



2 What is Offshore Engineering?


MSc Offshore Engineering Involves:

Man-made structures or systems.

On, in or under the sea.

For the purpose of:

- Winning a natural resource
- Supporting a public facility.



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A slide with a white background and a blue sidebar on the left. It contains text defining MSc Offshore Engineering and lists its purposes. The TU Delft logo is in the bottom right corner.

3 What is Offshore Engineering?

MSc Offshore Engineering

Two main topics:

- Offshore Engineering
 - Bottom Founded Structures
 - Floating Structures
- Dredging Engineering



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A slide with a white background and a blue sidebar on the left. It lists the two main topics of MSc Offshore Engineering. The TU Delft logo is in the bottom right corner.

4 What is Offshore Engineering?

Bottom Founded Structures

- Steel Jackets and Towers
- Concrete Gravity Based Structures
- Jack-ups

- Design
- Fabrication
- Installation
- Decommissioning


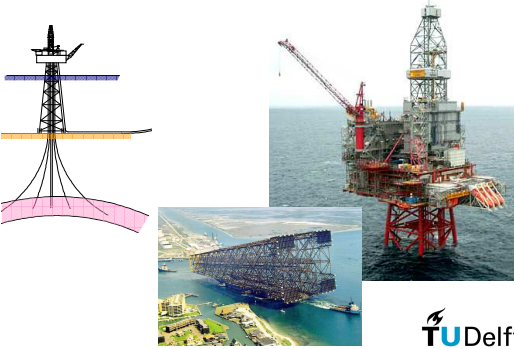


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A slide with a white background and a blue sidebar on the left. It lists types of bottom founded structures and the stages of their lifecycle. The TU Delft logo is in the bottom right corner.

5 What is Offshore Engineering?

Steel Jackets and Towers


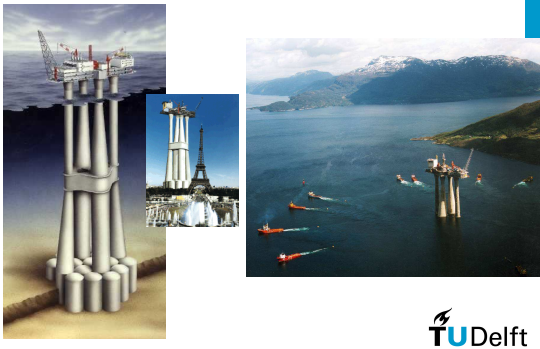


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A slide with a white background and a blue sidebar on the left. It features three images: a schematic of a steel jacket, a photograph of an offshore platform under construction, and a photograph of a steel jacket being transported in a drydock. The TU Delft logo is in the bottom right corner.

6 What is Offshore Engineering?

Concrete Gravity Based Structures





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A slide with a white background and a blue sidebar on the left. It features three images: a 3D model of a concrete gravity based structure, a photograph of a similar structure, and a photograph of an offshore platform in a fjord. The TU Delft logo is in the bottom right corner.

7 What is Offshore Engineering?

Jack-ups


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8 What is Offshore Engineering?

Floating Structures

- Semi Submersibles
- FPSO
- TLP
- Spar

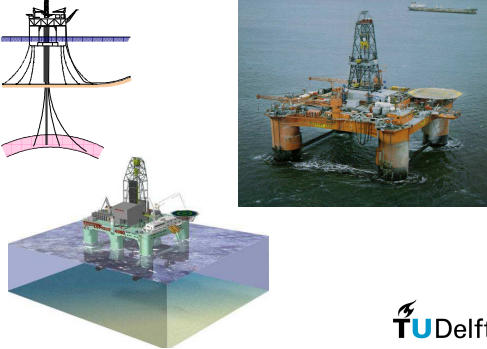

- Design
- Mooring
- Dynamic Positioning



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9 What is Offshore Engineering?

Semi Submersibles

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10 What is Offshore Engineering?

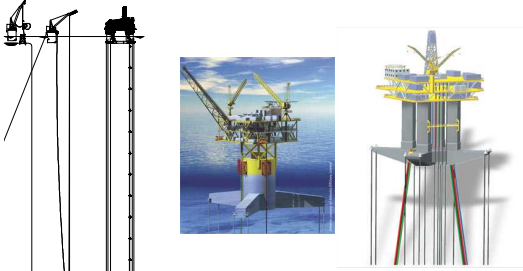

Floating Production Storage & Offloading (FPSO)




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11 What is Offshore Engineering?

