

14. MO18-5301 Fluid-Structure Interaction

Module name	Fluid-Structure Interaction
Module level, if applicable	Master
Code, if applicable	MO18-5301
Subtitle, if applicable	-
Course, if applicable	Fluid-Structure Interaction
Semester	3 rd Semester
Person responsible for the module	Dr.Eng. Rudi Waluyo Prastianto, S.T., M.T.
Lecturer	Dr.Eng. Rudi Waluyo Prastianto, S.T., M.T.
Language	Indonesian
Relation to curriculum	Elective course for master degree program in Ocean Engineering
Type of teaching, contact hours	Lecture, <50 students 150 minutes x 16 weeks per semester
Workload	1. Class, $3 \times 50' = 150$ minutes per week 2. Independent Study, $3 \times 60' = 180$ minutes per week 3. Structured Activities, $3 \times 60' = 180$ minutes per week
Credit points	3 CREDITS ~ 4.8 ECTS CREDITS $\times$ 1.6 ECTS
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.
Recommended prerequisites	-

Learning outcomes and their corresponding PLOs	CLO.5. Able to explain basic concepts of risk-based design. CLO.6. Able to perform risk assessment procedures and techniques. CLO.7. Able to apply appropriate risk assessment methods to evaluate an offshore building. CLO.8. Able to simulate the risk of offshore building.	LO.8. Able to identify, formulize and solved the science and technology problems related to ocean engineering through the accurate and innovative theoretical, experimental or computational approach
Content	Risk-Based Design Lecture includes an elective course. Risk-Based Design of offshore installations has the following key issues for threatening hazards, analyzing cause and probability, analyzing unintentional scenarios, analytical calculations for escalation, escaping, evacuation and safety system rescue and emergency analysis, and risk control. This subject is indispensable because the offshore industry is a high-risk job exposed to major accidents such as fires, explosions, collisions and falling objects. The danger and its analysis are read in separate chapters. Mitigation and risk control as well, followed by an outline from alternative handling to risk modeling, in particular being addressed on structures associated with offshore structures and tankers production and storage. This course contains of following materials: ■ Definition and Understanding of Risk ■ Concept of Probability Theory and Consequences ■ Simple System Network Model ■ Complex Network System Model ■ Method of Risk Assessment Qualitative, Semi Quantitative and Quantitative ■ Case Procedures and HAZOP (Hazard and Operability) ■ Fault Tree Analysis and Procedure (FTA) ■ Procedure and Case Study of ETA (Event Tree Analysis) ■ Procedure and Case Study of Bow Tie Analysis ■ Risk Management and Assessment ■ Design-Based Design for Offshore Building in accordance with Standard and Code ■ Safety Integrity	

Study and examination requirements and forms of examination	15. In-class exercise 16. Assignment 17. Mid-term exam 18. Final exam
Media employed	Offline: LCD, whiteboard, PowerPoint presentation Online: websites (myITS Classroom), Zoom, Microsoft Teams, PowerPoint presentation.
Reading list	<u>15.</u> Vinnem, J. E. "Offshore Risk Assessment Vol 2. Principles, Modelling and Applications of QRA Studies". 2014. Springer. <u>16.</u> Pearce, R. (2011). Risk Control For Asset Managers. Northfield Information Services, INC. <u>17.</u> Rausand, M. <i>System Reliability Theory</i> , 2 nd ed, Wiley, 2005b. <u>18.</u> Stamatelatos, M. W. V. <i>Fault Tree Handbook with Aerospace Applications</i> . NASA Headquarters Office of Safety and Mission Assurance, USA, 2002. <u>19.</u> (ABS), A. B. S. (2001). <i>Principles of Risk Based Decision Making</i> . United States of America. <u>20.</u> (API), A. P. I. (1993). Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities, <i>API RP 14J</i> . Washington. <u>21.</u> (API), A. P. I. (2005). Design and Analysis of Station Keeping Systems for Floating Structures, <i>Recommended Practice 2SK Third Edition</i> . Washington, D.C: API Publishing Services. <u>22.</u> (DNV), D. N. V. (2002). <i>Marine Risk Assessment</i> (Offshore Technology Report No. 63). <u>23.</u> (DNV), D. N. V. (2003). <i>Risk Management in Marine and Subsea Operations</i> . DNV-RP-H101: Det Norske Veritas.