

Department: Civil & Environmental Engineering
Level and Major: Graduate - Marine & Coastal Engineering

Division: Civil engineering

Course Title: Numerical method in marine engineering

Number of Credits: 3

Prerequisite (Corequisite): Structural analysis (I), Concrete Technology **Lecturer: -**

Course Topic

- Part one: fundamentals of the theory of numerical modeling
- Necessity and applications of numerical methods and mathematical modeling
- Explain the different stages of numerical modeling (understanding the physics of the problem, the governing equation, dismantling the physical environment, dismantling the governing equations, numerical solution steps, applying initial and boundary conditions, evolution, calibration)
- Types of partial differential equations and their classification (elliptical, Parabolic, hyperbolic)
- General introduction of the numerical methods (limited difference, control volume limited volume, limited part, boundary part, specification method, spectral methods)
- Complete introduction of the limited difference method or another numerical methods of part three (which will say about its application in part two)
- Explain the accuracy, consistency, stability and convergence of numerical method part two: application of numerical modeling in sea
- Equations governing on flow and sea wave
- Numerical solution of one-dimensional flow with free surface in estuaries (permanent and non-permanent)
- Numerical solution of two-dimensional flow with free surface in shallow water (s)
- Numerical solution of wave refraction equations
- Numerical solution of wave dispersion equations
- Modeling points and estimating forces on marine structures
- Points of numerical solution of short wave phenomena (two-dimensional in upright)
- Points of numerical solution of sedimentary equation
- Points of numerical solution of phenomena diffusion transmission

Course Description:

Reading Sources:

Course Goals and objectives:

Evaluation:

Course topics:

The course aims to: