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Co-ordinators : Prof. Debabrata Sen, Prof. S.C. Misra

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NPTEL : Design of Offshore Structures (Ocean Engineering)

Co-ordinators : Dr. S. Nallayarasu

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[Lecture 33 - Two Pile Group Effect For Axial Load](#)

Lecture 1 - Introduction and Terminologies

Lecture 2 - Introduction to HSE

Lecture 3 - Safety assurance and assessment

Lecture 4 - Safety assurance and assessment (Continued...)

Lecture 5 - Safety in design and operations

Lecture 6 - Organizing for safety

Lecture 7 - Hazard classification and assessment, Hazard evaluation and hazard control

Lecture 8 - HaZOP

Lecture 9 - HaZOP (Continued...)

Lecture 10 - Hazard evaluation and hazard control

Lecture 11 - Hazard Identification and Management in Oil & Gas Industry using HAZOP

Lecture 12 - FMEA

Lecture 13 - FMEA (Continued...)

Lecture 14 - Environmental Issues and Management

Lecture 15 - Impact of Oil and Gas Industry on Marine Environment

Lecture 16 - Oil Hydrocarbon in Marine Environment

Lecture 17 - Chemicals and Wastes from Offshore and Oil Industry

Lecture 18 - Dispersion Models – Atmospheric Pollution

Lecture 19 - Atmospheric Pollution (Continued...)

Lecture 20 - Hazard Assessment and Accident Scenario

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Lecture 22 - Toxic Release and Dispersion Modeling

Lecture 23 - Chemical Exposure Index (CEI)

Lecture 24 - Chemical Exposure Index (Continued.)

Lecture 25 - Quantitative Risk Assessment

Lecture 26 - Quantitative Risk Assessment (Liquid Release Models Case Study - Continued...)

Lecture 27 - Fire and Explosion Modeling

Lecture 28 - Fire and Explosion Modeling Flammability Diagrams

Lecture 29 - Explosion Modeling

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- Lecture 2 - Continuation of layout of ports
- Lecture 3 - Visakhapatnam port
- Lecture 4 - Ships and size of ships
- Lecture 5 - Port planning
- Lecture 6 - Harbour layout
- Lecture 7 - Site characteristics & navigation channel
- Lecture 8 - Bathymetric survey
- Lecture 9 - Tide, surge, tsunami and wave
- Lecture 10 - Wave rose diagram
- Lecture 11 - Breakwater
- Lecture 12 - Design of breakwater - Part-1
- Lecture 13 - Design of breakwater - Part-2
- Lecture 14 - Berm breakwater
- Lecture 15 - Dredging & methods of disposal
- Lecture 16 - Berthing structures modelling
- Lecture 17 - Berthing structures - analyses
- Lecture 18 - Loads
- Lecture 19 - Types of berthing structures
- Lecture 20 - Design of berthing, structures-1
- Lecture 21 - Design of offshore berthing, structures-1
- Lecture 22 - Estimation of mooring, berthing and seismic forces
- Lecture 23 - Estimation seismic forces
- Lecture 24 - Active and passive earth pressure and differential water pressure
- Lecture 25 - Load combinations and design
- Lecture 26 - Fenders
- Lecture 27 - Mechanical handling system
- Lecture 28 - Single buoy mooring and open sea jetty - Part 1
- Lecture 29 - Single buoy mooring and open sea jetty - Part 2
- Lecture 30 - Slipway, drydock, floating dock, shiplift
- Lecture 31 - Soil structure interaction

- Lecture 32 - Calculation of fixity depth
- Lecture 33 - Pile load test
- Lecture 34 - Ground improvement techniques
- Lecture 35 - Analysis of pile with spring support
- Lecture 36 - UPV,Half cell potential, Low high Integrity Test
- Lecture 37 - Mooring Dolphin at KPT
- Lecture 38 - Coastal structures and environmental management
- Lecture 39 - BOQ and Cost Estimate
- Lecture 40 - Proposed Mega Terminal Chennai
- Lecture 41 - Preliminary Project Report on Shipyard
- Lecture 42 - Procedures & clearances before implementation of a project
- Lecture 43 - Detailed project report
- Lecture 44 - Environmental studies of a project
- Lecture 45 - Design of pile
- Lecture 46 - Design and construction of diaphragm wall
- Lecture 47 - Empirical relationship between spt and several soil properties
- Lecture 48 - Model studies for a deep water port_case study

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Lecture 2 - Seaway Effects on Resistance

Lecture 3 - Ship Types and Powering Aspects

Lecture 4 - Frictional Resistance and Turbulence Stimulation

Lecture 5 - Wave Making Resistance

Lecture 6 - Bulbous Bow on Ship Resistance

Lecture 7 - Air and Wind Resistance Dimensional Analysis - I

Lecture 8 - Dimensional Analysis - II, Model Tests and Ship Resistance Prediction Methods - I