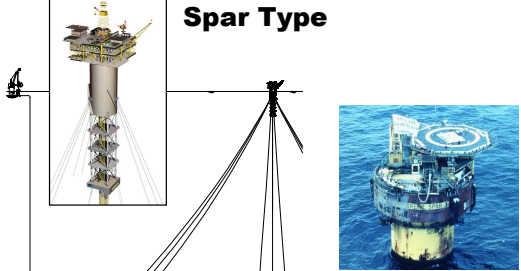

Tension Leg Platform (TLP)

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12 What is Offshore Engineering?

Spar Type

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13 What is Offshore Engineering?

Dredging Engineering

- Design of Dredging Equipment
- Optimization of Dredging Equipment
- Dredging Processes
 - Excavation
 - Transportation
 - Sedimentation





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14

Dredging Physics

- High Solids Concentration
 - 30 – 40 % by volume
- Large flow velocities
 - Erosion of sand with 40 m/s Flow velocity
- Large deformation velocities of soil leading to pore water cavitation
- Influence of water depth

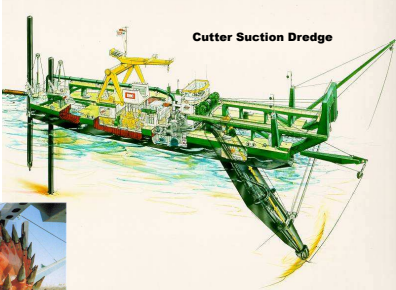



Size matters..

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15

Cutter Suction Dredge


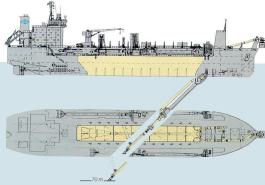




Cutter head

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16

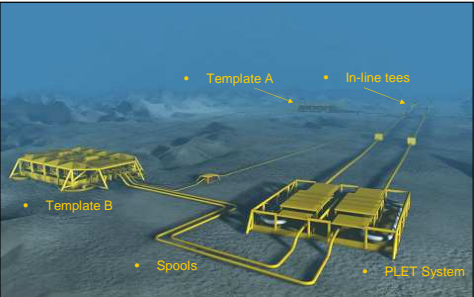
Trailing Suction Hopper Dredge

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17 What is Offshore Engineering?

Subsea Development



• Template A

• In-line tees

• Template B


• Spools

• PLET System

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18 What is Offshore Engineering?


Pipelines



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19 What is Offshore Engineering?

Fall-Pipe Vessel



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20 What is Offshore Engineering?

Offshore Wind Farms



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21 The OE MSc Curriculum

The Offshore Master Curriculum

For TU Delft BSc graduates from:

- Civil Engineering
- Mechanical Engineering
- Naval Architecture
- Other qualifying faculties,

and

- Bachelor students from other Universities
- Bachelor students from HBO / HTS

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22 The OE MSc Curriculum

Offshore Engineering Accents

- Fixed Structures
- Floating Structures
- Dredging

- Subsea Engineering
- Offshore Wind Energy

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23 The OE MSc Curriculum

Offshore Engineering Backbone


- Knowledge of the Environment:
 - Sea
 - Soil
- Interaction with the Environment
 - Excavation and transportation of solids
 - Wave induced loads
- Dynamics
- Design

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24 The OE MSc Curriculum

Survey Project

- Oil field development project in first MSc year



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25 The OE MSc Curriculum

Industrial Practice



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26 The OE MSc Curriculum

Master Thesis

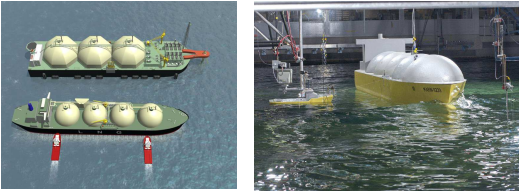
- 6 – 9 months research
- Usually in-house at a company
- Good working conditions
- Real problems
- Excellent Supervision

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27 The OE MSc Curriculum

Tugs in waves

P.W.S. Dierx



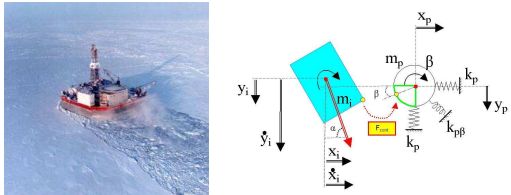
- Performed at Marin

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28 The OE MSc Curriculum

Arctic impact on offshore structures - iceberg limits

P.C.G. Bloemen




- Performed at Shell E&P

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29

Analysis of the discharge processes in a hopper

E. G. Dijkgraaf



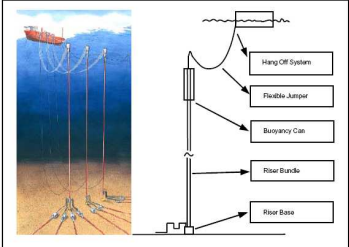
- Performed at Van Oord

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Deep water riser concepts offshore Angola

