

Ocean Structures and Materials - Video course

COURSE OUTLINE

The course will give an overview of different types of ocean structures that are deployed in sea for exploiting oil, gas and minerals. It will provide a detailed understanding of various types of structural systems/forms that are constructed at different water depths for oil and gas exploration, coastal protection etc. Brief overview of various environmental loads acting on these structures will be discussed along with the structural action to counteract the encountered loads. The course will cover different types of materials that are used in the construction of ocean structures in marine environment along with their construction methodologies in brief. Guidelines associated with selection of materials for marine environment, problems associated with the material behavior in marine environment and various protection methods will also be highlighted. The course also shall introduce inspection and testing methods of ocean structures, repair and rehabilitation processes. The course is supported by lot of tutorials and FAQs to make the reader to understand the described concepts.

COURSE CONTENT

Introduction to different types of ocean structures- near shore structures, different structural systems of ocean structures namely: fixed, floating, compliant type, semi-submersibles etc. Types of environmental loads- structural action of ocean structures- planning guidelines and design principles- regulations and codes of practice- foundation of ocean structures- sea bed anchors- dredging methods and equipments. Different materials for marine applications: metals, concrete and other materials for marine environment- their characteristics, properties and selection guidelines. Problems associated with deterioration of materials in marine environment, their remedies and protection methods. Codes of practice. Inspection and testing of marine structures- methods and equipments- non-destructive techniques. Repair and rehabilitation of marine structures. structural health monitoring of marine structures.

COURSE DETAIL

Module No.	Topics	No. of lectures
1	<ol style="list-style-type: none"> 1. Different types of ocean structures 2. Various structural systems deployed for shallow, medium, deep and ultra-deep waters 3. Various environmental loads acting on offshore structures 4. Structural action exercised by offshore structures 5. Different types of coastal structures 	12
2	<ol style="list-style-type: none"> 1. Brief outline of planning of ocean structures 2. Brief introduction to design of ocean structures 3. Towing, launching and installation of offshore structures and pipe lines 4. Regulations and codes of practice 5. Foundation systems for ocean structures 6. Sea bed anchors 7. Dredging methods and equipments 	9
3	<ol style="list-style-type: none"> 1. Materials for marine applications 	



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Ocean Engineering

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	2. Different types of materials and their applications in marine environment 3. Properties and selection of materials for marine environment 4. Corrosion and corrosion protection methods 5. Introduction to composites for marine environment 6. Codes of practice for materials in marine environment	15
4	1. Inspection and testing of ocean structures 2. Introduction to Non-destructive testing 3. Repair and rehabilitation of marine structures 4. Planning guidelines for maintenance of ocean structures 5. Structural health monitoring of ocean structures	4
	Total	40 lectures

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a) Books and Executive reports

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b) Research papers

1. Ahsan Kareem. 1985. Wind induced response analysis of Tension Leg Platforms. J. of Structural Eng. 111(1): 37-55.
2. Anagnostopoulos, S.A. 1982. Dynamic Response of Offshore Structures to Extreme Waves including Fluid - Structure Interaction. Engr. Structures, 4: 179-185.
3. Anil K. Chopra. 2003. Dynamics of structures: Theory and applications to earthquake Engineering: Pearson Education, Singapore
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5. Bea, R.G. Xu, T., Stear, J. and Ramas, R. 1999. Wave Forces on Decks of Offshore Platforms. J. Waterway, Port, Coastal and Ocean Engineering, 125(3):136-144.
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