Lecture 9 - Model Tests and Ship Resistance Prediction Methods - II

Lecture 10 - Model Tests and Ship Resistance Prediction Methods - III

Lecture 11 - Resistance in Shallow Water

Lecture 12 - Canal Effects on Resistance Holtrap-Mennen Method for Ship Resistance Prediction

Lecture 13 - Ship Resistance Prediction Methods - I

Lecture 14 - Ship Resistance Prediction Methods - II

Lecture 15 - Resistance of Advanced Marine Vehicles - I

Lecture 16 - Resistance of Advanced Marine Vehicles - II

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- Lecture 2 - Wave deformation - II
- Lecture 3 - wave deformation (problems - I)
- Lecture 4 - wave deformation (problems - II)
- Lecture 5 - wave deformation (problems - III)
- Lecture 6 - Sediment characteristics - I
- Lecture 7 - Sediment characteristics - II
- Lecture 8 - Radiation stresses - I
- Lecture 9 - Radiation stresses - II
- Lecture 10 - Longshore sediment transport - I
- Lecture 11 - Longshore sediment transport - II
- Lecture 12 - Longshore sediment transport (problems - I)
- Lecture 13 - Longshore sediment transport (problems - II)
- Lecture 14 - Coastal erosion protection measures - I
- Lecture 15 - Coastal erosion protection measures - II
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- Lecture 17 - Coastal erosion protection measures - IV
- Lecture 18 - Coastal erosion protection measures - V
- Lecture 19 - Coastal erosion protection measures - VI
- Lecture 20 - Coastal erosion protection measures - VII
- Lecture 21 - Coastal erosion protection measures - VIII
- Lecture 22 - Coastal erosion protection measures - IX
- Lecture 23 - Coastal erosion protection measures - X
- Lecture 24 - Cheaper CEP methods - XI
- Lecture 25 - Geosynthetics - I
- Lecture 26 - Geosynthetics - II
- Lecture 27 - Breakwaters - I
- Lecture 28 - Breakwaters - II
- Lecture 29 - Breakwaters - III
- Lecture 30 - Breakwaters - IV
- Lecture 31 - Forces on coastal structures - I

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[Lecture 34 - Physical modelling of coastal structures - I](#)

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NPTEL : Wave Hydrodynamics (Ocean Engineering)

Co-ordinators : Prof. V. Sundar

- Lecture 1 - Basic Fluid Dynamics - I
- Lecture 2 - Basic Fluid Dynamics - II
- Lecture 3 - Introduction
- Lecture 4 - Wave Motion - I
- Lecture 5 - Wave Motion - II
- Lecture 6 - Wave Motion - III
- Lecture 7 - Wave Motion Problems
- Lecture 8 - Standing Wave Theory
- Lecture 9 - Wave Deformation - I
- Lecture 10 - Wave Deformation - II
- Lecture 11 - Wave Deformation and Problems
- Lecture 12 - Random Waves
- Lecture 13 - Random Waves and Problems - I
- Lecture 14 - Random Waves and Problems - II
- Lecture 15 - Random Waves and Problems - III
- Lecture 16 - Simulation of Random Waves
- Lecture 17 - Directional waves
- Lecture 18 - Wave Loads on Structures - I
- Lecture 19 - Wave Loads on Structures - II
- Lecture 20 - Wave Loads on Structures and Problems - I
- Lecture 21 - Wave Loads on Structures and Problems - II
- Lecture 22 - Wave loads on Large Boies
- Lecture 23 - Finite Amplitude Wave Theories
- Lecture 24 - Hydrodynamic Testing Facility
- Lecture 25 - Hydrodynamic Testing Facility at IITM

- Lecture 1 - Introduction and objectives
- Lecture 2 - Fixed type offshore structures
- Lecture 3 - Compliant type offshore structures - I
- Lecture 4 - Compliant type offshore structures - II
- Lecture 5 - Drill ships and basics of drilling
- Lecture 6 - Subsea production systems
- Lecture 7 - Environmental loads - I
- Lecture 8 - Environmental loads - II
- Lecture 9 - Types of coastal structures - I
- Lecture 10 - Types of coastal structures - II
- Lecture 11 - Summary of coastal structures
- Lecture 12 - Tutorials on Module - I
- Lecture 13 - Outline of planning of ocean structures
- Lecture 14 - Introduction to design
- Lecture 15 - Construction techniques
- Lecture 16 - Dredging - I
- Lecture 17 - Dredging - II
- Lecture 18 - Uncertainties in analysis and design
- Lecture 19 - Design adequacy - Example I
- Lecture 20 - Design adequacy - Example II
- Lecture 21 - Dredging equipments' specifications
- Lecture 22 - Ocean Pollution
- Lecture 23 - Foundation and sea bed anchors
- Lecture 24 - Introduction to materials - I
- Lecture 25 - Introduction to materials - II
- Lecture 26 - Concrete in marine environment
- Lecture 27 - Concrete: problems and solutions
- Lecture 28 - Repair materials for marine structures
- Lecture 29 - Corrosion in concrete - I
- Lecture 30 - Corrosion in concrete - II
- Lecture 31 - Material sin repair and rehabilitation

