

# Advanced Marine Structures - Video course

## COURSE OUTLINE

The course will give a brief overview of Ultimate load design principles and plastic capacity of sections. Capacity estimate of tubular joints under axial, flexural and torsional buckling will be discussed. Fundamentals of impact analysis and its application to collision problems on marine structures will be also highlighted. A brief section on fluid-structure interaction highlighting flow induced vibration will be presented. Introductory topics on reliability of marine structures including FOSM and AFSOM methods will be also discussed. Concepts of fatigue analysis and design of marine structures will be presented. The focus is on detailed explanation of topics through numerical examples.

## COURSE CONTENTS

### Module 1

Ultimate load design: Principles and factors affecting the strength. Fundamentals of plastic analysis of sections- estimate of plastic capacity of beams and frames- application to marine structures. Theories of failure- Capacity estimate of tubular joints under axial, flexural and torsional buckling-design examples. Fundamentals of impact analysis

### Module 2

Fluid-structure interaction- elements of flow-induced vibration- Flow through perforated members

### Module 3

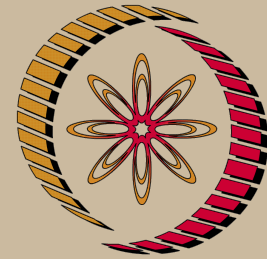
Introduction to reliability of marine structures- Reliability concepts and methods- FOSM and AFSOM methods

### Module 4

Fatigue and fracture- fatigue failure- cumulative fatigue damage models- fatigue analysis and design of marine structures-spectral fatigue damage

## COURSE DETAIL

Module No.	Topics	No. of lectures
1	<ul style="list-style-type: none"> <li>• Introduction and scope</li> <li>• Fixed type structures</li> <li>• Compliant type structures</li> </ul>	



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## Ocean Engineering

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	<ul style="list-style-type: none"> <li>• New generation marine structures</li> <li>• Environmental loads</li> <li>• Ultimate load design principles</li> <li>• Ultimate limit state</li> <li>• Partial safety factor</li> <li>• Plastic design</li> <li>• Plastic analysis- example problems</li> <li>• Theories of failure</li> <li>• Shear centre</li> <li>• Plastic capacity of sections under combined loads</li> <li>• Impact analysis</li> <li>• Ultimate capacity of tubular joints</li> </ul>	32 lectures
2	<ul style="list-style-type: none"> <li>• Fluid-structure interaction</li> <li>• Flow through perforated members</li> <li>• flow-induced vibration</li> </ul>	7 lectures
3	<ul style="list-style-type: none"> <li>• Introduction to Reliability of marine structures</li> <li>• Reliability framework in marine structures</li> <li>• Ultimate limit state and reliability approach</li> <li>• Levels of reliability</li> <li>• Methods of reliability estimates and limitations</li> <li>• FOSM and AFSOM methods of reliability</li> </ul>	8 lectures
4	<ul style="list-style-type: none"> <li>• Fatigue and fracture</li> <li>• fatigue failure</li> <li>• Fatigue loading and fatigue damage assessment</li> <li>• Stress concentration and fatigue analysis</li> </ul>	6 lectures
<b>TOTAL</b>		<b>53 lectures</b>

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