MTech Ocean Structures - Screening Test Brochure

For Admission to MTech Ocean Structures

Indian Institute of Technology Madras, Zanzibar Campus

About MTech Ocean Structures:

The Master of Technology in Ocean Structures offered at IIT Madras Zanzibar Campus will have a curriculum tailor-made to the industry needs in the Oil & Gas and Maritime sector. The program covers the basics of marine & offshore hydrodynamics, structural design for oil and gas exploration offshore platforms, ports, harbours including port structures & breakwater. The course equips students with core and elective courses to prepare them for careers in the oil & gas and maritime sectors.

Eligibility Criteria:

4-year UG degree in Civil Engineering with a minimum of 60% marks

Screening Test & Interview:

Selection will be based on marks obtained in UG (50% weightage) and screening test & interview (50% weightage).

Personal interview will be conducted for students clearing the screening test. Screening test & interview will be conducted online.

Program Streams:

Stream 1: Offshore and Ship structures

Stream 2: Port, Harbour & Coastal structures

Note: Stream selection will be based on CGPA obtained by students at the end of the first semester

Program Structure:

Semester 1	At IITM Zanzibar Campus
Semester 2	At IITM Zanzibar Campus
Semester 3	At IITM Chennai Campus
Semester 4	At IITM Zanzibar Campus

Syllabus for Screening Test:

Section 1: Engineering Mathematics

Linear Algebra: Matrix algebra; Systems of linear equations; Eigen values and Eigen vectors.

Calculus: Functions of single variable; Limit, continuity and differentiability; Mean value theorems, local maxima and minima; Taylor series; Evaluation of definite and indefinite integrals, application of definite integral to obtain area and volume; Partial derivatives; Total derivative; Gradient, Divergence and Curl, Vector identities; Directional derivatives; Line, Surface and Volume integrals.

Ordinary Differential Equation (ODE): First order (linear and non-linear) equations; higher order linear equations with constant coefficients; Euler-Cauchy equations; initial and boundary value problems.

Partial Differential Equation (PDE): Fourier series; separation of variables; solutions of one-dimensional diffusion equation; first and second order one-dimensional wave equation and two-dimensional Laplace equation.

Probability and Statistics: Poisson and Normal Distribution; Linear regression.

Numerical Methods: Error analysis; numerical differentiation; Integration by trapezoidal and Simpson's rule.

Section 2: Applied Mechanics and Structures

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Frictions and its applications; Centre of mass.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; shear force and bending moment diagrams; bending and shear stresses; torsion; Euler's theory of columns; energy methods; theories and failure, material testing methods. Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Section 3: Fluid Mechanics

Fluid properties; fluid statics, stability of floating bodies; Conservation laws: Mass, momentum and energy (Integral and differential form); Dimensional analysis and dynamic similarity; sources, sinks, doublets, line vortex and their superposition; Stoke's integral theorem. Generalised Bernoulli's equation, sources, sinks, dipole, Flow with circulation, potential flow with rotational symmetry. Viscous flow- Navier-Stokes equations, Couette flow, Plane poiseuille flow. Equation of continuity, Euler's equation, Bernoulli's equation, Viscous flow of incompressible fluids, elementary turbulent flow, boundary layer, flow through pipes, D'Alembert's paradox.

Particulars	Details
Examination Mode	Online - Computer Based Test (CBT)
Duration	3 Hours*
Type of Questions	(a) Multiple Choice Questions (MCQ) (b) Multiple Select Questions (MSQ) and/or (c) Numerical Answer Type (NAT) Questions
Questions for testing these abilities	(a) Recall (b) Comprehension (c) Application (d) Analysis & Synthesis
Number of Questions	65 Questions
Distribution of Marks	Engineering Mathematics: 20 Marks Applied Mechanics and Structures: 40 marks Fluid Mechanics: 40 Marks
Marking Scheme	Questions carry 1 mark and 2 marks
Negative Marks	No

*PwD candidates with benchmark disability are eligible for the compensatory time of 20 minutes per hour. Thus, they will get one hour extra for a three-hour examination.

For all admission queries

Email id: admissions@iitmz.ac.in

IITMZST 2024 Admission Committee

IIT Madras