[Lecture 32 - Materials for special repair](#)

[Lecture 33 - New materials for coastal embankments - I](#)

[Lecture 34 - New materials for coastal embankments - II](#)

[Lecture 35 - Non-destructive testing](#)

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- Lecture 1 - Introduction to different types of ocean structures - I
- Lecture 2 - Introduction to different types of ocean structures - II
- Lecture 3 - Introduction to different types of ocean structures - III
- Lecture 4 - Types of Compliant towers
- Lecture 5 - New Generation offshore and Coastal structures
- Lecture 6 - Environmental forces
- Lecture 7 - Wave forces, Current
- Lecture 8 - Introduction to Structural dynamics
- Lecture 9 - Characteristics of single degree - of - freedom model
- Lecture 10 - Methods of writing equation of motion
- Lecture 11 - Free and forced vibration of single degree - of - freedom systems
- Lecture 12 - Undamped and damped systems - I
- Lecture 13 - Undamped and damped systems - II
- Lecture 14 - Undamped and damped systems - III
- Lecture 15 - Comparison of methods
- Lecture 16 - Examples
- Lecture 17 - Numerical problems in single degree - of - freedom systems
- Lecture 18 - Two degrees - of - freedom systems
- Lecture 19 - Eigenvalues and Eigenvectors
- Lecture 20 - Orthogonality of modes
- Lecture 21 - Study of Multi degrees - of - freedom systems
- Lecture 22 - Equations of motion
- Lecture 23 - Natural frequencies and mode shapes
- Lecture 24 - Stodla, Rayleigh - Ritz and influence coefficient methods, Dunkerley
- Lecture 25 - Continuous system
- Lecture 26 - Structural action of offshore structures
- Lecture 27 - Fluid - Structure interaction - I
- Lecture 28 - Fluid - Structure interaction - II Dynamic analysis of offshore jacket platforms
- Lecture 29 - Steps of analysis using software
- Lecture 30 - Steps of analysis using software (Continued...)
- Lecture 31 - Dynamic analysis of articulated towers

Lecture 32 - Iterative frequency domain - I

Lecture 33 - Iterative frequency domain - II

Lecture 34 - Multi - legged articulated towers

Lecture 35 - Response control of multi-legged articulated towers using tuned mass dampers Experimental and analytical studies on MLAT

Lecture 36 - Development of Tension Leg Platforms and geometric optimization

Lecture 37 - Dynamic analyses of TLPs

Lecture 38 - Development of Mass, stiffness and damping matrices of TLP from first principles

Lecture 39 - Estimate of classical damping

Lecture 40 - TLPs under seismic excitation

Lecture 41 - Direct Integration method

Lecture 42 - Development of new generation offshore structures

Lecture 43 - Introduction to stochastic dynamics of ocean structures

Lecture 44 - Response spectrum

Lecture 45 - Narrow band process

Lecture 46 - Return period, Fatigue prediction

Lecture 47 - Modal response method, Modal mass contribution

Lecture 48 - Missing mass correction, Example problems

Lecture 49 - Duhamel's integral

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Lecture 2 - Fixed type structures

Lecture 3 - Compliant type structures

Lecture 4 - New generation marine structures

Lecture 5 - Environmental loads - I

Lecture 6 - Environmental loads - II

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Lecture 9 - Other loads - I

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Lecture 11 - Ultimate load design principles - I

Lecture 12 - Ultimate Limit State - I

Lecture 13 - Ultimate Limit State - II

Lecture 14 - Ultimate Limit State - III

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Lecture 16 - Plastic design - I

