, design of sea walls, break waters, tetra pod, tri- | 2 |

| | | |
|---|---|---|
| | bar etc. | |
| 7 | Harbour types and features, ship Features related to port planning, site investigation & selection, port layout, on-shore and offshore structures, cargo handling equipments, Navigational aids, Causes and occurrences of Tsunami and storms. | 4 |

**Reference Books:**

1 Arthar, T. Ippen, Estuary and coastline hydrodynamics , McGraw Hill Book Co.(1964)
2 Alonzo Def. Quinn, Design and Construction of Ports and Marine Structures, McGraw Hill Book Company. (1972).
3 Henry F. Cornik, Dock and Harbour Engineering Vol.–I to IV, Charles Griffin & Company Ltd.London,(1988).
4 Robert, L. Weigel, Oceanographical Engineering, Prentice Hall Inc.(1964)
5 Robert M.Sorensen, Basic Coastal Engineering , Springer, (2006).
6 Ojha S. P. Docks and Harbour engineering., Fourth revised and enlarged edition
7

**Course Outcomes: At the end of the course, Student will be able to**

| Sr. No. | CO statement | Marks % weightage |
|---|---|---|
| CO-1 | Analyse wind, tide and current data. | 20 |
| CO-2 | Formulate wave motion problem. | 20 |
| CO-3 | Apply linear theory to breaking and broken waves. | 20 |
| CO-4 | Analyse stability shores. | 20 |
| CO-5 | Design sea wall. | 20 |

**Suggested Specification table with Marks (Theory): (For ME only)**

| **Distribution of Theory Marks** | | | | | |
|---|---|---|---|---|---|
| **R Level** | **U Level** | **A Level** | **N Level** | **E Level** | **C Level** |
| **10%** | **20%** | **20%** | **20%** | **15%** | **15%** |

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

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**Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.**

**List of Practical:**

The practical may include study of different coastal structures, data Collection for design and study of various literatures of practice and implementation. The students will work in group for the design work based on syllabus such as;

1. Study of parameters of coastal engineering and planning
2. Wave theory
3. Related diff-shore structures
4. Shore erosion and coastal protection
5. Coastal structures and port design parameters
6. Port-layout and planning as per ship characteristics
7. Tsunami & Storms
8. Negotiation Aids

**List of Open Source Software/learning website:**

1. http://www.nptel.iitm.ac.in/courses/