S. van der Putten



- Performed at Heerema Marine Contractors

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Research Activities



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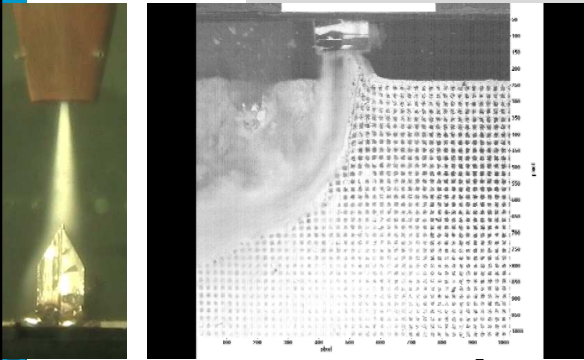
32

Ampelmann



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33



Water jet cutting of clay

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34 The OE MSc Curriculum

Offshore Engineering Summary:

- Program cutting across faculty boundaries.
- Selective group of participants.
- International orientation.
- Noteworthy industrial involvement and support.
- Not easiest route to a TU MSc diploma.

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35 The OE MSc Curriculum

Why attend the Offshore Engineering Curriculum?

- The most challenging field
 - constructing in the roughest environment
- The most pioneering Master Curriculum
 - Deep water > 2 km
 - Arctic
 - Renewable Energy
 - Challenging physics

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Offshore Engineering

Taking you beyond the horizon!

37

Master Curriculum

First MSc Year - Basic Core Curriculum plus Electives **Second MSc Year - Electives and Thesis**

Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
CE 6001 Survey of Offshore Technology (Credits: 2, 2, 2, 2)	CE 6002 Survey of Offshore Technology (Credits: 2, 2, 2, 2)	CE 6003 Survey of Offshore Technology (Credits: 2, 2, 2, 2)	CE 6004 Survey of Offshore Technology (Credits: 2, 2, 2, 2)	CE 6005 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6006 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6007 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6008 Offshore Mooring (Credits: 1, 1, 1, 1)
CE 6009 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6010 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6011 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6012 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6013 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6014 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6015 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6016 Offshore Mooring (Credits: 1, 1, 1, 1)
CE 6017 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6018 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6019 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6020 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6021 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6022 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6023 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6024 Offshore Mooring (Credits: 1, 1, 1, 1)
CE 6025 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6026 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6027 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6028 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6029 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6030 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6031 Offshore Mooring (Credits: 1, 1, 1, 1)	CE 6032 Offshore Mooring (Credits: 1, 1, 1, 1)

Credits for Information: Contact your advisor or the CE 6001 study area for details.
 CE 6001 is a required course for CE 6002, CE 6003, CE 6004, CE 6005, CE 6006, CE 6007, CE 6008, CE 6009, CE 6010, CE 6011, CE 6012, CE 6013, CE 6014, CE 6015, CE 6016, CE 6017, CE 6018, CE 6019, CE 6020, CE 6021, CE 6022, CE 6023, CE 6024, CE 6025, CE 6026, CE 6027, CE 6028, CE 6029, CE 6030, CE 6031, CE 6032.

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- 38
- ## Core Curriculum
- Survey of Offshore Engineering Lectures
 - Survey of Offshore Engineering Project
 - Introduction to Offshore Structures
 - Oceanography
 - Short Waves
 - Wind Waves
 - Offshore Hydromechanics
 - Probabilistic Design
 - Soil Mechanics
 - Thesis
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- 39
- ## Bottom Founded Structures
- Bottom Founded Structures
 - Structural Dynamics
 - Finite Element Methods
 - Offshore Soil Mechanics
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- 40
- ## Floating Structures
- Floating Structures
 - Drive Systems Design Principles
 - Offshore Moorings
 - Dynamic Positioning
 - Structural Dynamics
 - Finite Element Methods
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- 41
- ## Dredging Engineering
- Drive Systems Design Principles
 - Dredging Pumps and Slurry Transport
 - Dredging Processes
 - Dredging Equipment Design
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- 42
- ## Subsea Engineering
- Subsea Engineering
 - Drive Systems Design Principles
 - Marine Pipelines
 - Dynamic Positioning
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Offshore Wind Energy

- Introduction to Wind Energy
- Offshore Wind Farm Design
- Support Structure Design