Lecture 17 - Plastic design - II

Lecture 18 - Plastic design - III

Lecture 19 - Plastic design - IV - Example problems - I

Lecture 20 - Plastic analysis - Example problems - II

Lecture 21 - Plastic analysis - Example problems - III

Lecture 22 - Theories of failure - I

Lecture 23 - Theories of failure - II

Lecture 24 - Theories of failure - III

Lecture 25 - Theories of failure - IV

Lecture 26 - Shear centre - I

Lecture 27 - Shear centre - II - Examples

Lecture 28 - Plastic capacity of sections under combined loads - I

Lecture 29 - Plastic capacity of sections under combined loads - II

Lecture 30 - Impact analysis- fundamentals - I

Lecture 31 - Impact analysis- fundamentals - II

- Lecture 32 - Ultimate capacity of tubular joints
- Lecture 33 - Fluid structure interaction - I
- Lecture 34 - Fluid structure interaction - II
- Lecture 35 - Fluid induced vibration - I
- Lecture 36 - Fluid induced vibration - II
- Lecture 37 - Flow through perforated members - I
- Lecture 38 - Flow through perforated members - numerical studies - II
- Lecture 39 - Flow through perforated members - III - Analytical studies
- Lecture 40 - Introduction to Reliability - I
- Lecture 41 - Introduction to Reliability - II
- Lecture 42 - Introduction to Reliability - III
- Lecture 43 - Reliability framework in Marine structures
- Lecture 44 - Ultimate Limit state and Reliability approach - I
- Lecture 45 - Ultimate limit state and Reliability approach - II
- Lecture 46 - Levels of Reliability
- Lecture 47 - FOSM and AFOSM methods of Reliability
- Lecture 48 - Fracture and Fatigue
- Lecture 49 - Fatigue failure
- Lecture 50 - Fatigue loading and fatigue analysis
- Lecture 51 - Deterministic fatigue analysis
- Lecture 52 - Spectral fatigue analysis
- Lecture 53 - Stress concentration and fatigue analysis

- Lecture 1 - Introduction to Offshore structures
- Lecture 2 - Introduction to Offshore structures (Continued...)
- Lecture 3 - Environmental Loads
- Lecture 4 - Structural action of Ocean structures
- Lecture 5 - Single Degree of Freedom
- Lecture 6 - Equations of Motion
- Lecture 7 - Free Vibration of SDOF systems
- Lecture 8 - Damped and Undamped Forced Vibration
- Lecture 9 - Damped Forced Vibration
- Lecture 10 - Response building
- Lecture 11 - Numerical Example (SDOF)
- Lecture 12 - Numerical Example II
- Lecture 13 - Numerical Example
- Lecture 14 - Numerical Example - MDOF
- Lecture 15 - Numerical Example - Eigen value problems
- Lecture 16 - Orthogonality of modes - MDOF system models
- Lecture 17 - Numerical Methods for MDOF systems
- Lecture 18 - Influence Coefficient Method - MDOF
- Lecture 19 - STODLA Method - MDOF
- Lecture 20 - Stodla Method - Examples
- Lecture 21 - Rayleighs Method
- Lecture 22 - Modal Response Analysis for MDOF
- Lecture 23 - Rayleigh Damping
- Lecture 24 - Caughey Damping
- Lecture 25 - Damping Matrix by Super Positioning Method
- Lecture 26 - Duhamels Integral
- Lecture 27 - Modal superposition and truncation
- Lecture 28 - Modal participation and missing mass corrections
- Lecture 29 - Fluid Structure Interaction
- Lecture 30 - Fluid Structure Interaction - II
- Lecture 31 - Retrofitting and Rehabilitation - Application through Dynamics

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[Lecture 35 - Response Control of Compliant Structures \(MLAT\)](#)

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[Lecture 39 - Fluid Structure Interaction.](#)

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Lecture 2 - Uncertainties

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Lecture 23 - System Reliability - I

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Lecture 29 - Application Problem - I (Continued...)

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- Lecture 32 - Application Problem II (Continued...)
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- Lecture 35 - Codes on structural reliability
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- Lecture 37 - Mechanical models in Reliability analysis
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- Lecture 39 - Stochastic Process - I
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- Lecture 41 - Fatigue Reliability
- Lecture 42 - Design SN curve
- Lecture 43 - Simplified Fatigue Assessment
- Lecture 44 - Short term fatigue damage
- Lecture 45 - Behaviour of tubular joints
- Lecture 46 - Tubular Joints - Experimental studies on T-Joints
- Lecture 47 - Risk Assessment
- Lecture 48 - Logical Risk analysis
- Lecture 49 - Risk analysis of Mechanical Systems
- Lecture 50 - FMEA II
- Lecture 51 - Design FMEA for Offshore Triceratops
- Lecture 52 - Fault Tree Analysis
- Lecture 53 - Event Tree Analysis
- Lecture 54 - Consequence Analysis
- Lecture 55 - Risk Acceptability
- Lecture 56 - Risk and Hazard assessment
- Lecture 57 - Risk Picture
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Lecture 7 - Pollution Modeling - II

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- [Lecture 34 - Dose Response Assessment](#)
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- [Lecture 47 - Hazard Identification Practices](#)
- [Lecture 48 - Risk in Marine Systems - I](#)
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- [Lecture 50 - Safety measures in design and operation](#)
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